& the European Border and Coast Guard (EBCG)

Annexes to the Final Report

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Frontex – European Border and Coast Guard Agency
Plac Europejski 6
00-844 Warsaw, Poland

T +48 22 205 95 00
F +48 22 205 95 01
frontex@frontex.europa.eu
www.frontex.europa.eu

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Research and Innovation Unit

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Annexes

Annex A - Methodological tools

This section illustrates an overview of the tool deck used to carry out this study.
The table below provides a high-level view of the suggested tools for the assignment, per type of tool and work package.

Table 1- Methodological tools

Tools	WP1	WP2	WP3
Design tools			
Stakeholder mapping	X		
Data collection and analysis tools			
Desk research and literature review	X	X	
Semi-structured interviews	X	X	
Workshops		X	
Case studies	X		
Dissemination tools			
Webinars	X		X
Insights	X	X	X
Video clips		X	X
Visual booklet			X

Desk Research – Literature Review

In the framework of strategic and long-term analysis, the ultimate purpose of literature review lies in identifying key indicators, trends and potential drivers of uncertainty which past research has already established.
The team, including our Deloitte global delivery centre (research team), used desk research and literature review to obtain information for the preparation of the regulatory framework presented in Annex B, the case studies, and the set of principles, initiatives and roadmaps. For a thorough overview of the resources used in the desk research, see Annex D.

Interviews

In-depth interviews are a qualitative data collection method particularly well suited to gathering views, perceptions and opinions of interviewees. The purpose of interviews is to collect specific information on future or existing interventions as perceived by the participants.
Interviews can take the form of an informal conversation, a semi-structured or a structured conversation between the interviewer and the interviewee; they usually last anywhere between 30 minutes and an hour. Variations on in-depth interviews include paired depths (with two participants at once) and triads (three participants).
For this study, semi-structured interviews were used to allow the respondent to express him/herself freely, rather than being confined to a strict template. During the interview, the respondent was invited to develop the relevant topics in his/her own way. In this context, the interviewer did not ask questions in a fixed order but led the interview in accordance with the interviewee's train of thought, while ensuring that all relevant questions were answered.

An interview guideline was designed to list the different themes that were going to be treated. Additional topics were also discussed as these were considered as important or interesting to better understand the context.
Interviews were conducted via Microsoft Teams.
The information retrieved during the interviews was logged into an interview matrix to have an overview of the main discussion points across the interviews. Through this tool the team ensured the evidence was complete.
Thirteen interviews were carried out with Frontex representatives during the initial phase of this study to understand the context of the EBCG. An additional five interviews were also carried out with border management, law enforcement and other types of organisation to develop the case studies presented in section 3.2.

Case studies

Case studies are in-depth, self-contained studies embedded within a larger study. The purpose of case studies is to provide detailed information on a small number of examples, to understand the context, actions put in place and/or outcomes in order to learn and potentially inspire possible interventions.
Case studies are, amongst other, means to frame data collection methods such as literature review, interviews and review of secondary data. Case study designs are used when a research question requires detailed in-depth understanding that is holistic, comprehensive and contextualised. Case studies allow comparisons to be made between different actors within a single case, between cases, and between groups across cases.
For the purposes of this study, seven case studies were analysed to present Frontex and the EBCG community with an overview of the sustainable activities and initiatives undertaken by organisations (of a similar context), so as to identify applicable best practices and inspirations.
Case studies were identified and selected on the basis of two dimensions: context-specific relevance to Frontex and the EBCG community (through a high degree of applicability to operations and structure), and international standards relating to the professional management of sustainability risks expected of many organisations (beyond regulatory compliance minima). The research team evaluated the suitability of selected organisations to ensure the relevance of the best practices identified. The organisations analysed through these case studies included: Deloitte - The Edge NL office, the European Central Bank, the European Defence Agency, the French Ministry of Interior, the Portuguese Navy, the Swedish Coast Guard, and the US Department of Homeland Security.

Workshop

A workshop is a workgroup made up of stakeholders who have specific expertise relevant for the purposes of the study. It aims to establish an expert opinion on an action and its effects. It is based on the main information available on the design of the measure (and collected during the previous stages), as well as on the experts' own previous experience.
For this study, one workshop was organised for the representatives of Frontex and the EBCG community to present and gather feedback on the main findings of potential principles and practices developed to bring long-term sustainability value for the EBCG. This workshop took place virtually through the use of Microsoft Teams.
After the workshop, a report was produced formulating conclusions and main results from this session.

Webinar

Two webinars were organised for this study. The first webinar took place virtually through the use of Microsoft Teams and its aim was to present the regulatory framework and the relevant instruments, roadmaps and mechanisms identified at the EU and international levels. The second webinar also took place virtually as part of the finalisation of the research study. This webinar focused on the overall outcomes of the study.

Annex B - Regulatory Framework: summaries of literature review of EU and global instruments

To provide more comprehensive information for the reader, we include here the analysis of the instruments discussed throughout this document.

The Paris Agreement

Description	*The Paris Agreement is the first-ever universal, legally binding agreement on climate change, global warming, and greenhouse-gas emission reduction adopted by 196 countries in Paris on 12 December 2015, and which came into force on 4 November 2016.*[1] *The mission of the agreement is to act as a bridge between today's policies and climate-neutrality before the end of the century.*[2]

Key Facts	
Year Launched	2015
Key Agency	The UNFCCC secretariat (United Nations Framework Convention on Climate Change) is the United Nations entity tasked with supporting the global response to the threat of climate change and the Convention is the parent treaty of the 2015 Paris Agreement.
Responsibilities	• Set a global framework that aims to limit global warming to below 2°C and pursue efforts to limit it to 1.5°C above pre-industrial levels • Enable participating countries to deal with the impacts of climate change and support them in their efforts • Maintain the registry for Nationally Determined Contributions (NDC) established by the countries under the Paris Agreement
Geographic Boundaries: Global/ Regional	Global
Number of Participating Countries	196
Legally Binding	Yes[3]

Background

The UN Conference of the Parties (COP) is the supreme decision-making body of the Convention. All countries that have adopted the Paris Agreement take part in the COP, where they review and take decisions to promote the effective implementation of the Convention. The COP meets annually, unless the Parties decide otherwise. The first COP meeting was held in Berlin, Germany, in March 1995. The next (COP 26) is in Glasgow, UK, in November 2021.

[1] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[2] https://ec.europa.eu/clima/policies/international/negotiations/paris_en#:~:text=The%20Paris%20Agreement%20is%20a,the%20end%20of%20the%20century

[3] https://ec.europa.eu/clima/policies/international/negotiations/paris_en#tab-0-0

The Paris Agreement was part of a process dating back to the 1992 Earth Summit in Rio de Janeiro, Brazil, when countries initially joined the international UNFCCC treaty. Soon after, at COP 3 held in 1997, the countries adopted the Kyoto Protocol as an extension of the UNFCCC to strengthen their emission reductions. In 2012, they also agreed to extend the Kyoto Protocol until 2020. However, the agreement was not very effective due because the two top carbon dioxide (CO2) emitting countries globally, China and the United States, did not take part.

At COP 17 held in 2011, the countries reaffirmed their pledge to create a new and comprehensive climate treaty by 2015 that legally required all countries, including major carbon emitters, to limit their carbon dioxide and other greenhouse gases. For instance, China's target was to reach peak CO2 emissions by 2030, lower the carbon intensity of GDP by 60% to 65%, as compared to the 2005 levels, by 2030. It also plans to increase the share of non-fossil energy as part of total primary energy supply to below 20%. Similarly, the EU and its Member States which are part of the agreement, initially planned on cutting emissions by 40% as compared to 1990 levels, by 2030.[4] In April 2021, the EU adopted a new target to cut carbon emissions by at least 55% by 2030, compared with 1990 levels. In September 2020, the European Commission set out a blueprint for reaching the target. It expects to allocate at least 30% to climate-relevant spending from the 2021-2027 Multiannual Financial Framework budget of EUR 1.8 trillion.[5]

In 2012, the countries agreed to extend the Kyoto Protocol until 2020. However, the agreement was not very effective because the two top carbon dioxide (CO2) emitting countries globally, China and the United States, did not take part.[6]

In the lead-up to the Paris meeting, the UN tasked countries to submit plans detailing how they intended to reduce greenhouse gas emissions. Those plans were technically referred to as Intended Nationally Determined Contributions (INDCs). By 10 December 2015, 185 countries had submitted measures to limit or reduce their greenhouse gas emissions by 2025 or 2030.

The Paris Agreement opened for signature on 22 April 2016 – Earth Day – at UN Headquarters in New York. It entered into force on 4 November 2016, 30 days after the so-called "double threshold" (ratification by 55 countries that account for at least 55% of global emissions) had been met. Since then, more countries have ratified and continue to ratify the Agreement, reaching a total of 125 Parties in early 2017.[7]

In November 2020, under the presidency of Donald Trump, the US became the first nation in the world to formally withdraw from the Paris climate agreement.[8] In February 2021, exactly 105 days later, President Biden signed the instrument to bring the United States back into the Paris Agreement.[9]

The next conference, COP 26, is scheduled to take place in Glasgow, UK between 31 October to 12 November 2021.[10] It aims to finalise the Paris Rulebook regarding the Agreement's operations and to accelerate action to tackle the climate crisis through collaboration between governments, businesses and civil society.[11]

Programme Structure: Operational

Implementation[12]

The Paris Agreement works on five-year cycles of climate action carried out by countries and revised at regular intervals. Participating countries were invited to submit their Nationally Determined Contributions (NDCs) listing the commitments made towards reduction of Greenhouse Gas emissions by 2020. The NDCs also list actions taken to build resilience to adapt to the impacts of rising temperatures. The countries were invited to do this by formulating long-term low greenhouse gas emission development strategies (LT-LEDS) by 2020.

Monitoring[13]

[4] https://www.weforum.org/agenda/2020/11/paris-agreement-climate-change-us-biden/

[5] https://ec.europa.eu/commission/presscorner/api/files/document/print/en/qanda_20_1598/QANDA_20_1598_EN.pdf

[6] https://www.nrdc.org/stories/paris-climate-agreement-everything-you-need-know

[7] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[8] https://unfccc.int/news/unfccc-statement-on-the-us-decision-to-withdraw-from-paris-agreement

[9] https://unfccc.int/news/un-welcomes-us-announcement-to-rejoin-paris-agreement

[10] https://unfccc.int/process/bodies/supreme-bodies/conference-of-the-parties-cop

[11] https://ukcop26.org/cop26-goals/

[12] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[13] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

With the Paris Agreement, countries established an Enhanced Transparency Framework (ETF). Under the ETF, starting in 2024, countries will report transparently on actions taken and progress in climate change mitigation, adaptation measures, and support provided or received. All information submitted by each country will also undergo international technical expert review as part of the ETF. The information gathered through the ETF will feed into the Global Stocktake, which will assess the collective progress towards the long-term climate goals.

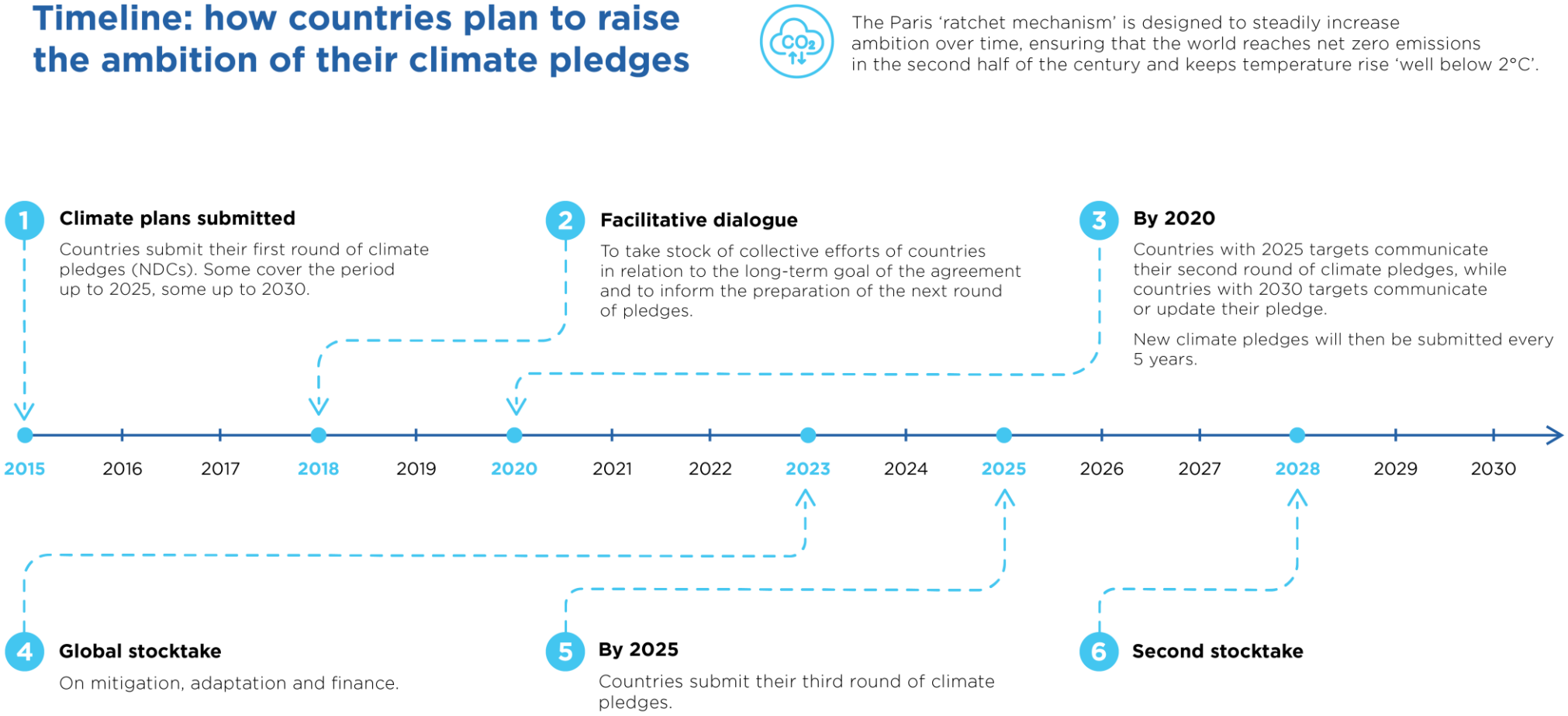
Global Stocktake (GST)[14]

The Global Stocktake is a key review exercise of the Agreement that involves taking stock of collective progress and implementing long-term goals. The output of the Stocktake will help countries review their climate targets and consider the latest science, global policy, and technological advances to ensure that the new targets are more ambitious than the previous ones.

- **Stage one: NDCs 1.0**
  - In the months preceding the Paris Agreement, the participating countries submitted their intended nationally determined contributions (NDCs)
  - The countries are not legally bound to meet the targets in their NDCs but must act "with the aim of achieving" these goals
- **Stage two: Facilitative dialogue**
  - In 2018, the participating countries convened in Katowice, Poland to have a facilitative dialogue, which was designed to inform the next round of NDCs. They discussed their progress on the long-term goals to peak emissions and achieve net-zero emissions.
- **Stage three: NDCs 2.0**
  - Countries with a target covering the period up to 2025 were required to communicate a new NDC by 2020, and those with 2030 targets were required either to communicate or update them by 2020. Countries must thereafter continue to submit new NDCs every five years.
  - Along with these, they are also encouraged to submit an "adaptation communication", which includes priorities, plans, and needs.
  - Every two years developed countries must also communicate how much climate finance they will provide to developing countries.

[14] https://www.carbonbrief.org/timeline-the-paris-agreements-ratchet-mechanism

Figure 1- Climate Pledge Timeline



Source: figure adapted by Deloitte from Carbon Brief, Paris Agreement Timeline, and the Ratchet Mechanism.

- **Stage four: Global stocktake**
  - The UN has scheduled a "global stocktake" for 2023, before the third round of NDCs.
  - It is expected that the assessments of the Intergovernmental Panel on Climate Change, the UN's climate science body, will inform the stocktake.

Thus, the Global Stocktake provides for a strong review and ratchet mechanism meant to counterweigh the otherwise strong decentralised character of the climate regime.

Financing

The Paris Agreement acknowledges the need for large-scale investments in emissions mitigation and reduction in the form of Climate Finance. The agreement noted that significant financial resources would be required to adapt to the adverse effects and reduce the impacts of a changing climate.

The Paris Agreement encourages voluntary contributions from all participating countries. However, developed countries are expected to assist the lesser developed and more vulnerable ones through Climate Finance and through a contribution at a higher scale than their previous contributions. This funding can be sourced from a variety of channels and instruments, including and especially through public funds. It can be used to support the specific priorities set by the developing countries.

The Global Environment Facility (GEF) has served as an operating entity of the financial mechanism since the Convention entered into force in 1994. At the Conference of the Parties (COP) 16, in 2010, countries established the Green Climate Fund (GCF) and in 2011, designated it as an operating entity of the financial mechanism. The financial mechanism is accountable to the COP, which decides on its policies, programme priorities, and eligibility criteria for funding.[15]
The GEF administers several trust funds and provides secretariat services for the Adaptation Fund described in more detail below.

Some facilities and funds important to the Agreement are:

- **Green Climate Fund (GCF):**[16] At COP 16 held in 2010 at Cancun, Mexico, the international community agreed to jointly mobilise USD 100 billion per year by 2020 to address the needs of developing countries. These Cancun agreements laid the foundation of the GCF.[17] The GCF is the world's largest climate fund, mandated to support developing countries in raising their NDCs. It follows a country-driven, four-pronged approach.
  - **Transformational planning and programming:** Catalysing innovation through integrated strategies for maximising co-benefits between mitigation, adaptation and sustainable development.
  - **Catalysing climate innovation**: Investing in new technologies, business models and practices to establish a proof of concept.
  - **De-risking investment to mobilise finance at scale:** Using scarce public resources to improve the risk-reward profile of low emission climate-resilient investment.
  - **Mainstreaming climate risks and opportunities into investment decision-making:** By doing this, finance can be more aligned with sustainable development. Some ways to do this are promotion of methodologies, standards, and practices that foster new norms and values.
- **Global Environment Facility (GEF):** GEF funding to support projects is contributed by donor countries. These financial contributions are replenished every four years by 40 GEF donor countries. The World Bank serves as the GEF Trustee, administering the GEF Trust Fund (contributions by donors), mobilising GEF resources, disbursing funds to GEF Agencies, preparing financial reports on investments and use of resources, etc.[18] The GEF manages the following funds:
  - **Special Climate Change Fund (SCCF):**[19] The SCCF aims to facilitate the creation of strong, climate-resilient economies and communities. The fund supports vulnerable and developing countries with climate-resilient technologies and infrastructure, helps them engage with the private sector and improves their access to finance from public sources and to markets for adaptation solutions.

[15] https://unfccc.int/topics/climate-finance/the-big-picture/introduction-to-climate-finance
[16] https://www.greenclimate.fund/about
[17] https://unfccc.int/process/conferences/the-big-picture/milestones/the-cancun-agreements
[18] https://www.thegef.org/about/funding
[19] https://www.thegef.org/topics/special-climate-change-fund-sccf

- **The Least Developed Countries Fund (LDCF):**[20] **Established** in 2001 by the UNFCC, this fund aims to protect the least developed countries from extreme temperatures and weather events that inflict lasting economic and societal damage.

- **Capacity-building Initiative for Transparency (CBIT)**[21]
  - The CBIT aims to strengthen the institutional and technical capacities of developing countries in providing transparency.
  - The GEF supported the establishment of the CBIT through voluntary contributions during GEF-6 and future replenishment cycles. The GEF operates on four-year funding tranches; GEF-6 covered the period 1 July 2014 to 30 June 2018[22]). As per an MOU between the COP and the GEF, the GEF annual reports are made available to the COP through the UNFCCC secretariat. In its report at COP 22, the GEF presented its initiatives and achievements relating to the Paris Agreement and the SDGs, the CBIT, the Program Priorities of the Least Developed Countries Fund (LDCF), innovations in blended finance and work in the areas of climate change mitigation and adaptation.
  - The fund balance as of June 2021 was USD 34 million.
- **Adaptation Fund (AF):**[23]
  - AF is one of the most innovative and unique climate funds, attracting funds from developed countries and private donations.
  - It channels adaptation finance to developing countries by delivering concrete, effective, and localised projects and continuing to innovate through pioneering programmes.
  - The Adaptation Fund is overseen by the Adaptation Fund Board, which has a majority of members representing developing countries and meets twice a year to review policy and project proposals.

Standing Committee on Finance (SCF)[24]

At COP 16 in 2010, the Parties to the Convention decided to establish the Standing Committee on Finance (SCF) to assist the COP in exercising its functions in relation to the financial mechanisms of the Convention. In 2015, it was decided that the SCF would serve the Paris Agreement.

The SCF has four specific functions:

- Improving coherence and coordination in the delivery of climate change financing.
- Rationalising the financial mechanism of the UNFCCC.
- Supporting with the mobilisation of financial resources for climate financing.
- Enabling the measurement, reporting, and verification of support provided to participating developing countries.

In addition, the SCF also organises an annual forum on climate finance and provides the COP with draft guidance for the operating entities. It provides expert input into periodic reviews of the financial mechanism and helps prepare a biennial assessment and overview of climate finance flows.

Role of the EU in external funding[25]

The EU, its Member States, the UK, and the European Investment Bank are together the biggest contributors of public climate finance to developing countries, providing EUR 23.2 billion in 2019, a 6.9% increase compared to 2018. The total without the UK was EUR 21.9 billion, a 7.4% increase compared to the total for the EU-27 in 2018. These entities together are also the world's top providers of official development assistance (a total EUR 75.2 billion in 2019), with climate action being increasingly integrated into the assistance. In 2018, the EU launched an Action Plan on Financing Sustainable Growth[26]. The EU also supports developing countries in improving their conditions for mobilising low-carbon finance.

In October 2019, the EU together with relevant authorities from countries such as Canada, China, India and Kenya launched the International Platform on Sustainable Finance. The platform had 17 member countries at the time of this

[20] https://www.theqef.org/topics/least-developed-countries-fund-ldcf

[21] https://fiftrustee.worldbank.org/en/about/unit/dfi/fiftrustee/fund-detail/cbit

[22] http://www.ipcinfo.org/fileadmin/user_upload/GAPS/docs/What_is_GEF_GEF-Programming_GEFthinking_FAO-GEFoverview.pdf

[23] https://www.adaptation-fund.org/

[24] https://unfccc.int/SCF

[25] https://ec.europa.eu/clima/policies/international/finance_en

[26] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0097

report, and they represent 55% of greenhouse gas emissions, 50% of the world population and 55% of global GDP.[27] The Platform aims to scale up the mobilisation of private capital for environmentally sustainable investment.

Technology

Technology Mechanism[28]

The Technology Mechanism of the Agreement aims to accelerate and enhance climate technology development and transfer to improve resilience to climate change and reduce GHG emissions. It consists of two complementary bodies–the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN).

The following key themes for the technology framework represent focused areas of action to be undertaken under the framework:

- Innovation:
  - Scaling up and diffusion of innovation at different stages of the technology cycle;
  - Adopting collaborative approaches to emerging climate technology research, development, and demonstration (RD&D);
  - Incentivising private sector participation and collaboration
  - Partnering with other countries and launching joint initiatives
- Implementation:
  - Attaching importance to planning tools and processes, such as NDCs, long-term low greenhouse gas emission development strategies, technology needs assessments (TNAs), national adaptation plans, technology road maps, and other relevant policies
  - Encouraging the use of multiple approaches and tools for the assessment of ready to transfer technologies
- Enabling environment and capacity-building:
  - Setting regulations and standards to create enabling environments and favourable market conditions for climate technologies
  - Analysing capacity-building activities at different stages of the technology cycle
  - Catalysing the development of endogenous capacities for climate-related technologies and harnessing indigenous knowledge
- Collaboration and stakeholder engagement:
  - Engaging with multiple stakeholders, including from the private sector, to plan and implement Technology Mechanism activities and inviting their pro-bono participation to leverage their expertise
  - Enhancing engagement between NDEs (National Designated Entities, which are the national, regional, sectoral and international technology centres, networks, organisations and private sector entities identified by the country) and relevant stakeholders by providing guidance and information
  - Enhancing collaboration with relevant international organisations, institutions, and initiatives, including academia, to leverage their expertise particularly in innovative technologies
- Support:
  - Ensuring stronger collaboration between the technology and financial mechanisms, identifying, and promoting innovative finance and investment at different stages of the technology cycle
  - Providing enhanced technical support, financing for innovation, access to RD&D, enabling environments, and capacity-building to developing countries
  - Developing and implementing the results of TNAs, engagement, and collaboration with stakeholders
  - Mobilising pro-bono and in-kind support for improved implementation, system monitoring, and support received to implement the technology framework

Technology Needs Assessments (TNAs)[29]

As per the Paris Agreement, participating countries are required to undertake **technology needs assessments (TNAs**) to determine their climate technology priorities. A TNA supports national sustainable development, builds national capacity, and facilitates the implementation of prioritised climate technologies.

[27] *https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/international-platform-sustainable-finance_en*

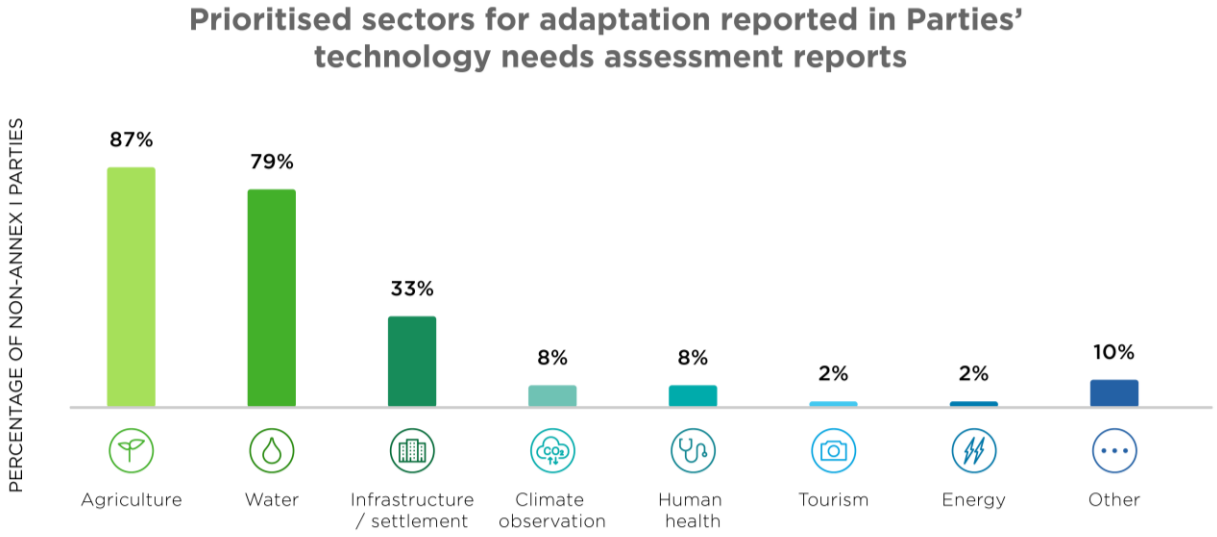
[28] *https://unfccc.int/sites/default/files/resource/cp24_auv_cop_4_TF.pdf*

[29] *https://unfccc.int/ttclear/tna*

- Since 2001, over 90 developing countries have undertaken TNAs to identify their technology needs for mitigation and adaptation;
- Since 2010, the **UNEP DTU Partnership**[30] has provided technical and methodological support to developing countries to undertake TNAs. The Global Environment Facility has supported these TNA projects through its **Poznan Strategic Program on Technology Transfer**[31];
- Since 2010, developing countries have also developed **technology action plans (TAPs**) as part of their TNAs, which are concrete action plans for the implementation of their prioritised technology needs. The GEF provides support for developing countries to undertake TNAs through its **Poznan Strategic Program on Technology Transfer;**
- Many countries have also identified climate technology needs in their nationally determined contributions (NDCs).

The following charts highlight the sectors that 53 developing countries prioritised in TNAs undertaken between

Figure 2- Prioritised sectors for mitigation and adaptation in Parties' technology needs assessments



Source: figure adapted by Deloitte from UNFCC, TNA[32]

[30] *UNEP is the United Nations Environment Programme; DTU is the Danish Technical University*

[31] https://unfccc.int/ttclear/tna

[32] https://unfccc.int/sites/default/files/resource/cp24_auv_cop_4_TF.pdf

TNAs should be aligned with NDCs and national adaptation plans for climate-resilient and low-emission development.

Poznan Strategic Program[33]

At COP 13, the UNFCCC participating countries asked the GEF to develop a programme to promote investment in technology transfer to help developing countries adopt environmentally sound technologies. In November 2008, the Strategic Program on Technology Transfer was discussed and approved by the GEF Council and the LDCF/SCCF Council. This was renamed the Poznan Strategic Program on Technology Transfer was eventually adopted by the GEF.

GEF's Technology Transfer Process

The GEF supports technology transfer to developing countries as they move towards a low-carbon development path, through the following process:

- Supporting developing countries' need to identify what technologies are needed to mitigate and adapt to climate change. This is done through Technology Needs Assessment (TNA) (q.v.).
- Once the TNA is completed, GEF finances pilot projects to realise the deployment, diffusion, and transfer of the technologies.
- The GEF also shares experience and environmentally sound technologies that have been successfully demonstrated.
- In the long-term implementation of the Poznan Program, the GEF has the following roles:
  - supporting Climate Technology Centres and a Climate Technology Network;
  - piloting Priority Technology Projects to foster innovation and Investments;
  - Private-Public Partnership for Tech Transfer;
  - Technology Needs Assessment;
  - acting as a Catalytic Supporting Institution for Tech Transfer.

Capacity Building

Recognising the fact that not all developing countries have sufficient capacities to deal with climate change challenges, the Paris Agreement places great emphasis on climate-related capacity-building. It requests that developed countries support developing ones with capacity-building actions in the following manner:

- execute country-driven capacity-building, based on and responsive to national, subnational, and local needs, especially in the case of developing countries Parties;
- guide the capacity building through lessons learned throughout the tenure of the UNFCCC and ensure it is an effective, iterative process that is participatory, cross-cutting, and gender-responsive;
- enhance the capacity of developing countries through cooperation and regularly communicate these actions
- through regional, bilateral, and multilateral approaches.

Developing country Parties should regularly communicate progress made on implementing these plans, policies, actions, or measures

Salient Features[34]

Articles

The Paris Agreement consists of 29 Articles. The key articles relevant to the EBCG are discussed below:

Article 2: Limiting the global temperature increase due to climate change to 1.5°C

The Paris Agreement aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including:

- Maintaining the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change;
- Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production.
- Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development

Article 4: Reach global peaking of GHGs and pursue mitigation to achieve NDCs

[33] https://www.thegef.org/content/poznan-strategic-program

[34] https://unfccc.int/sites/default/files/english_paris_agreement.pdf

- To achieve this temperature goal, countries aim to reach global peaking of greenhouse gas emissions (GHGs) as soon as possible, recognising peaking will take longer for developing country Parties, to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs (a sink is a reduction in atmospheric GHGs by storing carbon in another form, such as coal and oil deposits) in the second half of the century.
- All Parties are required to prepare, communicate, and maintain a nationally determined contribution (NDC) and to pursue domestic measures to achieve them. Parties are required to communicate their NDCs every five years and provide the information necessary for clarity and transparency.
- To set a firm foundation for higher ambition, each successive NDC should represent a progression beyond the previous one and reflect the highest possible ambition. Developed countries should continue to take the lead by undertaking absolute economy-wide reduction targets while developing countries would be offered support and should continue enhancing their mitigation efforts and moving towards economy-wide targets over time.
- Should countries or regional economic integration organisations agree to participate in the Paris Agreement as one, they are responsible for individual emission level targets and NDCs and must declare the same.

Article 5: Result-based payments and positive incentives for GHG reservoirs

- Countries are encouraged to conserve and enhance sinks and reservoirs of GHGs, including forests, and support them through results-based payments and positive incentives.

Article 6: Voluntary cooperation/Market- and non-market-based approaches

- The Paris Agreement recognises the possibility of voluntary cooperation among Parties to allow for higher ambition and sets out principles – including environmental integrity, transparency, and robust accounting – for any cooperation that involves the international transfer of mitigation outcomes. It establishes a mechanism for the mitigation of GHG emissions to support sustainable development and defines a framework for non-market approaches, such as adaptation, finance, technology transfer, and capacity-building. Inter alia, these approaches aim to enhance public and private sector participation in the implementation of NDCs.

Article 7: Enhancing adaptive capacity

- The Agreement establishes a global goal of enhancing adaptive capacity and strengthening resilience, and national adaptation efforts, including through international support and cooperation. It emphasizes utilising the best available science and strengthening institutional arrangements to support the synthesis of relevant information and knowledge, and the provision of technical support and guidance to Parties to the agreement.
- The Agreement also emphasises strengthening of systematic observation of the climate system and early warning systems to inform and support decision-making.

Article 8: Minimise climate change-related losses and damage

- The Agreement recognizes the importance of minimising and addressing losses associated with climate change, such as extreme weather events and slow onset events. It proposes several areas of cooperation, including early warning systems, risk insurance facilities, climate risk pooling, and other insurance solutions.

Article 9: Support provided to developing countries

- Developed countries should support developing countries in building clean, climate-resilient futures. The provision of resources should also aim to achieve a balance between adaptation and mitigation.
- In addition to reporting on finance already provided, developed countries must submit indicative information on future support every two years, including projected levels of public finance.
- The Financial Mechanism of the UNFCCC, including the Green Climate Fund (GCF), is also part of the Paris Agreement.

Article 10: Technology framework for climate-safe technology development

- The importance of technology in mitigation and adaptation is paramount and should be strengthened through cooperative action on technology development and transfer.
- A technology framework is expected to aid the Technology Mechanism in technology development and transfer, especially for climate-safe technology.
- In developing countries, capacity-building activities can be strengthened through appropriate institutional arrangements.

Article 13: Transparency framework

- The Agreement relies on a robust transparency and accounting system, and provides clarity on action and support by countries, with flexibility for their differing capabilities.
- Besides requiring reporting information on mitigation, adaptation, and support, the Agreement requires that the information submitted by each Party undergo international technical expert review.

Article 14: Global Stocktake

- This Article requires the Parties to the agreement to periodically take stock of the implementation of the Agreement to assess the collective progress towards achieving the purpose of the Agreement and its long-term goals. This is referred to as the "global stocktake".
- The first global stocktake is due to take place in 2023, and there will be one every five years thereafter, to help inform the parties of their progress and status on the relevant provisions of the agreement

Implementation Guidelines

Subsequent to the Paris Agreement being adopted in 2015 and coming into force in 2016, the Parties started working on the "Rulebook" to define the guidelines for the implementation of the Agreement.[35] The Rulebook defines the fundamental procedures and mechanisms that operationalise the Paris Agreement (e.g. how to implement its provisions, how to measure progress). As per the Rulebook:[36]

- all countries will prepare NDCs and work on domestic mitigation measures to achieve the objectives of these contributions;
- developed countries should continue taking the lead by undertaking economy-wide absolute emission reduction targets;
- developing countries will receive enhanced support and should continue enhancing their mitigation efforts and move towards economy-wide emission reduction or limitation targets;
- the least developed countries may prepare and communicate strategies, plans, and actions for low greenhouse gas emissions development on the basis of their special circumstances

Progress

- The NDC Synthesis Report[37] published in February 2021 covers new or updated submissions by 75 countries up to 31 December 2020. These represent approximately 30% of global greenhouse gas emissions. As per the report, nations must redouble their climate efforts to reach the Paris Agreement's goal of limiting the global temperature rise to 2°C (ideally 1.5°C) by the end of the century.
- Despite most countries increasing their emissions reduction ambition levels, the reduction in total emissions between 2010 and 2030 would be small, less than 1%
- As per the report, the Parties are undertaking comprehensive planning of their NDCs and linking them to relevant SDGs and national planning, regulatory and legislative processes. A significant number of countries included adaptation in their NDCs and provided information on their climate vulnerabilities and measures to address these.
- The implementation of the most conditional elements depends on access to enhanced financial resources, technology transfer, technical cooperation, capacity-building support, availability of market-based mechanisms, and the absorptive capacity of forests and other ecosystems

Partnerships

The United Nations Climate Change secretariat[38], part of the UNFCCC, is committed to forming meaningful partnerships with non-Party stakeholders such as foundations, cities, businesses, and civil society organisations.

- Proposals from gender- and youth-dedicated entities are encouraged, especially proposed projects highlighting the gender perspective and fostering youth engagement.
- The Paris Agreement specifically promotes incentivisation of private sector participation and collaboration along with international partnerships and joint initiatives.

Table 2- Potential partner entities for the UNFCCC secretariat

	Intergovernmental	Governmental	Non-governmental
Not-for-profit	• Intergovernmental organisations not part of the United Nations system	• Regional economic integration organisations	• Non-governmental non-profit organisations • Private philanthropic foundations

[35] https://cdn.who.int/media/docs/default-source/climate-change/cc-negotiations-and-health-lesson-4.pdf?sfvrsn=ecf88306_5

[36] https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf

[37] https://unfccc.int/news/climate-commitments-not-on-track-to-meet-paris-agreement-goals-as-ndc-synthesis-report-is-published

[38] https://unfccc.int/sites/default/files/b_2017_1_unfccc_guidelines_for_partnership_final.pdf

	Intergovernmental	Governmental	Non-governmental
	• United Nations system organisations	• National and subnational government agencies • Subsidiary bodies	• Individuals
For-profit and business sector		• State-owned companies	• Companies • Individual entrepreneurs • Business associations and coalitions • Corporate philanthropic foundations

Source: UNFCC Guidelines for partnership.

Conclusion

The Paris Agreement sought to create a dynamic structure that could evolve along with changes in national economies, technology and political will. That flexibility has allowed the European Union, Canada, South Korea, Japan, South Africa, and the United Kingdom among others to strengthen their initial pledges by promising to cut their net climate emissions to zero by 2050.

Before the 2015 Paris summit, global emissions were on course to push temperatures up by 3.5°C by 2100, according to estimates by the Climate Action Tracker, a non-profit science consortium. Since the Paris Agreement, the trajectory has flattened to 2.9°C.

While the pact has helped progress toward its goal of preventing average global temperatures from increasing by more than 2°C above preindustrial levels, there is also evidence of many countries not meeting the commitments made at the start of the Agreement. However, even if countries had kept those promises, some researchers have forecast that global temperatures will rise by 2.6°C by the end of the century, underlining the need for stronger action.

2030 Agenda for Sustainable Development

Description	*The 2030 Agenda for Sustainable Development was launched at the UN summit of New York in 2015. The Agenda consists of 17 Sustainable Development Goals and 169 targets and sets out a 15-year plan to achieve the Goals to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere[40]. The mission statement of the Agenda is to achieve "A world of universal respect for human rights and human dignity, the rule of law, justice, equality, and non-discrimination"[41]*

Key Facts	
Year Launched	Adopted in 2015, came into force in 2016[42]
Key Agency	The Division for Sustainable Development Goals (DSDG) in the United Nations Department of Economic and Social Affairs (UNDESA) acts as the Secretariat for the SDGs[43]
Responsibilities	Provide support and capacity-building for the goals and their related thematic issues, such as climate, oceans, urbanisation, partnerships, and Small Island Developing States. The DSDG evaluates the UN system-wide implementation of the 2030 Agenda and plays a role in advocacy and outreach activities on the Sustainable Development Goals (SDGs).
Geographic Boundaries: Global/ Regional	Global
Number of Participating Countries	193[44]
Legally Binding	No[45]

Background

The 2030 Agenda is a continuation of the UN Millennium Development Goals (MDGs) (2000-2015), which were the first international consensus on facing global problems, such as the eradication of extreme poverty and hunger and promoting improvements in access to education.

The achievements of the MDG's paved the way for the new set of goals to tackle the most pressing challenges and shift to a more sustainable way of living. Hence, in 2012, at the UN Conference on Sustainable Development in Rio De Janeiro, Brazil, the Member States launched a process to develop the Sustainable Development Goals (SDGs), following which in 2013, the General Assembly set up an Open Working Group to develop the proposal for SDGs.

Consequently, in 2015, the 2030 Agenda of Sustainable Development was signed by 193 Member States. The Agenda is made up of 17 SDGs, further broken down into 169 targets, to be met by 2030 with the intention of "leaving no one behind".[46]

[40] https://www.un.org/sustainabledevelopment/development-agenda/

[41] https://unsdg.un.org/2030-agenda/universal-values

[42] https://www.un.org/sustainabledevelopment/development-agenda-retired/

[43] https://sdgs.un.org/about

[44] http://www.un.org.cn/info/6/620.html

[45] https://www.un.org/sustainabledevelopment/development-agenda-retired/

[46] https://sdgs.un.org/goals

Programme Structure: Operational

Implementation

The SDGs are country-led programmes. Each country develops its policies, plans and programmes to achieve the targets. The Agenda recognises that the policies and programmes need to be backed by multi-stakeholder involvement from civil society, the private sector, and academia, and global support to mobilise the required finances and resources.
Moreover, the Agenda also recognises the need for quality, accessible and timely data collection and regional follow-up and review at the national level to monitor the progress of the goals.

Monitoring

At the global level, the 17 Sustainable Development Goals are monitored and reviewed using a set of global indicators. The global indicator framework was developed by the Inter-Agency and Expert Group on SDG Indicators (IAEA-SDGs) in 2016. Each goal was assigned targets along with two relevant indicators. The United Nations Economic and Social Council and the General Assembly then adopted these indicators. These indicators are reviewed yearly by a SDG Progress Report to be prepared by the Secretary-General.
The means by which implementation of the SDGs will be monitored and reviewed is outlined in the Addis Ababa Action Agenda of 2015, the outcome document of the Third International Conference on Financing for Development, to ensure that financial resources are effectively mobilised to support the new sustainable development agenda.[47]
At the national level, governments may also develop its indicators to assist in monitoring progress made on the goals and targets.

Financing the SDGs

The UN Secretary-General released a four-year **Strategy for Financing the 2030 Agenda for Sustainable Development** on 24 September 2018 during a High-level Meeting at UN Headquarters in New York. The Strategy contains **three objectives** to transform the global financial system from global to provide local-levels finance in support of the 2030 Agenda by addressing the barriers that constrain the channelling of finance into sustainable development, and leveraging opportunities to increase investments in the SDGs at scale:[48]

1. Aligning global economic policies and financial systems with the 2030 Agenda

- Highlight the global financial and economic policies and actions needed to realise the 2030 Agenda;
  - Integrate sustainability considerations into macroeconomic policies and regulations;
  - Promote SDG-aligned trade and investment agreements and debt sustainability in the context of the 2030 Agenda;
  - Ensure inclusive global taxation cooperation on fundamental and frontier issues, including taxation in the digitalised economy and the relationship between the tax and the SDGs.
- Galvanise the public and private sectors to scale up climate finance;
  - Collaborate with public and private investors to increase the use of renewable energy and energy efficiency investments, including through the Climate Finance Leadership Initiative and the Global Investors for Sustainable Development Alliance;
  - Expand the use of green financing instruments;
  - Build awareness about sustainable investing and promote impact measurements.
- Mobilise the financial industry to transform financing for sustainable development;
  - Support the Global Investors for Sustainable Development Alliance to increase long-term SDG investments for Responsible Banking[49];
  - Collaborate with the financial industry to implement and report on global principles and standards for responsible financial practice and integrity.

2. Enhancing sustainable financing strategies and investments at regional and country levels

- Enhance domestic resource mobilisation efforts to increase financing for SDG priorities;
  - Increase the UN's support to countries to develop and implement integrated national financing frameworks for SDG plans;
- Improve country access to sustainable and green finance, notably for Disaster Risk Reduction (DRR) and resilience in the Least Developed Countries (LDCs) and Small Island Developing States (SIDS);

[47] *https://sustainabledevelopment.un.org/content/documents/2051AAAA_Outcome.pdf*

[48] *https://www.un.org/sustainabledevelopment/wp-content/uploads/2018/09/SG-Financing-Strategy_Sep2018.pdf*

[49] *Responsible Banking here refers to the Principal of Responsible Banking, a framework which ensures that signatory banks' strategy and practice align with the vision society has set out for its future in the Sustainable Development Goals and the Paris Climate Agreement*

- In collaboration with climate financing mechanisms and International Financial Institutions, strengthen country capacity to increase access to green finance, promote carbon pricing, and remove inefficient fossil fuel subsidies;
- Promote financing opportunities for graduating LDCs and SIDS through thought leaderships and partnerships with development agencies and private sources of finance;
- In collaboration with Multilateral Development Banks and Development Finance Institutions, strengthen the UN's engagement with national development banks to enhance their role in SDG and climate finance.

- Strengthen international and regional cooperation, and country capacity to prevent, reduce, and recover illicit financial flows;
  - Influence international and national policymaking to create systemic linkages between combating illicit financial flows and sustainable development;
  - Strengthen the UN system's work on anti-corruption at the country level to prevent illicit financial flows;
  - Collaborate with financial centres to eliminate safe havens for illicit funds and enhance international cooperation to expedite recovery and return.

3. Seizing the potential of financial innovations, new technologies, and digitalisation to provide equitable access to finance

- Accelerate innovative and digital financing mechanisms for the SDGs;
  - Support the Task Force on Digital Financing of the SDGs to explore the potential and risks of digital financing for the SDGs;
  - In collaboration with Multilateral Development Banks and Development Finance Institutions, create new strategic partnerships and mechanisms to unlock new sources of finance and financial innovation for investment in the SDGs.

In addition, UN country teams (UNCTs), including economists and partnership and development financing specialists within Resident Coordinator Offices, have strengthened the UN's capacity to support the Member States on strategic finance. Country-development of financing strategies and investing in initiatives that leverage public and private financing to advance the SDGs, are linked to the UN Joint SDG Fund (see next section).
At the global level, a UN Network of Economists has been established to enhance thought leadership, including to support UNCTs in terms of the analytical and research work required for effective policy advice. The UN system collaborates with international financial institutions (IFIs), including the World Bank Group, IMF, and Multilateral Development Banks (MDBs), development finance institutions (DFIs), and other financing institutions at global, regional, and country levels to accelerate actions to finance sustainable development.

The UN Joint SDG Fund

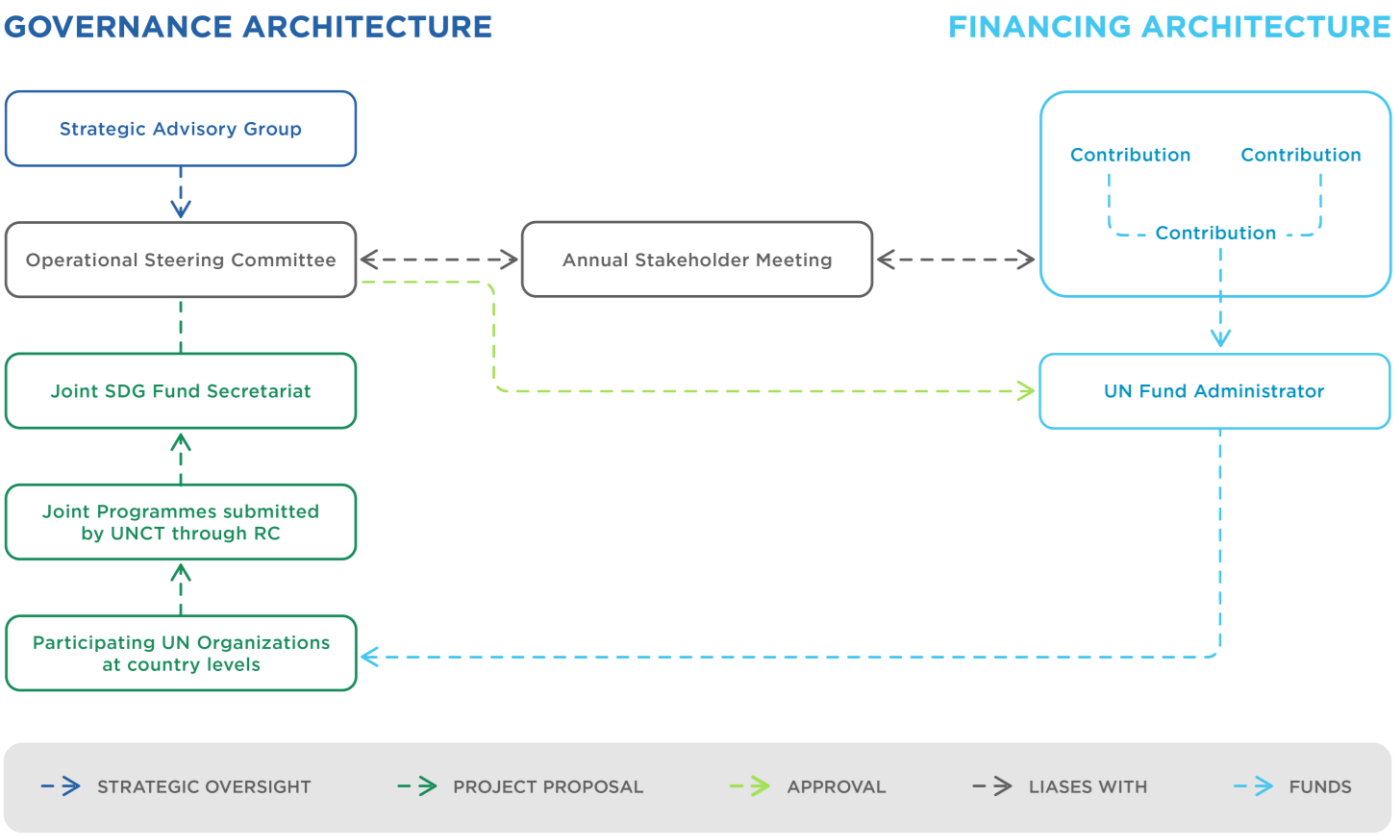
The Joint SDG Fund is a multi-partner trust fund. This means that the contributions it receives are not entity-specific but aim to support broader UN system-level functions.

The fund is managed by the following entities:

- the Strategic Advisory Group, chaired by the United Nations Deputy Secretary-General and Chair of the UNSDG, provides leadership and strategic direction to the Fund;
- under the direction of the Strategic Advisory Group, the Operational Steering Committee ensures the efficient management of operational and technical aspects of the Joint SDG Fund;
- the Fund is be administered by the Multi-Partner Trust Fund Office (MPTF Office), which is responsible for Fund design and set-up, maintenance of the Fund account, receipt of donor contributions, and disbursement of funds upon instructions from the Operational Steering Committee, and provision of periodic consolidated reports;
- participating UN Organisations are responsible for providing inputs to the review of concept notes and full project proposals, and for implementing activities outlined in approved proposals.[50]

[50] https://www.jointsdgfund.org/governance

Figure 3- Governance Structure of the Joint SDG Fund



Source: figure adapted by Deloitte from Joint SDG Fund[51]

Salient Features

Goals

Agenda 2030 contains 17 Sustainable Development Goals listed below, of which 8 could be relevant for the EBCG. These are highlighted in the list below and are discussed in detail subsequently.

- GOAL 1: No Poverty
- GOAL 2: Zero Hunger
- GOAL 3: Good Health and Well-being
- GOAL 4: Quality Education
- GOAL 5: Gender Equality
- **GOAL 6: Clean Water and Sanitation**
- **GOAL 7: Affordable and Clean Energy**
- GOAL 8: Decent Work and Economic Growth
- **GOAL 9: Industry, Innovation, and Infrastructure**
- GOAL 10: Reduced Inequality
- **GOAL 11: Sustainable Cities and Communities**
- **GOAL 12: Responsible Consumption and Production**
- **GOAL 13: Climate Action**
- **GOAL 14: Life Below Water**
- **GOAL 15: Life on Land**
- GOAL 16: Peace and Justice Strong Institutions

[51] https://www.jointsdgfund.org/governance

- GOAL 17: Partnerships to Achieve the Goal

Detailed analysis of the EBCG-relevant Goals

GOAL 6: Clean Water and Sanitation

Objective: Ensure availability and sustainable management of water and sanitation for all

Policy brief and Acceleration Plans:

UN-Water SDG 6 Global Acceleration Framework (2020)[52]

Recognising the fact that, at the current rate of progress, the world will not reach the SDG 6 targets by 2030, UN-Water launched a Global Acceleration Framework in 2020 intending to deliver faster results by improving the implementation and efficiency of related programmes.

According to UN Water, which is an interagency coordination mechanism for water and sanitation, increasing political will, leveraging, and scaling up technologies and partnerships, improving capacity-building among youth are required along with optimising financial resources to accelerate the implementation of SDG 6.

UN-Water has stressed the adoption of Information and Communication Technologies (ICT) as a key accelerator and enabler for the management of programmes. These can help improve access to water, monitoring of water resources, and other areas such as weather forecasting, setting up early warning systems, improving water distribution, and monitoring irrigation and landscaping.

The Global Acceleration Framework also focuses on scientific evidence as a prerequisite for designing and implementing such programmes, thus requiring the Member States to work with research foundations, academics and the scientific community to assess water externalities and implement instruments such as pricing, transfers, and other regulations.

The Global Acceleration Framework is designed to deliver faster results through four action pillars:

1. **Engage**
   - leveraging the UN's convening power to make resources and expertise available to countries and regions;
   - providing technical assistance and resources to the government through joint sector support;
   - engaging with local authorities and civil society to develop a community-centric approach;
   - encouraging multi-stakeholder movements through advocacy and direct support to address the water and sanitation crisis;
   - facilitating effective implementation and achievement of fundamental goals, such as the reduction of poverty and gender inequality, along with additional dedicated institutional, analytical, and operational frameworks;
   - establishing powerful partnerships at the global, regional, and river, lake, and aquifer basin levels.
2. **Align**
   - reduce fragmentation by aligning operational and financial strategies, policies, and approaches in support of Member States;
   - harness synergies between different SDGs to improve efficiency and improve coordination between multiple stakeholders on the operational and financial front;
   - reduce policy and institutional fragmentation between levels, actors, and sectors, including harmonisation of mandates of institutions.
3. **Accelerate**
   - **financing**: optimise financing for water and sanitation to accelerate the achievement of SDG 6 through more coordinated funding to better utilise the existing resources and harness the synergies among different SDGs;
   - **data and Information**: leverage the use of data to ensure information exchange and accountability and promote sharing information transparently within and between sectors and across borders to inform decision-making;
   - **capacity Development:** underline the need for capacity development, monitoring, and evaluation for improving service levels, operating, and maintaining technology, increasing job creation in the water sector, and monitoring performance, including at the community level;
   - **innovation:** leverage science, ICT, emerging technologies, innovative governance, and business models to improve water resource and sanitation development and management;
   - **governance:** relevant actors should clarify and take ownership of their context-specific roles, recognise interlinkages, build on complementarities, establish policy frameworks, and promote integrated water and sanitation solutions.
4. **Account**
   - promote shared accountability among all actors and communities by reviewing the progress and learning together;

[52] https://www.unwater.org/publications/the-sdg-6-global-acceleration-framework/

- develop a working culture that adapts to the latest evidence of what works and changes quickly;
- bring together all actors to review progress, reflect, learn, and trigger increased and better-directed action

Table 3- Goal 6: Targets and Indicators relevant for the EBCG[53] [54]

Target	Target Description	Indicator
Improve Water Quality, Wastewater Treatment, and Safe Reuse	By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater, substantially increasing recycling and safe reuse globally	• **Proportion of wastewater safely treated** • **Proportion of bodies of water with good ambient water quality**

GOAL 7: Affordable and Clean Energy

Objective: Ensure access to affordable, reliable, sustainable, and modern energy for all

Policy brief and Acceleration Plans:

Accelerating SDG 7 Achievements: SDG 7 Policy Briefs in support of the High-Level Political Forum (HLPF) 2020[55]

In 2019, the UN Department of Economic and Social Affairs convened a Multi-stakeholder SDG 7 Technical Advisory Group (SDG7-TAG) to access the progress of SDG 7. The Group, which involved several multilateral organisations, recognised that there was a need to accelerate the progress of the goal. In 2020, it presented detailed recommendations and scenarios for energy policies that can simultaneously address the SDG goals, the climate crisis, and the global pandemic. Therefore, the document incorporated steps to advance SDG 7 during COVID-19 as well. It provided the following guidelines:

- integrate sustainable energy solutions into COVID-19 responses and recovery strategies to help economies become greener and more resilient;
- use enhanced Nationally Determined Contributions (NDCs) as a framework for green investment through economic recovery packages;
- prioritise modern energy services;
- invest in renewables and energy efficiency to create green jobs;
- phase out inefficient fossil fuel subsidies;
- adopt transition strategies to support the phase-out of coal through clean energy plans and targets;
- promote a more gender-equal response and recovery;
- encourage a transition from energy-intensive lifestyles to more sustainable patterns;
- design development activities to prioritise green investment;
- strengthen international cooperation and multilateralism.

Further, the document discusses the policy priorities for protecting the planet and building resilience.

Advancing SDG7 implementation in support of the 2030 Agenda:

- **access to electricity**: developing energy markets and leveraging private sector resources to decrease the cost of electrification;
- **renewable energy**: increasing policy attention to the deployment of modern renewables in all end-use sectors to ensure a just energy transition;
- **energy efficiency**: harnessing emerging digital technologies to tap into innovative, system-wide increases in energy efficiency through collaborative policy efforts across sectors.

Advancing SDG implementation through Nationally Determined Contributions:

- promote a holistic approach to clean energy deployment to address mitigation and resilience priorities, including water, the agriculture-food chain, gender, decent jobs, and others, and reflect those in NDCs;
- strengthen or add an economy-wide GHG target to reflect more ambitious abatement options in the power sector;
- strengthen or add targets to support planning for renewables, for example:

[53] https://www.globalgoals.org/6-clean-water-and-sanitation

[54] https://unstats.un.org/sdgs/metadata/

[55] https://sustainabledevelopment.un.org/content/documents/26235UNFINALFINAL.pdf

- renewable energy targets as a share of the total electricity generation mix;
- renewable energy targets aligning with longer-term national plans and national cost-effective renewable energy potential; rooftop solar targets;
- energy access targets (e.g. also through the deployment of decentralised energy solutions);
- strengthen or add targets to support grid flexibility:
- energy storage targets to support renewable energy deployment;
- targets for smart meter deployment and forecasting technologies to predict the real-time output of variable renewable energy generation.

- strengthen or add targets and commitments to address existing fossil fuel assets, for example:
  - address the integration of renewable energy and energy efficiency, which includes sectors such as heating, cooling, transport, and cooking solutions as well;
  - strengthen or add policies and actions for the power sector;
  - accelerate the development and deployment of utility-scale and behind-the-meter power storage solutions to spur the renewable energy transition.

Building Global Energy Interconnection (GEI) and strengthening interlinkages with the SDGs

- establish work mechanisms at the UN level to support GEI development to help develop global multilateral frameworks to facilitate global energy interconnections;
- mobilise nations to include regional grid development as a vital component of green stimulus plans within the overall economic recovery work;
- establish regional cooperation centres around the globe at the level of the UN to support R&D and implement GEI plans through technical assistance, market consulting, and fundraising to improve the synergy of cross-border joint operations, and the operational efficiency and security of power supply systems in different countries

Table 4- Goal 7: Targets and Indicators relevant for the EBCG [57] [58]

Target	Target Description	Indicator
Increase Global Percentage of Renewable Energy	By 2030, increase substantially the share of renewable energy in the global energy mix	• **Renewable energy share in total final energy consumption**
Expand and Upgrade Energy Services for Developing Countries	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, Least Developed Countries, Small Island Developing States, and Land-locked Developing Countries in line with their respective programmes of support	• **Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfers for infrastructure and technology to sustainable development services**

GOAL 9: Industry, Innovation, and Infrastructure

Objective: Build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation

Policy brief and Acceleration Plans:

2017 HLFP Thematic Review of SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation[59] [60]

The policy brief, which was the most recent at the times this report was researched, recognised several bottlenecks to achieving SDG 9 by 2030, such as resource constraints, poor access to infrastructure, electricity, and energy, especially

[56] https://sustainabledevelopment.un.org/content/documents/26235UNFINALFINAL.pdf

[57] https://www.globalgoals.org/7-affordable-and-clean-energy

[58] https://unstats.un.org/sdgs/metadata/

[59] https://sustainabledevelopment.un.org/content/documents/14363SDG9format-revOD.pdf

[60] *The HLPF meets periodically to review the progress of selected SDGs. For a full review list please refer to: https://sustainabledevelopment.un.org/hlpf/2021*

in landlocked, least developed, and small island countries. Thus, there was a need to explore innovative solutions in terms of governance, finance, and collaboration to solve developmental challenges in these regions.
Moreover, the document recognised that investment in infrastructure and technologies that also reduce carbon emissions are key to achieving SDG 9. Further, it sets out recommendations on accelerating the progress of sustainable and inclusive industrialisation and infrastructure:

- invest in ICT connectivity;
- defer special taxes on ICT equipment and services;
- encourage research and development by enhancing technology security and privacy;
- increase the number of indicators to reflect affordability, inclusiveness, and quality of internet access, and the level of internet use, by individuals and enterprises;
- strengthen the capacity of national statistical systems to produce ICT statistics;
- recognise, monitor, and share best practices on how ICTs are key enablers of many of the SDGs, including but not restricted to SDG 9;
- introduce innovative financing approaches that use public resources such as Official Development Assistance (ODA) to neutralise risks and build resilient infrastructure;
- promote collaboration among stakeholders engaged in private-sector research and development focused on reducing technology gaps.

Table 5- Goal 9: Targets and Indicators relevant for the EBCG [61] [62]

Target	Target Description	Indicator
Develop Sustainable, Resilient and Inclusive Infrastructures	Develop quality, reliable, sustainable, and resilient infrastructure, including regional and transborder infrastructure to support economic development and human well-being with a focus on affordable and equitable access for all	• **Proportion of the rural population who live within 2 km of an all-season road** • **Passenger and freight volumes, by mode of transport**
Upgrade All Industries and Infrastructures for Sustainability	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency, and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries acting in accordance with their respective capabilities	• **CO2 emission per unit of value-added**

GOAL 11: Sustainable Cities and Communities

Objective: Make cities and human settlements inclusive, safe, resilient, and sustainable

Policy brief and Acceleration Plans:

Accelerating SDG 11 Achievement Policy Brief in Support of the First SDG 11 Review at the UN High-Level Political Forum 2018[63]

The policy brief discussed the progress made on SDG 11 and provides refinements to the SDG 11 monitoring framework. It highlights existing issues related to urbanisation and underscores how 'urban' is a cross-cutting or transversal dimension that can accelerate the achievement of other goals and targets.
To accelerate the process of SDG 11 implementation and monitoring, the document suggests using mass data generation from self-evaluation tools through mobile devices, community-based efforts, and the use of technology to enhance data generation and processing. This can be done through the following mechanisms:

- **adopt a functional statistical definition of what constitutes the city and its boundaries:** at the international level, this will help standardise values and harmonise results to prevent technical inconsistencies;
- **develop a National Sample of Cities to facilitate aggregation at the national level:** The National

[61] https://www.globalgoals.org/9-industry-innovation-and-infrastructure
[62] https://unstats.un.org/sdgs/metadata/
[63] https://sustainabledevelopment.un.org/content/documents/194452018_HLPF_Thematic_Review_of_SDG_11_UNHabitat_12_June_2018_original.pdf

- Sample of Cities (NSC) approach developed by UN-Habitat is a recommended solution. If adopted by countries, the NSC offers the low-cost option of monitoring fewer representative sets of cities consistently over time, and the ability to report seamlessly on the national level performance of their cities;
- **strengthen supportive frameworks and capacity development for better SDG 11 monitoring:** strengthening national and local capacities for collecting, analysing, and disseminating data and information, including different forms of disaggregation, to aggregate urban data at the country level. This requires partnerships, institutional coordination, adequate systems, and monitoring and reporting frameworks. It also calls for adequate governance structures, the planning, and management of urban and territorial spatial development, finance, innovations, and capacity for effective implementation.
- **establish complementary datasets to support global and local policy work:** adopting UN-Habitat's City Prosperity Initiative (CPI) as a local monitoring platform contributes to the integration of the different SDGs' urban indicators to address, in a structured manner, the environmental, social, and economic components of sustainability.

Table 6- Goal 11: Targets and Indicators relevant for the EBCG[64] [65]

Target	Target Description	Indicator
Protect the world's cultural and natural heritage	Strengthen efforts to protect and safeguard the world's cultural and natural heritage	**Total expenditure (public and private) per capita spending on the preservation, protection, and conservation of all cultural and natural heritage by:** • **type of heritage (cultural, natural, mixed, and World Heritage Centre designation);** • **level of government (national, regional, and local/municipal);** • **type of expenditure (operating expenditure/investment);** • **type of private funding (donations in kind, private non-profit sector, and sponsorship)**

Goal 12: Responsible consumption and production

Objective: To ensure responsible consumption and production patterns

Policy brief and Acceleration Plans:

2018 HLPF Review of SDGs implementation: SDG 12 - Ensure sustainable consumption and production patterns[66]

The policy review stated that there had been a positive development of national policy on sustainable consumption and production patterns and since 2002 and the number of such policies and instruments had increased. As of 2018, 71 countries plus the European Union had documented their macro policies, regulatory, voluntary, or economic instruments that support the shift towards sustainable consumption and production patterns.

However, the brief highlighted a serious concern around the existing monitoring framework to measure the goal's target as no international standards had been established for the indicators. The document also laid down that use of nanomaterials was not yet addressed in the regulatory frameworks. Moreover, these frameworks also need to regulate the negative impacts of ICT, such as e-waste, on sustainable consumption.

In line with the above, it provided the following recommendations:

[64] https://www.globalgoals.org/11-sustainable-cities-and-communities

[65] https://unstats.un.org/sdgs/metadata/

[66] https://sustainabledevelopment.un.org/content/documents/196532018backgroundnotesSDG12.pdf

- achieve resource and energy efficiency by helping small and medium-scale enterprises to improve productivity and generate value, resulting in improved worker remuneration.
- pay attention to regional priorities and variances as regional approaches lead to greater ownership of action.
- forge partnerships for sustainable development to deploy a more coherent response by pooling assets and expertise. Private sector and multi-stakeholder actors are critical since they possess the capital, technologies, knowledge, and software necessary to enable the shift towards sustainable consumption and production (SCP) patterns.
- create a streamlined, and centralised UN-wide reporting system through a coordinated effort of the UN agencies.

Policy brief and Acceleration Plans:

One Plan for One Planet:[67]

Adopted in 2012 at the World Summit on Sustainable Development, the 10-Year Framework of Programs on Sustainable Consumption and Production (10YFP-SCP) is a global commitment to accelerate the shift towards sustainable consumption and production in both developed and developing countries.

The One Planet network, which is a multi-stakeholder partnership committing countries and organisations to engage in the achievement of sustainable development, was formed by coordinating collective impact through its six programmes – Public Procurement, Buildings and Construction, Tourism, Food Systems, Consumer Information, and Lifestyles and Education.

One Plan One Planet aims to achieve sustainable consumption and production by defining common objectives and principles across the One Planet network.

The plan lays down the following strategic objectives:

- provide an effective implementation mechanism for SDG 12 in terms of financing;
- provide tools and solutions for the shift to sustainable consumption and production;
- lead the cohesive implementation of sustainable consumption and production;
- demonstrate the impact of sustainable consumption and production.

Table 7- Goal 12: Targets and Indicators relevant for the EBCG[68] [69]

Targets	Target Description	Indicator
Responsible Management of Chemicals and Waste	By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their lifecycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water, and soil to minimise their adverse impacts on human health and the environment	• **Number of parties to international multilateral environmental agreements on hazardous waste and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement** • **Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment**
Sustainable Management and Use of Natural Resources	By 2030, achieve the sustainable management and efficient use of natural resources	• **Material footprint, material footprint per capita, and material footprint per GDP** • **Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP**

[67] https://spaces.oneplanetnetwork.org/system/files/strategy_one_planet.pdf

[68] https://www.globalgoals.org/12-responsible-consumption-and-production

[69] https://unstats.un.org/sdgs/metadata/

Targets	Target Description	Indicator
Substantially Reduce Waste Generation	By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse	• **National recycling rate, tons of material recycled**
Encourage Companies to Adopt Sustainable Practices and Sustainability Reporting	Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	• **Number of companies publishing sustainability reports**
Promote Sustainable Public Procurement Practices	Promote public procurement practices that are sustainable, in accordance with national policies and priorities	• **Number of countries implementing sustainable public procurement policies and action plans**
Remove Market Distortions That Encourage Wasteful Consumption	Rationalise inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking into account the specific needs and conditions of developing countries and minimising the possible adverse impacts on their development in a manner that protects the poor and the affected communities	• **Number of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels**

Goal 13: Climate action

Objective: Take urgent action to combat climate change and its impacts

Policy brief and Acceleration Plans:

HLPF 2019 review of SDG 13: Climate Action World Wildlife Fund Briefing[70]: The World Wildlife Fund Brief of the HLFP 2019 Review of SDG13[71], set out recommendations for the effective implementation of SDG13:

- sincere implementation of the Paris Agreement and enhancement of NDCs by 2020;
- transition to renewables and phase out fossil fuels;
- scale up the use of nature-based solutions that are socially inclusive and equitable;
- double the contributions to the Green Climate Funds to reach a goal of USD 100 billion per year;
- align financial portfolios to the Paris Agreement;
- formulate policies and regulation to promote sustainable consumption and production practices and promote a circular economy;
- adopt agro-ecological practices and promote sustainable fishing for long-term productivity and nature protection;
- support the implementation of the UN Decade on Ecosystem Restoration 2021-2030 as declared by the UN General Assembly.

[70] https://d2ouvy59p0dg6k.cloudfront.net/downloads/hlpf_2019___wwf_brief_sdg_13___final.pdf

[71] https://wwfint.awsassets.panda.org/downloads/hlpf_2019___wwf_brief_sdg_13___final.pdf

Table 8- Goal 13: Targets and Indicators relevant for the EBCG[72] [73]

Target	Target Description	Indicator
Integrate Climate Change Measures into Policies and Planning	Integrate climate change measures into national policies, strategies, and planning	• **Number of countries that have communicated the establishment or operationalisation of an integrated policy/strategy/plan, which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)**

Goal 14: Life Below Water

Objective: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development

Policy brief and Acceleration Plans:

2017 HLPF Thematic Review of SDG 14: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development[74]

The policy brief recognised the importance of the economic, social, and environmental benefits of healthy oceans and the impact of activities that damage oceans, which are felt across national borders. Hence the document recognised the importance of having targets and indicators that could report the progress on SDG 14. The thematic review thus examined each target and made recommendations to the HLPF on the gaps and opportunities to mitigate risks and ensure the sustainable use of oceans and other water bodies.

The recommendations include:

- **pollution**: a novel approach to deal with some forms of plastics and cross-sectoral interventions to deal with transboundary paths to decrease pollution;
- **ocean acidification and climate change:** promotion of activities that encourage and allow countries to meet commitments made under the Paris Agreement and promote monitoring and research on the effects of climate change on ocean ecosystems to better inform policymakers and guide meaningful adaptation and mitigation options, as part of Nationally Determined Contributions (NDCs);
- **marine and coastal environment including spatial management**: support for the implementation of integrated management frameworks, using management tools (including Marine Protected Areas in the context of broader management objectives) through cross-sectoral cooperation (e.g. Regional Seas Conventions and action plans, Regional Fisheries Bodies and Large Marine Ecosystem projects), as well as support for ongoing efforts to develop an implementing agreement for Biodiversity Protection Beyond National Jurisdiction and development of conservation and management frameworks for high seas is required;
- **access for small-scale fishers and their opportunities for trade:** strong policies, regulation, and institutional frameworks are required to protect the rights of small fisheries. For small island developing states and least developed countries, it is crucial to promote economically beneficial activities such as ocean-driven tourism, marine-derived energy, and minerals to strengthen the capacities of communities relying on coastal and ocean opportunities;
- **fisheries subsidies**: fishery subsidies are resulting in overfishing and overcapacity, so there is a need to revisit existing fishing, taxes, regulation, and policies. The UN Ocean Conference in June 2017 and the WTO Ministerial Conference in December 2017 were to aim to set a minimum common denominator that could be agreed upon

[72] https://www.globalgoals.org/13-climate-action

[73] https://unstats.un.org/sdgs/metadata/

[74] https://sustainabledevelopment.un.org/content/documents/14375SDG14format-revOD.pdf

and included in trade agreements, including at the regional level. (While the negotiations are still ongoing, the WTO Director-General Ngozi Okonjo-Iweala has urged the Member States to conclude by July 2021.) [75]

- **scientific knowledge and research capacity**: exploiting advances in observation technology, trans-ocean, and regional communication systems to make data visible and accessible to allow decision-makers to optimise extractive and non-extractive activities and minimise risks. There is also a need to formulate national ocean research policies and scientific advisory mechanisms to support such development. International and interdisciplinary scientific collaboration is needed along with technology transfer and an international framework to fill technological and knowledge gaps in this space.
- **implementing international law**: formalisation of maritime boundaries and support for countries, regional fisheries management organisations, and other governance arrangements to continue implementing the 2008 International Guidelines for the Management of Deep-sea Fisheries in the High Seas. A further suggestion is working together to create an international legally binding agreement under UNCLOS for the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction (BBNJ process).

Table 9- Goal 14: Targets and Indicators relevant for the EBCG[76] [77]

Target	Target Description	Indicator
Reduce Marine Pollution	By 2025, prevent and significantly reduce marine pollution of all kinds, from land-based activities, including marine debris and nutrient pollution	• **Index of coastal eutrophication and floating plastic debris density**
Protect and Restore Ecosystems	By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and act for their restoration to achieve healthy and productive oceans	• **Proportion of national exclusive economic zones managed using ecosystem-based approaches**
Sustainable Fishing	By 2020, effectively regulate harvesting and end overfishing, illegal, unreported, and unregulated fishing and destructive fishing practices and implement science-based management plans, to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	• **Proportion of fish stocks within biologically sustainable levels**

Goal 15: Life on Land

Objective: Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Policy brief and Acceleration Plans:

2018 HLPF Background Note - Review of progress towards achieving SDG 15[78]

The 2018 High-Level Political Forum on Sustainable Development recognised that societies rely on terrestrial ecosystems and biodiversity to strengthen their resilience. Therefore, SDG 15 is central to providing the environmental services essential for ensuring safe and adequate water supplies, supporting sustainable food systems, and mitigating climate change.

[75] https://sdg.iisd.org/news/wto-fisheries-subsidies-negotiations-focus-on-overfishing/

[76] https://www.globalgoals.org/14-life-below-water

[77] https://unstats.un.org/sdgs/metadata/

[78] https://sustainabledevelopment.un.org/content/documents/200087.8_Formatted_Background_NoteSDG_15.pdf

The document stated that regional assessment reports issued by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) had found that biodiversity was declining in all regions of the world.
Hence, citing the slow progress, the policy brief provided recommendations on overcoming the bottlenecks in monitoring the SDG indicators and accelerating its progress. They were as follows:

- upscaling the sustainable management of land and water resources and establishing a narrative that the tools and solutions for achieving SDG 15 are also essential for goals related to climate change, water, and food security;
- laying out the risks and costs of inaction to mitigate the impact from business-as-usual developments in sectors such as agriculture, infrastructure, mining, urbanisation, and energy. This would stimulate reform to existing economic instruments such as subsidies that have an adverse impact and would pave the way for more effective regulation, taxation, and pricing;
- since capacity building is critical to implementation, national governments need to work with agencies across sectors to integrate SDG15 goals across other national priorities. For example, national statistical agencies have more experience with socio-economic measurement than environmental agencies, and ministries of the environment and biodiversity are often unable to participate effectively in cross-sectoral dialogue.
- coordination of action and collaboration among stakeholders to create enabling environments to accelerate the adoption of sustainable practices. Private sector investments and campaigns can help transform consumer behaviour.

Table 10- Goal 15: Targets and Indicators relevant for the EBCG[79] [80]

Target	Target Description	Indicator
Conserve and Restore Terrestrial and Freshwater Ecosystems	By 2020, ensure the conservation, restoration, and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains, and drylands, are in line with obligations under international agreements	• **Forest area as a proportion of total land area** • **Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type**
Ensure Conservation of Mountain Ecosystems	By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, to enhance their capacity to provide benefits that are essential for sustainable development	• **Coverage by protected areas of important sites for mountain biodiversity** • **Mountain Green Cover Index**
Protect Biodiversity and Natural Habitats	Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	• **Red List Index**
Combat Global Poaching and Trafficking	Enhance global support for efforts to combat poaching and trafficking of protected species, including increasing the capacity of local communities to pursue sustainable livelihood opportunities	• **Proportion of traded wildlife that was poached or illicitly trafficked**

Conclusion

The Sustainable Development Goals have set out missions and targets for each of the 17 goals. Moreover, each goal has also undergone a policy review and progress evaluation by the HLPF to understand if any course correction is required. These could further help track and improve attainment of the targets through effective and timely monitoring of goals set by the 2030 Agenda for Sustainable Development.

[79] https://www.globalgoals.org/15-life-on-land
[80] https://unstats.un.org/sdgs/metadata/

Shaping Europe's Digital Future

Description	*Shaping Europe's digital future is a Communication published by the European Commission in February 2020. It focuses on three main pillars to achieve digital transformation in Europe that can benefit citizens, businesses, and the environment. These three pillars are technology that works for people, a fair and competitive digital economy, along with an open, democratic, and sustainable society*

Key Facts	
Year Launched	2020
Key Agency	European Commission
Responsibilities	Proposes legislation, enforces EU laws, and direct the European Union's administrative operations
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	NA

Background[81]

The European Union (EU) has framed a digital strategy to facilitate digital transformation in its Member States. The EU's digital strategy envisions a digital transformation that works for people and businesses. It also aims to help achieve the EU's target of a climate-neutral Europe by 2050.

As part of the EU's digital strategy, the European Commission (EC) released a Communication titled Shaping Europe's digital future on 19 February 2020. The Communication emphasises that the EU's approach to achieving digital transformation should benefit all its citizens.

Overview[82]

In the Communication on Shaping Europe's digital future, the EC put forth its ideas and action plans for achieving digital transformation in Europe backed by European values. These key European values include openness, fairness, diversity, inclusiveness, and democracy. The Communication further outlined a European approach to digitisation that will put people first and:

- empower and include all European citizens,
- open up new business opportunities and reinforce every European business,
- bolster the development of trustworthy and reliable technology,
- promote an open and democratic society,
- foster a vibrant and sustainable economy,
- address global challenges ethically, and
- help achieve a green transition by fighting climate change.

This European approach to digital transformation will be based on three main pillars, namely:

- technology that works for people,
- a fair and competitive digital economy, and
- an open, democratic, and sustainable society

EU's digital strategy is envisioned to benefit citizens, businesses, and the environment alike.

[81] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en#latest

[82] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en#latest

This Communication on Shaping Europe's digital future was released with other related documents such as:[83]

- White Paper on Artificial Intelligence: a European approach to excellence and trust
- A European strategy for data
- Commission Report on safety and liability implications of AI, the Internet of Things and Robotics.

Three pillars for Europe's digital transformation[84]

For the five years starting 2020, the EC plans to focus on the three objectives/strategic pillars listed above to facilitate digital transformation.

These three pillars would ensure that digital solutions support Europe in paving the way to digital transformation through empowered citizens, businesses, and governments. These would further work for the benefit of people while upholding Europe's values. Thus, these pillars would also make Europe a global trendsetter.

Technology that works for people

About:

The EC aims to develop and deploy technology to bring a real difference to people's lives while upholding European values. It further aims to ensure cyber resilience and the trustworthiness of new-age technologies such as AI, super-computing, etc.

Strategic goals:

As per the data published on the official website, under this pillar, the EU's digital strategy goals are to:

- invest in the digital competencies of every European;
- safeguard people from cyber threats such as hacking, ransomware, and identity theft;
- ensure Artificial Intelligence (AI) is developed in ethical ways and can earn people's respect and trust;
- expedite the roll-out of ultra-fast broadband for homes, schools, and hospitals throughout the EU; and
- widen Europe's super-computing ability to bring innovative developments in the fields of medicine, transport, and the environment.

Funding:

The EU Multinational Financial Framework, the InvestEU guarantee, and structural and rural development funds will finance these strategic objectives. In addition, the Capital Markets Union will help make market-based financing available for high-tech companies.

Key strategic actions:

Under this pillar, the EC has strategised the following actions to implement its digital strategy and fulfil its goals:

Table 11- Key strategic actions and the year of implementation[85]

Key action	Year of implementation
Develop a White Paper on Artificial Intelligence that provides various options for a legislative framework for trustworthy AI, along with a follow-up on safety, liability, fundamental rights, sustainability, and data protection	Q4 2020 (published along with 'Shaping Europe's digital future')
Build and deploy joint digital capacities in the fields of AI, cyber, super- and quantum-computing, quantum communication, and blockchain	NA
Frame European strategies on Quantum and blockchain technology	Q2 2020
Revise the EuroHPC Regulation on super-computing	NA
Accelerate investments in Europe's Gigabit connectivity by: • revising the Broadband Cost Reduction Directive • updating the Action Plan on 5G and 6G • launching a new Radio Spectrum Policy Programme	2021

[83] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en#latest

[84] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en#latest

[85] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en#latest

Key action	Year of implementation
Roll out 5G corridors for connected and automated mobility, including railway corridors	2021-2030
Set up a European cybersecurity strategy and promote the single market for cybersecurity; the strategy includes: • establishment a joint Cybersecurity Unit with the Member States • review the Security of Network and Information Systems (NIS) Directive	NA
Strategise a Digital Education Action Plan to enhance digital literacy and competencies at all levels of education	Q2 2020
Design a reinforced Skills Agenda to boost digital skills throughout society and a reinforced Youth Guarantee to emphasise digital skills in early career transitions	Q2 2020
Establish a reinforced EU government interoperability strategy to strengthen coordination and set common standards for secure and borderless flow of public sector data	2021

A fair and competitive digital economy

About:

The EC envisions a frictionless and fair single market for companies of all sizes, maturities, and sectors to compete ethically with each other. Further, it wishes to provide all companies with equal opportunities to develop, market, and utilise digital technologies and related products and services. In this pursuit of attaining a fair and competitive digital economy, the EC wants to ensure that consumer rights are well protected.

Strategic goals:

As per the data published on the official website, under this pillar, the EU's digital strategy goals are to:

- strengthen a robust community of cutting-edge and fast-growing start-ups and SMEs to access finance and expand;
- introduce a Digital Services Act to enhance the responsibility of online platforms and clarify rules regarding online services;
- ascertain that EU rules are appropriate for the digital economy;
- ensure that all companies in Europe compete fairly with each other; and
- increase access to high-quality data while safeguarding personal and sensitive data.

Key strategic actions:

Under this pillar, the EC has strategised the following actions to implement its digital strategy and fulfil its goals:

Table 12- Key strategic actions and the year of implementation[86]

Key action	Year of implementation
Establish a European Data Strategy to make Europe a global leader in the data-agile economy	Q2 2020
Launch a legislative framework for data governance	Q4 2020
Announce a possible Data Act	2021
Consistently evaluate and review the aptness of EU competition rules for the digital age and launch a sector inquiry	2020-2023
Explore ex-ante rules in the context of the Digital Services Act and to ensure that markets continue to remain fair for innovators, businesses, and new market entrants	Q42020

[86] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en#latest

Key action	Year of implementation
Introduce an Industrial Strategy Package offering actions to help the transformation towards clean, circular, digital, and globally competitive EU industries, and the reinforcement of single market rules	NA
Establish a framework for convenient and secure Digital Finance, including • legislative proposals on crypto assets and digital, operational, and cyber resilience in the financial sector • a strategy to develop an integrated EU payments market that supports pan-European digital payment services and solutions	Q32020
Facilitate communication on business taxation to resolve tax-related challenges arising from digitisation	NA
Deliver a new Consumer Agenda to empower consumers and help them make informed choices for a smooth digital transformation	Q4 2020

An open, democratic, and sustainable society

About:

The EC intends to create a trustworthy environment for empowering citizens in how they act, interact, and share data online and offline. While respecting European democratic values and citizens' fundamental rights, the EC wants to develop a sustainable, climate-neutral, and resource-efficient economy. In this way, it also wants to contribute to accomplishing the European Green Deal and the Sustainable Development Goals (SDGs).

Strategic goals:

As per the data published on the official website, under this pillar, the EU's digital strategy goals are to:

- leverage technology to help Europe become climate-neutral by 2050;
- reduce the digital sector's carbon emissions;
- ensure that citizens have better control over their data and that their data is protected;
- develop a European health data space to boost targeted research, diagnosis, and treatment; and
- battle online disinformation and encourage diverse and reliable media content.

Key strategic actions:

Under this pillar, the EC has strategised the following actions to implement its digital strategy and fulfil its goals:

Table 13- Key strategic actions and the year of implementation[87]

Key action	Year of implementation
Develop new and revised rules to strengthen the Internal Market for Digital Services by: • integrating the responsibilities of online platforms and information service providers • bolstering the oversight over online platforms' content policies in the EU	Q4 2020 (as part of the Digital Services Act package).
Revise the electronic identity (eIDAS) Regulation to reinforce its effectiveness, extend its benefits to the private sector, and promote trusted digital identities for all Europeans	Q4 2020
To launch a Media and Audiovisual Action Plan to: • help digital transformation and the competitiveness of the audiovisual and media sector • Improve access to quality content and media pluralism	Q4 2020
Develop a European Democracy Action Plan to: • boost the resilience of democratic systems	Q4 2020

[87] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en#latest

Key action	Year of implementation
• support media pluralism • address external intervention in European elections	
Launch Destination Earth, an initiative to promote a high precision digital model (digital twin) of the Earth that would increase Europe's environmental prediction and crisis management capabilities	2021
Set up a circular electronics initiative for the (then) forthcoming circular economy action plan to: • ensure that electronic devices are durable and can be dismantled, reused, and recycled • secure the right to repair or upgrade to extend the lifecycle of electronic devices • avoid premature obsolescence	2021
Strategise initiatives to accomplish climate-neutral, energy-efficient, and sustainable data centres by 2030	2020-2030
Set transparency measures for telecom operators on their environmental footprint	NA
Promote electronic health records based on a common European exchange format to enable secure access and exchange of health data across the EU	2022
Design a European health data space to enhance safe accessibility of health data, leading to targeted and faster research, diagnosis, and treatment	2022

Europe's ambitions to become a global pioneer in digitisation[88,89]

About:

For Europe to truly impact the way in which digital solutions are developed and leveraged globally, it needs to be a strong and independent digital player. Thus, in the Communication on Shaping Europe's digital future', the EC also focused on the EU's global ambitions to become a digital stalwart. The EU wishes to leverage its diplomatic strengths and industrial and technological capabilities to become a trendsetter in digital transformation.

Strategic goals:

EU as a global leader aims to achieve the following goals:

- become a global role model for the digital economy,
- help developing economies in going digital, and
- set digital standards and promote them globally.

Key strategic actions:

The EC has strategised the following actions to implement its digital strategy and fulfil its goals:

Table 14- Key strategic actions and the year of implementation[90]

Key action	Year of implementation
Establish a Global Digital Cooperation Strategy **Global Digital Cooperation Strategy**: To promote the European approach to digital transformation based on European values and Europe's history of technology, innovation, and ingenuity on the global	2021

[88] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en#latest

[89] https://ec.europa.eu/info/sites/default/files/communication-shaping-europes-digital-future-feb2020_en_4.pdf

[90] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en#latest

Key action	Year of implementation
stage and to reflect the EU's work in Africa and other places on the Sustainable Development Goals, the Digital for Development (D4D) alliance, and capacity building	
Publish a White Paper on an instrument on foreign subsidies	Q2 2020
Design a Digital for Development Hub to: • build on the EU approach, • promote EU values, and • mobilise EU Member States and EU industry, Civil Society Organisations (CSOs), financial institutions, expertise, and technologies in digitisation	NA
Develop a standardisation strategy to deploy interoperable technologies respecting Europe's rules, and support Europe's approach and interests on the global stage	Q3 2020
Map opportunities and prepare an action plan to promote the European approach in bilateral and multilateral relations	Q2 2020

Envisioned benefits of Europe's digital transformation for the environment[91]

Europe's digital strategy aims to support the European Green Deal in making EU climate-neutral by 2050 in the following ways:[92]

- introduce a new EU Industrial Strategy to support the green transition,
- reinforce the EU's abilities to predict and manage environmental disasters through the 'Destination Earth' initiative,
- propose a circular electronics initiative to make devices last longer, which can reduce the carbon footprint,
- strive to make data centres and ICT infrastructure climate-neutral by 2030,
- leverage AI, 5G, cloud and edge computing, and the Internet of Things (IoT) to better deal with climate change and reduce the carbon footprint of the ICT sector,
- create smart and automated transport systems to reduce traffic congestion and enhance mobility,
- facilitate sustainable and green public procurement for all ICT products and services,
- support the circular economy and improve the energy efficiency of the ICT sector,
- introduce new product passports to educate consumers and industry about the origin, composition, handling, and recycling of products,
- create smart buildings and green data spaces, and
- launch precision farming that will lead to water and energy conservation.

Conclusion

In the Communication on Shaping Europe's digital future, the EC has presented its ideas and action plans to achieve digital transformation in Europe. The approach to achieving digital transformation is based on three pillars, namely:

- technology that works for people
- a fair and competitive digital economy
- an open, democratic, and sustainable society

The action plan, if implemented effectively, can help Europe become a global trendsetter in digitisation.

[91] https://ec.europa.eu/commission/presscorner/detail/en/fs_20_281

[92] Please note that this list is not explicitly mentioned in the Communication; it has been derived from an infographic on the relevant page of europa.eu

Horizon Europe

Description	*Horizon Europe is the European Union's key funding programme for research and innovation to ensure a sustainable and inclusive future. It tackles climate change, helps to achieve the UN's Sustainable Development Goals, and boosts the EU's competitiveness and growth.*

Key Facts	
Year Launched	2021
Key Agency	European Research Executive Agency (REA), established by the European Commission[93]
Responsibilities	REA is responsible for managing research projects supported under Horizon Europe from 2021 to 2027
Geographic Boundaries: Global/ Regional	Global
Number of Participating Countries	European Union Member States (27) and associated countries [94]
Legally Binding	NA

Background

Horizon Europe is the European Union's flagship programme to support Research and Innovation (R&I) from fundamental concept to market uptake. It is a continuation of the EU's earlier programme Horizon 2020, which has been a widely recognised asset in realising Europe's ambitions in terms of scientific breakthroughs, increased competitiveness, and effective solutions to societal challenges. Horizon Europe builds on the foundation of the former programme with a view to having an even greater impact than the current one in the domain of R&I by encouraging continent-wide competition and collaboration.

Horizon Europe was created in line with EU's current priorities and is fully consistent with the policies of the Commission, inter alia, the Budget for Results policy, its implementation of the 2030 Agenda on Sustainable Development, and the Union Global Strategy. This framework programme will reinforce the Union's scientific, research, and technological bases to help address global challenges and contribute to achieving the Sustainable Development Goals (SDGs), besides boosting EU's competitiveness on a global stage.

Mission

The general objective of this key funding programme is to deliver scientific, economic, technological, and societal impact by strengthening the European Research Area while also delivering on various Union strategic priorities and principles outlined in Agenda 2030 and the Paris Agreement. Horizon Europe also aims to boost Europe's innovation capacity, creating jobs, delivering on citizens' priorities, and sustaining the EU's socio-economic model and values.

The programme has the following specific objectives:

- encourage scientific excellence, promote creation and dissemination of high-quality new fundamental and applied knowledge, innovative methods, skills, training, and mobility of researchers;
- strengthen the overall impact of R&I in developing, supporting, and implementing Union policies, and assisting the adoption of innovative solutions in industry, particularly in SMEs, to address global challenges;
- facilitate technological development, nurture all forms of innovation, encourage knowledge transfer, and use of innovative solutions;

[93] https://ec.europa.eu/info/departments/european-research-executive-agency_en

[94] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/list-3rd-country-participation_horizon-euratom_en.pdf

- Optimise the Programme's delivery to strengthen the European Research Area, promote excellence-based participation from all Member States and enable international collaboration in European R&I.

Programme Structure

Implementation

Horizon Europe is divided into three pillars, each with a different role promoting the best science, finding solutions to societal and industrial problems, and funding small companies. The programme also introduces five research and innovation missions, as part of the second pillar, to address specific contemporary societal challenges.

Figure 4- Horizon Europe Structure

Source: figure adapted by Deloitte from European Commission[95]

The components of the structure and their functions are outlined below:

- The first pillar, **Excellent Science**, supports the best science and funds basic research. This pillar has three parts.
  - The **European Research Council (ERC)**, an EU agency that provides grants to target researchers and ground-breaking research projects without stipulating the research fields or challenges;
  - The **Marie Skłodowska-Curie Actions (MSCA)**, a collection of different research fellowships that aim to assist young researchers in developing their careers;
  - **Research Infrastructures** which directs funds to physical or virtual infrastructure that could be of use to European researchers.
- The second pillar, **Global Challenges and European Industrial Competitiveness,** is the largest pillar in terms of the budget share, accounting for 56% of the total budget. This pillar directly funds research related to societal challenges and develops industrial and technological capacities. The components of this pillar are:

[95] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf

- six broad, theme-based **"clusters"** covering health, culture, security, climate and energy, food and environment, and (the biggest cluster) digital, industry, and space;
- EU-wide **mission areas** that are designed to address some of the greatest global challenges like fighting cancer, adapting to climate change, protecting our oceans, climate-neutral and smart cities, and ensuring soil health and food;
- In addition, pillar II will also fund the non-nuclear direct actions of the **Joint Research Centre** (JRC). The JRC is the Commission's in-house research service, which provides independent technical and scientific support to policymakers in the EU and its Member States.

- The third pillar, **Innovative Europe**, aims to make Europe a leader in science-based and technological innovation. This pillar has three components:
  - **European Innovation Council** (EIC) to provide grants, equity, and loans for small businesses – in effect, turning the EU into a major tech investor;
  - **European Institute of Innovation and Technology** (EIT) to support education and training programmes geared towards innovation, supporting university spin-offs, and convening public-private partnerships in specific fields such as health or energy R&D;
  - **European Innovation Ecosystems** (EIE) to complement and collaborate with the EIC and EIT and innovative activities across Horizon Europe and other EU funding programmes to enhance the overall ecosystem for innovation in Europe[96].
- The fourth constituent of Horizon Europe – **Widening Participation and Strengthening the European Research Area** (ERA) – sits alongside the three main pillars and tries to improve the performance of research agencies in Europe's poorer regions and the European research community at large. There are two elements:
  - **Widening participation and spreading excellence**: the ERA is akin to a single market for ideas, with sub-programmes to encourage the cross-border exchange of scientific research and innovation in Europe;
  - **Reforming and enhancing the European R&I system**, which covers measures applicable throughout the EU to support a diverse mix of different EU policy initiatives for EU research policy and the ERA.

Like other EU Framework Programmes, Horizon Europe is implemented through subject-specific work programmes which form the core of Horizon Europe. These work programmes set out the Commission's research objectives in energy, health, ICT, and other fields. Moreover, to make Europe more globally competitive, a series of 49 partnerships underpin the entire system and are a fundamental feature of the topics in the second pillar. These partnerships are legally constituted all-public, public-private, and associations carrying out collaborative R&D in specific sectors.

In general, the EU aims to form more connected and efficient innovation ecosystems to aid the scaling of companies, promote innovation and facilitate cooperation among national, regional, and local innovation performers.

European Partnerships

European Partnerships are initiatives, prepared with early involvement of Member States and/or Associated Countries, where the Union together with public and/or private associates, foundations and other stakeholders, commits to jointly support the development and implementation of a programme for research and innovation activities. The key aim of European partnerships is to contribute to the effective implementation and achievement of EU priorities, address complex global challenges stipulated in Horizon Europe and strengthen the European Research Area (ERA). There are three types of European partnerships[97] namely:

- **co-funded European partnerships:** partnerships involving EU countries[98], with research funders and other public authorities at the core of the association;
- **co-programmed European partnerships:** partnerships between the Commission and public and/or private partners based on memoranda of understanding and/or contractual arrangements;
- **institutionalised European partnerships:** partnerships in the domain of research and innovation between the EU, Member States[99], and/or industry. They require a legislative proposal from the Commission and are based on

[96] https://sciencebusiness.net/news/whats-new-horizon-europe-sciencebusiness-summary

[97] https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe_en

[98] *References to 'Member States' and 'EU' in the text also include associated countries and territories, as appropriate*

[99] *References to 'Member States' and 'EU' in the text also include associated countries and territories, as appropriate*

a Decision by the European Parliament and Council (Article 185 of the Treaty on the Functioning of the European Union (TFEU)) or a Council Regulation (Article 187, TFEU)

Budget Allocation

The budget for the Horizon Europe programme is set at EUR 95.5 billion at current prices (including EUR 5.4 billion from the Next Generation of the EU – Recovery Fund).[100] The budget breakdown for 2021-2027 is shown below.

Table 15- Horizon Europe programme: budget breakdown

Pillar (Budget)	Component	Budget (EUR billion)
Excellent Science (EUR 25 011 billion)	European Research Council	16 003
	Marie Skłodowska-Curie Actions	6 602
	Research infrastructures	2 406
Global Challenges and European Industrial Competitiveness (EUR 53 516 billion)	Health	8 246
	Culture, Creativity and Inclusive Society	2.280
	Civil Security for Society	1 596
	Digital, Industry, and Space	15 349
	Climate, Energy, and Mobility	15 123
	Food, Bioeconomy, Natural Resources, Agriculture and Environment	8 952
	Joint Research Centre	1 970
Innovative Europe (EUR 13 597 billion)	European Innovation Council	10 105
	European Innovation Ecosystems	0 528
	European Institute of Innovation and Technology	2 965
Widening Participation and Strengthening the European Research Area (EUR 3 393 billion)	Widening participation and spreading excellence	2 955
	Reforming and enhancing the European R&I System	0 438

Salient Features

The First Horizon Europe Strategic Plan (2021-2024)

The Strategic Plan for 2021-2024 consists of four Key Strategic Orientations (KSO) supported by 15 impact areas that guide the Horizon Europe work programmes until 2024. Each KSO has impact areas that define the wider effects on the economy, society, and science to be chosen by research and innovation activities. The impacts are related to the six clusters that are a part of Horizon Europe's second pillar, Global Challenges and European Industrial Competitiveness.

[100] https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

It takes into account a range of horizontal considerations associated with areas for international cooperation, and key specific issues, such as gender, social sciences and humanities integration, key enabling technologies, ethics, open science practices, as well as social innovation[101].

It identifies five missions and 29 European co-funded and co-programmed partnerships with partners from industry, national governments, civil society organisations, and many more. The five missions are committed to solving major societal challenges in a holistic and interdisciplinary manner fighting cancer, adapting to climate change, protecting our oceans, living in climate-neutral and smart cities, and ensuring soil health for food, people, nature, and climate. The European Partnerships and the missions have adopted an impact-oriented programme approach, consistent with the Key Strategic Orientations of the first strategic plan.
The four Key Strategic Orientations (KSOs) for targeting investments in the Framework Programme's first four years are outlined below[102], along with impact areas and contributing clusters.

Table 16- First Horizon Europe Strategic Plan: Key Strategic Orientations

Key Strategic Orientations	Description	Impact areas	Contributing clusters
Promoting an open strategic autonomy by leading the development of key digital, enabling, and emerging technologies, sectors, and value chains	The objective is to make Europe more resilient and independent through investments in digital supply chains, promote uptake of innovative technologies for the green and digital transformation of industrial ecosystems.	• A competitive and secure data-economy • Industrial leadership in key and emerging technologies that work for people • Secure and cyber- secure digital technology • High-quality digital services for all	• **Health** • **Culture, Creativity and Inclusive Society** • **Civil Security for Society** • **Digital, Industry, and Space** • **Climate, Energy, and Mobility**

[101] https://ec.europa.eu/info/sites/default/files/research_and_innovation/funding/documents/ec_rtd_horizon-europe-strategic-plan-2021-24.pdf

[102] https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/strategic-plan_en

Key Strategic Orientations	Description	Impact areas	Contributing clusters
Restoring Europe's ecosystems and biodiversity, and managing sustainably natural resources	Develop knowledge and capabilities to provide innovative technologies and solutions to enable sustainable management of natural resources contributing to climate neutrality and adaptation.	• Enhancing ecosystems and biodiversity on land and in water • Clean and healthy air, water, and soil • Sustainable food systems from farm to fork on land and sea	• **Health** • **Digital, Industry, and Space** • **Climate, Energy, and Mobility** • **Food, Bioeconomy, Natural Resources, Agriculture and Environment**
Making Europe the first digitally enabled circular, climate-neutral and sustainable economy	Horizon Europe investments will support the implementation of the European Green Deal and the European Union's new growth strategy. Funds will be aligned with strategic priorities such as the New Industrial Strategy for Europe, the European Strategy for Energy System Integration, the Offshore Renewable Energy Strategy, the Circular Economy Action Plan, the European Union's Climate Action Plan, the European Hydrogen Strategy, the Renovation Wave Strategy	• Climate change mitigation and adaptation • Affordable and clean energy • Smart and sustainable transport • Circular and clean economy	• **Health** • **Digital, Industry, and Space** • **Climate, Energy, and Mobility** • **Food, Bioeconomy, Natural Resources, Agriculture and Environment**
Creating a more resilient, inclusive, and democratic European society	Horizon Europe will facilitate innovations, develop policies and institutions to aid democratic processes, and boost trust in democratic institutions, through the rule of law and equality, improved accountability, and transparency. This will strengthen border management, disaster risk management, and implementation of law besides mitigating the negative impact of the Covid-19 pandemic.	• A resilient EU prepared for emerging threats • A secure, open, and democratic EU society • Good health and high-quality accessible healthcare • Inclusive growth and new job opportunities	• **Health** • **Culture, Creativity and Inclusive Society** • **Civil Security for Society** • **Digital, Industry, and Space** • **Climate, Energy, and Mobility** • **Food, Bioeconomy, Natural Resources, Agriculture and Environment**

International Cooperation

Horizon Europe identifies international cooperation as a priority in tackling global challenges by enabling excellent science. International cooperation also provides Europe access to resources, technological know-how, value chains, and global markets.

International cooperation will be positioned along the following lines:

- collaborative research and innovation activities with partners from key developing countries focusing on strategic areas of mutual advantage under all clusters;
- international mobility and cooperation in frontier research aiding innovative EU companies, especially through actions in Pillars I and III;
- EU participation and leadership in multilateral alliances, like those related to sustainable food and nutrition security, tackling climate change, environmental degradation, biodiversity decline and global health issues;
- policy dialogues with third countries and regions aiming at strategic level cooperation in research and innovation – open science policies, a common approach to research ethics and integrity, digital technologies, safety, and quality standards, consumer products and services

Eight Specific Issues

1. **Gender equality and inclusiveness:** Gender equality, including addressing intersecting socioeconomic inequalities and integration of gender dimensions in research and innovation content, is a cross-cutting priority across the programme.
2. **Social Sciences and Humanities:** This is a key ingredient of research and innovation, particularly in the twin green and digital transitions.
3. **Ethics and integrity:** All projects funded by Horizon Europe, including research activities conducted in a non-EU country, must respect the European Code of Conduct for Research Integrity and observe ethical principles and legislation.
4. **Open science practices:** The programme will be based on the principle "as open as possible, as closed as necessary", which increases the quality and impact of R&I leading to greater responsiveness to societal problems. Several clusters, partnerships, and the Research infrastructures component will aid the development and consolidation of the European Open Science Cloud.
5. **Dissemination and Exploitation (D&E), including links to education and training, market uptake, and deployment:** Horizon Europe will aid and incentivise recipients throughout and after the project lifecycle through integrated services like IP Booster services[103], Horizon Results[104] and the Horizon Impact Reward.
6. **Key Enabling Technologies (KETs):** These play a critical role in Europe's competitiveness in strategic value chains. Through KETs, EU industries will gain a competitive advantage in global markets and advance towards solving global challenges, making the EU a circular, climate-neutral, and sustainable economy.
7. **Social Innovation:** Horizon Europe will back social innovation across the four Key Strategic Orientations by empowering social partners, consumers, citizens, and businesses to solve problems relating to energy and mobility, climate, habitat, and environmental protection.
8. **EU Taxonomy:** The EU Taxonomy Regulation[105] adopted in June 2020 outlines the framework for creating a 'green list' classification system underlining conditions under which economic activities can be regarded as environmentally sustainable. The EU taxonomy will contribute to the European Green Deal by increasing private sector investment in green and sustainable projects

Analysis of Clusters

Cluster 1: Health

Horizon Europe and the EU4Health programmes endeavour to maximise their synergies: Horizon Europe's focus will be on creating new knowledge and know-how, while EU4Health will aim at utilising this new knowledge and know-how to achieve maximum public health impact.

The health cluster will drive research and innovation to address health-related challenges by developing innovative methodological and technological solutions, advancing expertise and capabilities, designing sustainable techniques for

[103] https://ipbooster.meta-group.com/

[104] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/projects-results;programCode=H2020

[105] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R0852

digital transformations, improving accessibility to health care, supported by robust and reliable supply chains in Europe. This cluster will promote and nurture synergies with regional and national public health policies, other EU programmes and policies, and health-related European infrastructures, to maximise the impact of EU investments.

Description of Expected Impacts

- **Staying healthy in a rapidly changing society:** Research and Innovation (R&I) is vital in understanding health problems and thereby contributing to developing effective solutions for disease prevention and health promotion. It can bring new pieces of evidence, methodologies, and tools for augmenting health literacy, enhance the adoption of healthy lifestyles, and empower citizens to manage their health.
- **Living and working in a health-promoting environment:** R&I can help identify and assess the risks and benefits for health to drive EU policy action and overarching policy frameworks such as the European Green Deal, the EU Strategic Framework on Health and Safety at Work, the 8th Environment Action Programme, and the European Environment and Health Process.
- **Tackling diseases and reducing their burden:** R&I is key to improving existing prevention strategies to create tangible impacts to tackle diseases. International cooperation is essential to bring to the fore the best global expertise, access world-class research infrastructures, and leverage large-scale investments.
- **Ensuring access to innovative, sustainable and high-quality health care:** R&I can support innovative solutions for health care systems in dimensions like financing and governance, training of the health workforce, resilience, and preparedness for health emergencies and climate change.
- **Unlocking the full potential of new tools, technologies, and digital solutions for a healthy society:** Management of benefits and risks of new technologies is crucial in the acceptability of innovations and their due incorporation in health policies and health care systems. Artificial intelligence technologies can be exploited to support health care systems in general.
- **Maintaining an innovative, sustainable, and globally competitive health-related industry:** There is a need for cross-sectoral R&I to strengthen single market strategies (the digital single market) and support sustainable innovation uptakes to foster affordability, accessibility, and reduction in health inequalities.

Cluster 1 will specifically support the following two Horizon Europe key strategic orientations and the impact areas associated with the Key Strategic Orientations

Table 17- Cluster 1: Key Strategic Orientations and Impacts

Key Strategic Orientations (KSO)	Expected Impact	Intervention Areas	European Partnerships
Promoting an open strategic autonomy by leading the development of key digital, enabling, and emerging technologies, sectors, and value chains	Unlocking the full potential of new tools, technologies, and digital solutions for a healthy society	· Tools, Technologies and Digital Solutions for Health and Care, including Personalised medicine	Personalised Medicine
	Maintaining an innovative, sustainable and globally competitive health-related industry	· Tools, Technologies and Digital Solutions for Health and Care, including Personalised medicine · Health Care Systems	· Health Innovation Partnership (Innovative Health Initiative)
Creating a more resilient,	Staying healthy in a rapidly changing society	· Health throughout the Life Course	

Key Strategic Orientations (KSO)	Expected Impact	Intervention Areas	European Partnerships
inclusive, and democratic European society		· Environmental and Social Health Determinants	
	Living and working in a health-promoting environment	· Health throughout the Life Course · Environmental and Social Health Determinants	· Partnership on Risk Assessment of Chemicals
	Tackling diseases and reducing their burden	· Non-Communicable and Rare Diseases · Infectious Diseases, including Poverty-related and Neglected Diseases	· EU-Africa Global Health Partnership[106] · Rare Diseases · One Health AMR · Fostering a European Research Area for Health Research (ERA for Health)
	Ensuring access to innovative, sustainable & high-quality health care	· Health Care Systems	· Transformation of Health Care systems · Pandemic Preparedness

Cluster 2: Culture, Creativity and Inclusive Society

This cluster focuses on challenges relating to cultural heritage and the creative economy, and democratic governance, as well as social and economic transformations. Cluster 2 is in line with the United Nations Sustainable Development Goals and will address priorities of the EU that give a new impetus to European democracy, the European Green Deal, a people-centric economy, and make Europe suitable for the digital era, resilient and stronger in the world, enable it to better manage migration and mobility, as well as stimulate creativity and protect Europe's cultural heritage.

Description of Expected Impacts

- Democratic governance is reinvigorated by improving the accountability, transparency, effectiveness, and trustworthiness of rule-of-law based institutions and policies: The objective of research investments is to develop innovations, policies, and institutional frameworks that increase political participation, civic engagement and equality, social dialogue, and that help fight discrimination and racism
- Social and economic resilience and sustainability; inclusive growth through evidence-based policies for employment, education, social fairness, and Inequalities: These two expected impacts are synergetic and build on each other to reinforce the EU's inclusive growth and upward convergence through social investment and output-enhancing policies consistent with the European Pillar on Social Rights, the EU's policies on jobs and growth and the Just Transition Mechanism
- The full potential of cultural heritage, arts, and the cultural and creative sectors: R&I results will contribute to European integration and societal solidarity by providing wider, better, and equal access to heritage, culture, and the arts by analysing the role of culture in multi-cultural societies.

Cluster 2 will specifically support the following two Horizon Europe key strategic orientations and the impact areas associated with them.

Table 18- Cluster 2: Key Strategic Orientations and Impacts

[106] *Candidate Institutionalised European Partnership based on Article 187 TFEU that requires the preparation and adoption of a Commission proposal for Council Decision.*

Key Strategic Orientations	Expected Impact	Intervention Areas	European Partnerships
Promoting an open strategic autonomy by leading the development of key digital, enabling and emerging technologies, sectors and value chains	Full potential of cultural heritage, arts, and cultural and creative sectors	· Cultural Heritage	NA
Creating a more resilient, inclusive, and democratic European society	Democratic governance is reinvigorated by improving the accountability, transparency, effectiveness and trustworthiness of rule-of-law based institutions and policies	· Democracy and Governance	NA
	Social and economic resilience and sustainability	· Social and Economic Transformations	NA
	Inclusive growth through evidence-based policies for employment, education, social fairness and inequalities, including in response to socio-economic challenges due to the COVID-19 pandemic	· Social and Economic Transformations	NA

Cluster 3: Civil Security for Society

The vision of Cluster 3 is to support and strengthen EU responses to security challenges by investing in security research to make the European civil security industry sector globally competitive. Security research will serve as a tool for the EU to change from a reactive approach to a proactive approach based on foresight, prevention, and anticipation.

This Cluster will support the Commission's priorities of Promoting our European way of life[107], a Europe fit for the digital age[108], and the European Green Deal[109]. In particular, the cluster will support the Counter-Terrorism Agenda[110], the implementation of the Security Union Strategy[111], EU Disaster Risk Reduction policies[112], the border management and security dimensions of the New Pact on Migration and Asylum[113], the EU Maritime Security Strategy[114], and the EU Cybersecurity Strategy[115].

Description of Expected Impacts

- **Enhanced disaster risk reduction:** R&I will augment societal risk awareness, prevention, and preparedness, including better capacities to improve the precision and verifiability of disaster predictions. It will encourage risk-informed innovations, enhanced technological solutions, and concepts, better tools, and procedures for better coordination of cross-border incidents, and will lead to the formulation of standards at EU-level for emergency planning.

[107] https://ec.europa.eu/info/strategy/priorities-2019-2024/promoting-our-european-way-life_en

[108] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age_en

[109] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

[110] https://ec.europa.eu/home-affairs/system/files/2020-12/09122020_communication_commission_european_parliament_the_council_eu_agenda_counter_terrorism_po-2020-9031_com-2020_795_en.pdf

[111] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1596452256370&uri=CELEX:52020DC0605

[112] https://ec.europa.eu/echo/what/civil-protection/european-disaster-risk-management_en

[113] https://ec.europa.eu/info/strategy/priorities-2019-2024/promoting-our-european-way-life/new-pact-migration-and-asylum_en

[114] https://ec.europa.eu/oceans-and-fisheries/ocean/blue-economy/other-sectors/maritime-security-strategy_en

[115] https://digital-strategy.ec.europa.eu/en/policies/cybersecurity-strategy

- **Improved air/land/sea border management and maritime security:** R&I will help develop tools and methods for integrated border management and maritime surveillance to increase reaction capability and capacity for border surveillance, and management of EU critical maritime infrastructure.
- **Tackling crime and terrorism, and threats to infrastructures:** R&I will give a deeper understanding of human and social aspects affecting crime and terrorism, which will help EU police authorities to better tackle challenges by developing new tools, technologies, and systems.
- **Increased cybersecurity and a more secure online environment:** R&I will strengthen European cybersecurity industrial capacities, supply chain security, and improve open strategic autonomy vis-à-vis foreign technologies.

Cluster 3 will specifically support the following two Horizon Europe key strategic orientations and the impact areas associated with them.

Table 19- Cluster 3: Key Strategic Orientations and Impacts

Key Strategic Orientations	Expected Impact	Intervention Areas	European Partnerships
Promoting an open strategic autonomy by leading the development of key digital, enabling, and emerging technologies, sectors, and value chains	Increased cybersecurity and a more secure online environment	• Cybersecurity	The European Cybersecurity Industrial, Technology and Research Competence Centre
Creating a more resilient, inclusive and democratic European society	Enhanced disaster risk reduction	• Disaster-resilient societies	NA
	Improved air/land/sea border management and maritime security	• Protection and Security	NA
	Tackling crime and terrorism, and threats to infrastructures	• Protection and Security • Cybersecurity	NA

Cluster 4: Digital, Industry, and Space

This cluster will strengthen Europe's industrial base and economic competitiveness, enhance its resilience and flexibility, both in terms of technologies and supply chains. Horizon Europe synergises with programmes and initiatives like the European Commission's New Industrial Strategy for Europe[116], the European Green Deal[117], the Circular Economy Action Plan[118], the Space Strategy for Europe[119], and digital strategies, including Shaping Europe's Digital Future[120], the EU Data Strategy[121] and the Artificial Intelligence White Paper[122].

The main vision behind the proposed investments under this Cluster is that of Europe developing secure, competitive, and trusted technologies for European industry in key areas, enabling sustainable production and consumption, and maximising social, economic, and territorial benefits in Europe.

Description of Expected Impacts

[116] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy_en

[117] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

[118] https://ec.europa.eu/environment/pdf/circular-economy/new_circular_economy_action_plan.pdf

[119] https://ec.europa.eu/transparency/documents-register/detail?ref=COM(2016)705&lang=en

[120] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en

[121] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en

[122] https://ec.europa.eu/info/sites/default/files/commission-white-paper-artificial-intelligence-feb2020_en.pdf

- **Industrial leadership and increased autonomy in key strategic value chains with security of supply in raw materials:** To make Europe climate-neutral and a circular economy, there is a need to accelerate the adoption of digital and enabling technologies in industrial value chains and strategic sectors.
- **A globally attractive, secure, and dynamic data-agile economy:** R&I is necessary to develop data technologies that can fuel Europe's economy, by sharing, processing, modelling, and analysing large data volumes, while maintaining privacy, safety, security, and ethical standards.
- **Open strategic autonomy in digital technologies and future emerging enabling technologies:** Europe increasingly depends on other countries for its key digital capacities, such as computing systems, digital components, data infrastructure, and web platforms. Therefore, there is a need to reinforce the European digital industry and regain leadership across digital supply chains.
- **Open strategic autonomy in developing, deploying, and using global space-based infrastructures, services, applications, and data:** the EU aims to be competitive, secure its independent access to space in the future and reduce its dependence on non-EU suppliers of services and technologies.
- **A human-centred and ethical development of digital and industrial technologies:** Innovative technological solutions have the potential to enhance social inclusion, by ensuring a two-way engagement with society in developing technologies, thereby enhancing trust, cooperation, and respect for the environment.
- **Global leadership in clean and climate-neutral industrial value chains, circular economy and climate-neutral digital systems and infrastructures:** New innovative technologies and new sustainable methods will enable industry to minimise energy and resource consumption, decarbonise production processes and protect the environment.

Cluster 4 will specifically support the following two Horizon Europe key strategic orientations and the impact areas associated with them.

Table 20- Cluster 4: Key Strategic Orientations and Impacts

Key Strategic Orientations	Expected Impact	Intervention Areas	European Partnerships
Promoting an open strategic autonomy by leading the development of key digital, enabling, and emerging technologies, sectors, and value chains	Industrial leadership and increased autonomy in key strategic value chains with security of supply in raw materials	• Advanced Materials • Circular Industries • Low-Carbon and Clean Industries • Manufacturing Technologies • Key digital technologies • Emerging enabling technologies	• Made in Europe • Processes4Planet
	Globally attractive, secure, and dynamic data-agile economy	• Artificial Intelligence and Robotics • Advanced Computing and Big Data • Manufacturing Technologies	• Artificial Intelligence, Data, and Robotics • Smart Networks and Services[123] • Key Digital Technologies[124] • High-Performance Computing • European Metrology

[123] *Candidate Institutionalised European Partnership based on Article 187 TFEU that requires the preparation and adoption of a Commission proposal for Council Decision.*

[124] *Candidate Institutionalised European Partnership based on Article 185 TFEU that requires the preparation and adoption of a Commission proposal for a Decision of European Parliament and Council*

Key Strategic Orientations	Expected Impact	Intervention Areas	European Partnerships
	Open strategic autonomy in digital technologies and future emerging enabling technologies	• Key digital technologies • Emerging enabling technologies • Artificial Intelligence and Robotics • Next Generation Internet • Advanced Computing and Big Data	• Artificial Intelligence, Data, and Robotics • Photonics • Smart Networks and Services • Key Digital Technologies • High-Performance Computing • European Metrology
	Open strategic autonomy in developing, deploying, and using global space-based infrastructures, services, applications, and data	• Space, including Earth Observation	• Globally Competitive Space • Systems
	A human-centred and ethical development of digital and industrial technologies	• Next Generation Internet • Artificial Intelligence and Robotics • Manufacturing Technologies	• Made in Europe • Artificial Intelligence, Data, and Robotics • Key Digital Technologies
Making Europe the first and sustainable economy	Global leadership in clean and climate-neutral industrial value chains, circular economy and climate-neutral digital systems and infrastructures	• Manufacturing Technologies • Advanced Materials • Circular Industries • Low-Carbon and Clean Industries • Key digital technologies • Artificial Intelligence and Robotics	• Clean Steel - Low Carbon Steelmaking • Made in Europe • Processes4Planet • Photonics • Artificial Intelligence, Data, and Robotics

Cluster 5: Climate, Energy and Mobility

Cluster 5 is primarily driven by the objective of making Europe climate neutral by 2050, involving the transition to climate neutrality of the mobility and energy sectors at latest by 2050, complemented with boosting their resilience, competitiveness, and utility for society. Actions in this cluster will support the implementation of the European Green Deal, the Paris Agreement, the European Economic Recovery Plan[125], and other EU priorities in the areas of energy, climate, and mobility.

The activities will also contribute to Commission priorities such as A Europe fit for the digital age, An economy that works for the people and A Clean Planet for All by creating more green jobs, leading to faster digitisation, accelerated economic and social transformation, and decarbonisation of the energy and transport sectors, thus making Europe a leader in global markets for sustainable technologies.

Description of Expected Impacts

[125] https://ec.europa.eu/info/strategy/recovery-plan-europe_en

- **Clean and sustainable transition of the energy and transport sectors:** R&I actions will aim to provide concrete solutions for urban energy and mobility systems, while also investigating more effective means of citizen participation.
- **Climate-neutral and environmental-friendly mobility:** R&I in the transport sector is needed to align the projected targets for GHG emissions with the objectives of the Paris Agreement so that the EU achieves the net-zero GHG emission goal by 2050.
- **Transition to a climate-neutral and resilient society and economy:** Research will enhance knowledge of climate change and its implications and societal impacts, develop tools to support decision-making for adaptation and mitigation actions, and help develop technologies for a zero-carbon transition.
- **An efficient, clean, sustainable, secure, and competitive energy supply:** R&I will focus on boosting the cost performance and reliability of renewable energy solutions to make the energy supply side cleaner, more secure and competitive.
- **Efficient and sustainable use of energy:** R&I actions will enable cost-effective energy solutions for building renovations that can later be scaled up to district and city level, and efficient use of decarbonised energy in industry.
- **Safe, seamless, smart, inclusive, resilient, climate-neutral, and sustainable mobility systems:** R&I will enable a smooth transformation from supply-based transport to demand-driven climate-neutral, safe and sustainable transport and mobility services.

Cluster 5 will specifically support the following two Horizon Europe key strategic orientations and the impact areas associated with them.

Table 21- Cluster 5: Key Strategic Orientations and Impacts

Key Strategic Orientations (KSO)	Expected Impact	Intervention Areas	European Partnerships
Promoting an open strategic autonomy by leading the development of key digital, enabling and emerging technologies, sectors and value chains	Clean and sustainable transition of the energy and transport sectors	• Communities and Cities • Clean Transport and Mobility • Energy Storage	• Clean Hydrogen • Batteries: Towards a competitive European industrial battery value chain • Driving Urban Transitions to a Sustainable Future (DUT)
	Climate-neutral and environment-friendly mobility	• Industrial Competitiveness in Transport • Clean Transport and Mobility • Smart Mobility	• Transforming Europe's Rail System • Integrated Air Traffic Management • Clean Aviation • Towards Zero-emission Road Transport (2ZERO) • Zero-emission Waterborne Transport
Making Europe the first digitally enabled circular, climate-neutral, and sustainable economy	Transition to a climate-neutral and resilient society and economy	• Climate Science and Solutions	•
	Efficient, clean, sustainable,	• Energy Supply	• Clean Energy Transition

Key Strategic Orientations (KSO)	Expected Impact	Intervention Areas	European Partnerships
	secure, and competitive energy supply	• Energy Systems and Grids • Energy Storage	
	Efficient and sustainable use of energy	• Buildings and Industrial Facilities in the Energy Transition	• People-centric Sustainable Built Environment (Built4People)
	Safe, seamless, smart, inclusive, resilient, climate-neutral, and sustainable mobility systems	• Industrial Competitiveness in Transport • Clean Transport and Mobility • Smart Mobility	• Connected and Automated Mobility (CCAM)

Cluster 6: Food, Bioeconomy, Natural Resources, Agriculture and Environment

R&I investments are instrumental in addressing the serious negative impacts of climate change and the production and consumption patterns of human activities in general. Cluster 6 will be a key factor in meeting the objectives of various complementary programmes and priorities like the European Green Deal, an economy that works for people and A Europe fit for the digital age. The most relevant Green Deal initiatives are the Farm to Fork Strategy[126], the Circular Economy Action Plan, the Climate Action Plan, EU Biodiversity Strategy[127], the Zero Pollution Action Plan[128], and the New Industrial Strategy for Europe.

The circular economy, the sustainable bioeconomy, the blue economy, sustainable agriculture, and digitisation and technologies have the potential to balance the social, environmental, and economic goals laid out in the UN 2030 Sustainable Development Agenda, thus setting the economy on a course of a low ecological footprint and sustainable development. Research producing new knowledge, a multiplicity of innovations, thriving place-based innovation and industrial ecosystems, community and societal engagement, and innovative business and governance models will play a significant role in achieving the objectives of the programme.

Description of Expected Impacts

- **Climate neutrality and adaptation to climate change:** R&I will facilitate a better understanding of climate mitigation and the adaptation potential of ecosystems, support the development of innovative production, distribution, and waste management systems, enable preservation of natural carbon sinks, foster adaptation to climate change impacts, improve resource efficiency and resilience, and support EU monitoring, risk-based assessment and forecasting capacities.
- **Preservation and restoration of biodiversity and ecosystems:** R&I will enable transformative changes to better understand, observe, monitor, restore, value, and manage biodiversity and ecosystem services.
- **Food and nutrition security for all from sustainable food systems from farm to fork:** R&I will be crucial in accelerating the transition to a sustainable, low ecological footprint, and inclusive and healthy food systems from primary production to consumption
- **Balanced development of rural, coastal and urban areas:** R&I will enable knowledge building and equitable access to information on the differential impacts of climate, socio-economic, demographic, and environmental changes on rural coastal, and urban areas, leading to territorial cohesion by driving equal opportunities for people.

[126] https://ec.europa.eu/food/horizontal-topics/farm-fork-strategy_en

[127] https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en

[128] https://ec.europa.eu/environment/strategy/zero-pollution-action-plan_en

- **Sustainable and circular management of natural resources; tackling pollution; bioeconomy:** Innovative solutions based on safe circular and bio-based approaches, implemented through sustainable and technology breakthrough business models, will ensure competitiveness, increase resource efficiency along and across value chains, as well as aid job creation in economically and socially disadvantaged areas.
- **Innovative governance models enabling sustainability, environmental observation:** R&I will provide a better understanding of the impacts of global changes and the application of digital and big-data technologies to assess the environmental and socio-economic aspects, which will support policy design and adaptation measures based on strong evidence-based knowledge.

Cluster 6 will specifically support the following two Horizon Europe key strategic orientations and the impact areas associated with them.

Table 22- Cluster 6: Key Strategic Orientations and Impacts

Key Strategic Orientations (KSO)	Expected Impact	Intervention Areas	European Partnerships
Restoring Europe's ecosystems and biodiversity, and managing sustainably natural resources	Climate neutrality and adaptation to climate change	• Environmental Observation • Biodiversity and Natural Resources • Agriculture, Forestry and Rural Areas • Seas, Oceans and Inland Waters • Food Systems • Bio-based Innovation Systems in the EU Bioeconomy • Circular Systems	• Water4All: Water Security for the Planet
	Preservation and restoration of biodiversity and ecosystems	• Environmental Observation • Biodiversity and Natural Resources • Agriculture, Forestry and Rural Areas • Seas, Oceans and Inland Waters • Food Systems • Bio-based Innovation Systems in the EU Bioeconomy • Circular Systems	• Rescuing Biodiversity to Safeguard Life on Earth
	Food and nutrition security for all from sustainable food systems from farm to fork	• Environmental Observation • Biodiversity and Natural Resources • Agriculture, Forestry and Rural Areas • Seas, Oceans and Inland Waters • Food Systems • Bio-based Innovation Systems in the EU Bioeconomy	• Accelerating Farming Systems • Transition: Agro-ecology • Living Labs and Research Infrastructures • Animal Health and Welfare • Safe and Sustainable

Key Strategic Orientations (KSO)	Expected Impact	Intervention Areas	European Partnerships
		• Circular Systems	Food Systems for People, Planet, and Climate
	Balanced development of rural, coastal and urban areas	• Environmental Observation • Biodiversity and Natural Resources • Agriculture, Forestry and Rural Areas • Seas, Oceans and Inland Waters • Food Systems • Bio-based Innovation Systems in the EU Bioeconomy • Circular Systems	
Making Europe the first digitally enabled circular, climate-neutral and sustainable economy	Sustainable and circular management of natural resources; tackling pollution; bioeconomy	• Environmental Observation • Biodiversity and Natural Resources • Agriculture, Forestry and Rural Areas • Seas, Oceans and Inland Waters • Food Systems • Bio-based Innovation Systems in the EU Bioeconomy • Circular Systems	• Circular bio-based Europe: Sustainable, inclusive, and circular bio-based solutions
	Innovative governance models enabling sustainability, environmental observation	• Environmental Observation • Biodiversity and Natural Resources • Agriculture, Forestry and Rural Areas • Seas, Oceans and Inland Waters • Food Systems • Bio-based Innovation Systems in the EU Bioeconomy • Circular Systems	• Agriculture of Data • A Climate Neutral, Sustainable and Productive Blue Economy

Work Programmes 2021-2022

Marie Skłodowska-Curie Actions (MSCA)

MSCA were launched in 1996 and this is the Union's reference programme for doctoral education and postdoctoral training that encourages young individuals to pursue research as a career option, attracts top talents from around the world, retains researchers in the EU, and reintegrates those working in other places.

The positive effects of the MSCA programme on organisations include[129]

[129] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-2-msca-actions_horizon-2021-2022_en.pdf

- increasing the quality of researchers' training and the supervision offered;
- strengthening research capacity;
- enhancing human resources practices and procedures;
- building new and sustainable international and inter-sectoral partnerships and networks.

The MSCA has the following five main intervention areas laid out in the specific programme implementing Horizon Europe:

- Nurturing Excellence through Mobility of Researchers across Borders, Sectors, and Disciplines;
- Fostering new Skills through Excellent Training of Researchers;
- Strengthening Human Capital and Skills Development across the European Research Area;
- Improving and Facilitating Synergies;
- Promoting Public Outreach.

The following actions within the MSCA are implementing the abovementioned intervention areas:

Table 23- MSCA Actions and Objectives

Action	Main Objective
MSCA Doctoral Networks	These networks aim to train creative, entrepreneurial, innovative and resilient doctoral candidates, competent to tackle current and future challenges and to convert ideas and knowledge into products and services for social and economic benefit.
MSCA Postdoctoral Fellowships	The aim of these fellowships is to enhance the innovative potential of researchers holding a PhD, seeking to acquire new skills through advanced training, international, interdisciplinary and inter-sectoral mobility.
MSCA Staff Exchanges	These exchanges promote innovative international, inter-sectoral and interdisciplinary collaboration in R&I through staff exchanges and create an environment for sharing ideas and knowledge at all stages of the innovation chain.
MSCA COFUND	COFUND co-finances new or existing doctoral programmes and postdoctoral fellowship schemes at regional, national and international level with an aim of spreading MSCA best practices, including international, inter-sectoral and interdisciplinary research training, as well as international and inter-sectoral mobility of researchers at all stages of their career.
MSCA and Citizens	Through the European Researchers' Night[130], MSCA and Citizens aims to bring research and researchers closer to the public at large, to increase awareness of R&I activities and to boost public recognition of science and research education.

Research Infrastructures

The Research Infrastructures Programme under Horizon Europe aims to empower Europe with state-of-the-art and accessible research infrastructures that enable research and technological innovation and drive interdisciplinary and data-driven science. Research Infrastructures and Technological Infrastructures help in developing an integrated and effective ecosystem in Europe starting from knowledge creation through to technology deployment. They also facilitate the implementation of Open Science policies in addition to supporting European technology leadership and competitiveness.

The Research Infrastructures work programme 2021-2022 is designed around the following five Destinations[131]:

- **INFRADEV** – Developing, consolidating, and optimising the European research infrastructures landscape, maintaining global leadership;
- **INFRAEOSC** - Enabling an operational, open, and Findable, Accessible, Interoperable and Reusable (FAIR) European Open Science Cloud (EOSC) ecosystem;
- **INFRASERV** – Research infrastructure services to support health research, accelerate the green and digital transformation, and advance frontier knowledge;
- **INFRATECH** – Next-generation of scientific instrumentation, tools, and methods, and advanced digital solutions;

[130] *A research communication and promotion event taking place across EU Member States and Horizon Europe Associated Countries*

[131] *https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-3-research-infrastructures_horizon-2021-2022_en.pdf*

- **INFRANET** - Network connectivity in Research and Education – Enabling collaboration without boundaries.

Cluster 1: Health

The Health work programme 2021-2022 contributes to two Key Strategic Orientations stipulated in the Horizon Europe Strategic Plan 2021-2024, notably:

- promoting an open strategic autonomy by leading the development of key digital, enabling, and emerging technologies, sectors, and value chains,
- creating a more resilient, inclusive and democratic European society.

It aims to contribute to four of the Strategic Plan's impact areas, namely:

- a resilient EU prepared for emerging threats;
- good health and high-quality accessible health care;
- a competitive and secure data economy;
- high-quality digital services for all.

The work programme[132] includes six Destinations, which are the six expected impacts in cluster 1 of the Strategic Plan. This is illustrated in the following table.

Table 24- Cluster 1 Work Programme: Destination and Expected Impacts

Destination	Description	Expected Impact[133]
Staying healthy in a rapidly changing society	Citizens of all ages stay healthy in a rapidly changing society due to healthier diets, lifestyles and environments, health policies, and better effective solutions in the health sector.	Staying healthy in a rapidly changing society
Living and working in a health-promoting environment	Sustainable living and working environments owing to a better understanding of socio-economic, environmental, and occupational determinants of health.	Living and working in a health-promoting environment
Tackling diseases and reducing disease burden	Health care providers can better manage diseases and reduce disease burden due to better deployment of effective and innovative health technologies, improved capabilities to treat diseases and manage epidemics.	Tackling diseases and reducing disease burden
Ensuring access to innovative, sustainable, and high-quality health care	This is possible through the uptake of cost-effective, safe, and people-centred solutions, with a focus on health system resilience, population health, and better evidence-based health policies.	Ensuring access to innovative, sustainable, and high-quality health care
Unlocking the full potential of new tools, technologies, and digital solutions for a healthy society	New health tools and technologies are effectively applied due to secure, inclusive, and integrated health policies and health care systems.	Unlocking the full potential of new tools, technologies, and digital solutions for a healthy society
Maintaining an innovative, sustainable, and globally competitive health-related industry	EU health industry is sustainable, innovative, and globally competitive owing to the deployment of breakthrough technologies making the EU more resilient and less dependent on imports.	Maintaining an innovative, sustainable, and globally competitive health-related industry

Cluster 2: Culture, creativity, and inclusive society

[132] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-4-health_horizon-2021-2022_en.pdf

[133] The destinations of this work programme are the same as the expected impacts set out in the Strategic Plan for the health cluster

The work programme 2021-2022 of cluster 2, Culture, creativity and inclusive Society, aims to realise the goals and priorities of EU on the safeguarding and promotion of cultural heritage, enhancing democratic governance and citizens participation, and shaping multidimensional economic, social, technological, and cultural transformations, by mobilising the multidisciplinary expertise of European social sciences and humanities. This cluster aims to provide evidence-based policy options for an inclusive European green and digital transition and recovery.

Synergies and complementarities with other relevant Union programmes will be sought, which include Creative Europe[134]; Erasmus+[135]; Neighbourhood, Development and International Cooperation Instrument[136]; Digital Europe Programme (DEP)[137]; Reform Support Programme[138]; Justice, Rights and Values Fund[139]; European Social Fund Plus (ESF+)[140]; European Regional Development Fund (ERDF)[141]; European Agricultural Fund for Rural Development (EAFRD)[142]; InvestEU Programme[143] and Asylum and Migration Fund (AMF)[144]. Further, complementarities and synergies with other parts of Horizon Europe will be ensured, in particular Cluster 3,4,5 and 6 namely, Civil security for society; Digital, industry and space; Climate, energy and mobility; and Food, bioeconomy, natural resources, agriculture and environment.

This work programme identifies the following three Destinations[145]:

Table 25- Cluster 2 Work Programme: Destination and Expected Impacts

Destination	Description	Expected Impact
Innovative Research on Democracy and Governance	Activities in this Destination will provide data, knowledge, and scientifically robust recommendations to strengthen democratic governance and improve trust in democratic institutions, by safeguarding fundamental rights, increasing transparency, accountability, and effectiveness.	Democratic governance is reinvigorated by improving the accountability, transparency, effectiveness and trustworthiness of rule-of-law based institutions and policies
Innovative Research on the European Cultural Heritage and the Cultural and Creative Industries	Activities in this Destination will support innovation and competitiveness to better engage with cultural heritage, improve its protection and restoration, besides supporting sustainable growth and job creation in the cultural and creative industries.	Full potential of cultural heritage, arts and cultural and creative sectors
Innovative Research on Social and Economic Transformations	Activities in this Destination will help address economic, social,	Social and economic resilience and sustainability

134 https://ec.europa.eu/culture/creative-europe

135 https://ec.europa.eu/programmes/erasmus-plus/node_en

136 https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/global-europe-neighbourhood-development-and-international-cooperation-instrument_en

137 https://digital-strategy.ec.europa.eu/en/activities/digital-programme

138 https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/625150/EPRS_BRI(2018)625150_EN.pdf

139 https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/new-justice-rights-and-values-fund

140 https://ec.europa.eu/european-social-fund-plus/en/what-esf

141 https://ec.europa.eu/regional_policy/en/funding/erdf/

142 https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/european-agricultural-fund-rural-development-eafrd_en

143 https://europa.eu/investeu/home_en

144 https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/asylum-migration-and-integration-fund_en

145 *https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-5-culture-creativity-and-inclusive-society_horizon-2021-2022_en.pdf*

Destination	Description	Expected Impact
	and political inequalities, support the development of human capital and contribute to a broad European strategy for inclusive growth.	

Cluster 3: Civil Security for Society

The work programme 2021-2022 of cluster 3 will support the implementation of EU policy priorities in security, including cybersecurity, and disaster risk reduction and resilience, including **health** crises like the COVID-19. This cluster contributes to three expected impacts of two KSOs within the Horizon Europe Strategic Plan framework. The impact areas include A secure, open and democratic EU society, A resilient EU prepared for emerging threats of the KSO Creating a more resilient, inclusive and democratic European society, and the Secure and cybersecure digital technology impact of the KSO Promoting an open strategic autonomy by leading the development of key digital, enabling and emerging technologies, sectors and value chains.

This work programme consists of the following six Destinations that build on the structure of Horizon 2020 security research work programmes and correspond to the following expected impacts of Cluster 3 in the Horizon Europe Strategic Plan[146]:

Table 26- Cluster 3 Work Programme: Destination and Expected Impacts

Destination	Description	Expected Impact
Better protect the EU and its citizens against Crime and Terrorism	This Destination aims to fight crime and terrorism more effectively, particularly through better prevention of crime and enhanced investigation capabilities concerning both traditional crime and cybercrime, as well as providing better protection of citizens from violent attacks in public spaces.	Tackling crime and terrorism, and threats to infrastructures
Effective management of EU external borders	This Destination is aimed at ensuring strong European land, air and sea external borders by developing strong capabilities for checks at external borders, hence safeguarding the integrity and functioning of the Schengen area.	Improved air/land/sea border management and maritime security
Resilient infrastructure	This destination aims to support the protection of critical European infrastructures, enabling public and private actors to meet current and emerging challenges through the use of technologically complex applications.	Tackling crime and terrorism, and threats to infrastructures
Increased Cybersecurity	Cybersecurity R&I activities will support a Europe fit for the digital age, enabling and supporting digital innovation while preserving a high level of privacy, security, safety and ethical standards.	Increased cybersecurity and a more secure online environment
A Disaster-Resilient Society for Europe	This Destination supports the implementation of international policy frameworks (e.g., the Sendai Framework for Disaster Risk Reduction[147], the Paris Agreement, Sustainable Development Goals), EU	Enhanced disaster risk reduction

[146] *https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-6-civil-security-for-society_horizon-2021-2022_en.pdf*

[147] https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030

Destination	Description	Expected Impact
	disaster risk management policies, European Green Deal priorities including the new EU Climate Adaptation Strategy[148], as well as the Security Union Strategy and the Counter-Terrorism Agenda.[149]	
SSRI (Strengthened Security Research and Innovation)	Research applied in this domain will contribute to increasing the impact of the work carried out in the EU Security, Research and Innovation ecosystem as a whole by contributing to forward-looking planning of EU security capabilities, ensuring development of security technologies and safeguarding the open strategic autonomy and technological sovereignty of the EU.	• Enhanced disaster risk reduction • Improved air/land/sea border management & maritime security • Tackling crime and terrorism, and threats to infrastructures • Increased cybersecurity and a more secure online environment

Cluster 4: Digital, Industry, and Space

The work programme 2021-2022 of cluster 4 aims to shape trusted and competitive technologies for a European industry with global leadership in key sectors. Actions within this cluster will support key enabling technologies that are important from a strategic standpoint in shaping Europe's industrial future, and deliver on the following six expected impacts in the Strategic Plan, by matching them with Destinations in this work programme[150]:

Table 27- Cluster 4 Work Programme: Destination and Expected Impacts

Destination	Description	Expected Impact
Climate neutral, circular and digitised production	Activities under this Destination focus on the twin green and digital transitions providing a green productivity premium to discrete manufacturing, construction and energy-intensive industries, including process industries.	Global leadership in clean and climate-neutral industrial value chains, circular economy, and climate-neutral digital systems and infrastructures through innovative, sustainable, and green manufacturing and production processes and their digitisation
Increased autonomy in key strategic value chains for resilient industry	Activities under this Destination will tackle missing segments in strategic areas and value chains, to strengthen the EU's industrial base and boost its competitiveness and open strategic autonomy.	Industrial leadership and increased autonomy in key strategic value chains with the security of raw material supply, achieved through the deployment of innovative technologies
World leading data and computing technologies	Investment in this Destination will reinforce the cloud and data infrastructure supply industry and make data accessible to research, education, businesses and governments across the EU in a way that meets European values and requirements.	A globally secure, attractive, and dynamic data-driven economy by developing the uptake of next-generation data and computing technologies and infrastructures, aiding the European single market for data and a reliable artificial intelligence ecosystem

[148] https://ec.europa.eu/clima/sites/clima/files/adaptation/what/docs/eu_strategy_2021.pdf

[149] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:795:FIN

[150] *https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-7-digital-industry-and-space_horizon-2021-2022_en.pdf*

Destination	Description	Expected Impact
Digital and emerging technologies for competitiveness and fit for the green deal	Actions under this Destination will develop world-class technologies serving the needs of all types of European industries, providing top-performing solutions that businesses will trust and adopt to maintain their competitiveness and maximise their contribution to environmental sustainability.	Open strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data thereby fostering the EU's space sector competitiveness
Open strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data	This Destination will foster competitiveness of space systems and reinforce EU's capacity to access the space, while also developing innovative space capabilities and adapting to rapidly changing markets.	Open strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data thereby fostering the EU's space sector competitiveness
A human-centred and ethical development of digital and industrial technologies	Actions under this Destination will support EU objectives of inclusiveness, by supporting a human-centred approach to technology development that is aligned with European social and ethical values, as well as sustainability.	A human-centred and ethical development of industrial and digital technologies, through a two-way engagement in the development of technologies, empowering workers and end-users, and nurturing social innovation

Cluster 5: Climate, Energy and Mobility

The main objective of the work programme 2021-2022 of the cluster Climate, Energy and Mobility is to expedite the twin green and digital transitions to achieve climate neutrality in Europe by 2050. The activities of this work programme will support the implementation of United Nations Sustainable Development Goals and the Paris Agreement by accelerating social and economic transformation, creating more jobs, generating innovation-based inclusive growth, and adapting to digitisation.

The activities of this work programme support the implementation of the Paris Agreement and the United Nations Sustainable Development Goals. By accelerating economic and social transformation, faster digitisation, generating innovation-based and inclusive growth, activities under this programme will aid Europe's recovery[151] in the aftermath of the Covid-19 crisis, contributing directly to the Commission's priorities of a European Green Deal, Europe fit for the digital age, and an Economy that works for people[152].

Activities in this work programme contribute to all four Key Strategic Orientations (KSOs) of the Strategic Plan and will deliver on six specific expected impacts that are transformed into a specific Destination, as described below[153].

Table 28- Cluster 5 Work Programme: Destination and Expected Impacts

Destination	Description	Expected Impact
Climate sciences and responses for the transformation towards climate neutrality	Fostering climate science and helping to identify efficient and effective pathways and responses to climate change	Transition to a climate-neutral and resilient society and economy
Cross-sectoral solutions for the climate transition	Supporting various cross-cutting technologies and solutions for	Clean and sustainable transition of the energy and transport sectors

[151] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:456:FIN

[152] https://ec.europa.eu/info/strategy/priorities-2019-2024/economy-works-people_en

[153] *https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-8-climate-energy-and-mobility_horizon-2021-2022_en.pdf*

Destination	Description	Expected Impact
	energy, climate, and mobility applications	
Sustainable, secure, and competitive energy supply	Making energy supply more secure, sustainable, and competitive	Efficient, clean, sustainable, secure, and competitive energy supply
Efficient, sustainable, and inclusive energy use	Reducing energy demand of buildings and industry, and aiding their active role in a smart energy system	Efficient and sustainable use of energy
Clean and competitive solutions for all transport modes	Increasing the competitiveness and environmental/climate performance of different transport modes	Climate-neutral and environmental-friendly mobility
Safe Resilient Transport and Smart Mobility services for passengers and goods	Advancing mobility services and solutions at the system level for goods and passengers	Safe, seamless, smart, inclusive, resilient, climate-neutral, and sustainable mobility systems

Cluster 6: Food, Bioeconomy, Natural Resources, Agriculture and Environment

The work programme of this cluster aims to drive transformative change in the EU economy and society by adopting a more balanced sustainable approach. R&I activities in this cluster will contribute to the UN's Sustainable Development Goals and accelerate the ecological transition required by the European Green Deal. In particular, activities will contribute to SDG 2 – zero hunger; SDG 3 – good health and wellbeing; SDG 6 - clean water and sanitation; SDG 8 – decent work and economic growth; SDG 9 – industry, innovation, and infrastructure; SDG 11 – sustainable cities and communities; SDG 12 - responsible consumption and production; SDG 13 – climate action, SDG 14 – life below water and SDG 15 - life on land.

Activities in this work programme contribute to all four Key Strategic Orientations (KSOs) of the Strategic Plan and will deliver on six specific expected impacts that are transformed into a specific Destination, as described below[154].

Table 29- Cluster 6 Work Programme: Destination and Expected Impacts

Destination	Description	Expected Impact
Land, oceans, and water for climate action	R&I activities will support solutions for climate- and environmentally friendly practices to reduce emissions of major greenhouse gases and the environmental footprint of land use changes and agricultural activities.	Climate neutrality and adaptation to climate change
Biodiversity and ecosystem services	R&I activities will focus on delivering results that will have an important impact on biodiversity, food, health, water and climate, which are all interconnected, and to achieving the goal of healthy and resilient ecosystems by 2030.	Preservation and restoration of biodiversity and ecosystems

154 https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2021-2022_en.pdf

Destination	Description	Expected Impact
Circular economy and bioeconomy sectors; clean environment and zero pollution	R&I investments will address all issues along the value chain via resource efficiency to optimise after-use systems and improve waste cycle management.	Sustainable and circular management of natural resources; tackling pollution; bioeconomy
Fair, healthy, and environmentally friendly food systems from primary production to consumption	R&I activities will act as key drivers steering and accelerating the transition to safe, sustainable, healthy and inclusive food systems, from farm to fork, thereby ensuring food and nutrition security for all.	Food and nutrition security for all from sustainable food systems from farm to fork
Resilient, inclusive, healthy, and green rural, coastal, and urban communities	Transdisciplinary R&I activities with a strong social and behavioural sciences dimension, and attention to gender aspects, will foster sustainable, balanced and inclusive development of rural, coastal and urban areas.	Balanced development of rural, coastal, and urban areas
Innovative governance, environmental observations, and digital solutions in support of the Green Deal	R&I activities under this destination aim to experiment with new ways to govern the transition process while also modernising the governance, in particular by making information and knowledge available and accessible.	Innovative governance models enabling sustainability, environmental observation

European Innovation Ecosystems

The European Innovation Ecosystems (EIE) work programme aims to develop more inclusive, connected, and efficient innovation ecosystems that support scaling of companies and drive innovation to tackle global challenges. The work programme comprises actions under three Destinations namely, CONNECT, SCALEUP and INNOVSMES[155].

- **CONNECT** – focuses on building inclusive, interconnected innovation ecosystems across Europe by building on existing strengths of ecosystems and promoting participation from all actors across territories;
- **SCALEUP** – aims at strengthening network connectivity within and between innovation ecosystems for sustainable growth of businesses;
- **INNOVSMES** – actions will support the European Partnership on Innovation SMEs, which will aid SMEs to increase their R&I capacity and productivity leading to integration in global value chains.

This work programme will contribute to all Horizon Europe impact areas and key strategic orientations. In addition, it will work in conjunction with the European Innovation Council (EIC), the European Institute of Innovation and Technology (EIT), the Widening participation and strengthening the European Research Area work programmes, and other innovation activities of Horizon Europe.

Widening participation and strengthening the European Research Area (ERA)

This work programme is divided into two components namely, Widening Participation and Spreading Excellence, and Strengthening the European Research Area. Activities will help build R&I capacities, augment geographical diversity, and promote networking and access to excellence by strengthening collaboration across Europe.
The following three Destinations are identified as part of the work programme[156]:

[155] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-10-european-innovation-ecosystems_horizon-2021-2022_en.pdf

[156] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-11-widening-participation-and-strengthening-the-european-research-area_horizon-2021-2022_en.pdf

- **Improved access to excellence:** Actions that aim to build R&I capacities in widening countries[157], including through national and regional R&I reforms and investments, to enable them to progress towards gaining a competitive edge at European and international level;
- **Attracting and mobilising the best talents:** Congruent with the strategic priority of Deepening the ERA, actions in this part will support further progress on the free movement of knowledge in an upgraded, efficient, and effective R&I system;
- **Reforming and enhancing the EU research and innovation system:** These activities aim to maximise the impact of EU research and innovation funding on the European economy, science, and the wider society. In line with this, the European Research Area (ERA) has been relaunched, marking a paradigm shift from an activity-driven to an impact-driven approach.

European Innovation Council (EIC)

The main purpose of the EIC is to identify and support cutting-edge technologies and breakthrough innovations that have the potential to scale up internationally and lead global markets. The EIC supports all phases of innovation from R&D of breakthrough technologies to their demonstration and validation to meet global needs. Additionally, it helps in the growth and development of start-ups and small and medium-sized enterprises (SMEs).

The EIC work programme provides financial support through three main instruments: the Pathfinder for advanced research on breakthrough / cutting edge technologies; Transition for transforming research results into innovation opportunities; and the Accelerator for individual companies to develop and scale up advanced innovations with high risk and high impact[158].

This work programme implements the following key features, in accordance with the Horizon Europe legislation:

- integrated, agile support across the full innovation spectrum from early-stage research to start-up and scale-up;
- a balance between open funding and challenge driven funding;
- tailored approach to proposal evaluation;
- active project and portfolio management by EIC Programme Managers;
- policy of open access and Intellectual Property Rights.

European Research Council (ERC)

The European Research Council aims to provide long-term funding to encourage and support exceptional investigators and their research teams to lead ground-breaking, high-risk/high-gain research, including frontier research, across Europe. The ERC's approach is 'bottom-up' and 'investigator-driven' in nature, allowing researchers to identify new avenues and opportunities in any research field.

The ERC work programme has three types of grants:[159]

- **Starting Grant:** support for excellent principal investigators at the career stage where they are starting their own independent research team or programme;
- **Consolidator Grant:** support for excellent principal investigators at the career stage where they are still consolidating their own independent research team or programme;
- **Advanced Grant:** support for excellent principal investigators at the career stage where they are already established research leaders with a well-known track record of research achievements.

Conclusion

Horizon Europe is a key EU instrument to steer and accelerate Europe's preparedness and resilience to tackle climate change, achieve the SDGs, and boost the EU's growth and competitiveness. This research and innovation funding programme will commit sizeable amounts of finance to support the twin transitions towards a green and digital recovery for Europe. The programme will support digital transformation through the uptake of breakthrough technologies and ICT solutions and help in the achievement of sustainability goals in education, health, energy, manufacturing, security, mobility, agriculture, and food systems. Further, this programme will ensure vibrant international cooperation across various stakeholders and reinforce the EU's efforts to promote multilateralism and dialogue on the United Nations SDGs.

[157] Bulgaria, Croatia, Cyprus, Czechia, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia and all Associated Countries with equivalent characteristics in terms of R&I performance and the Outermost Regions (defined in Art. 349 TFEU)

[158] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021/wp_horizon-eic-2021_en.pdf

[159] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021/wp_horizon-erc-2021_en.pdf

Certifications

EU Ecolabel Certification

Description	*The EU Ecolabel is a voluntary label of environmental excellence that is awarded to products and services meeting high environmental standards throughout their lifecycle. The EU Ecolabel aims to promote Europe's transition to a circular economy by empowering market actors to produce, consume and live more sustainably.*

Key Facts	
Year Launched	1992
Key Agency	The European Commission (EC) manages the scheme at the EU level to ensure effective implementation of the Ecolabel Regulation. The EC has established a European Union Ecolabelling Board (EUEB) that is the central body consisting of the representatives of the competent bodies of all the Member States.
Responsibilities	The EUEB contributes to the development and revision of EU Ecolabel criteria and to any review of the implementation of the EU Ecolabel scheme. It also advises the Commission on minimum environmental performance requirements across products and services.[160]
Geographic Boundaries: Global/ Regional	Global – Manufacturers, producers, importers, service providers and wholesalers placing their products and/or services on the European Economic Area market can apply for the certification.
Number of participating countries	NA
Legally binding	No[161]

Background

The EU Ecolabel scheme contributes to making consumption and production more sustainable by reducing the environmental impacts of goods and services throughout their lifecycle – from raw material procurement, to production, distribution, and disposal. It has an important role to play in making Europe a circular economy by including aspects of the circular economy in the EU ecolabel criteria. The EU Ecolabel encourages producers to use raw materials efficiently, generate less waste and CO2 during the production process, use fewer hazardous chemicals and make products that are long-lasting, easy to repair and recyclable. It also acts as an enabler of sustainable lifestyles and promotes green procurement practices as it encourages consumers, public and private buyers to opt for sustainable products and services with excellent environmental performances.

The EU Ecolabel covers a broad spectrum of products and services ranging from cleaning products to textiles, paints and lubricants, to electronic equipment, furniture, and coverings.

Salient Features

Work Plan 2020-2024[162]

The Strategic EU Ecolabel Work Plan 2020-2024 is an operational tool for planning and management of activities associated with the EU Ecolabel scheme. The main goal of the EU Ecolabel is to promote sustainable means of procurement, production, and consumption across market actors to transition towards a circular economy. To achieve this goal, the following three objectives and thematic areas have been identified.

[160] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32010R0066&rid=7#d1e390-1-1

[161] https://ec.europa.eu/environment/ecolabel/documents/EU%20Ecolabel%20Work%20plan%202020-2024%20Dec%202020.pdf

[162] https://ec.europa.eu/environment/ecolabel/documents/EU%20Ecolabel%20Work%20plan%202020-2024%20Dec%202020.pdf

Table 30- EU Ecolabel Certification Work Plan (2020-2024): Objectives and Thematic Areas of Actions

Objectives	Thematic area for actions
Mainstream and further develop the EU Ecolabel as a relevant tool in policies and initiatives promoting Sustainable Consumption and Production (SCP), the circular economy, sustainable lifestyles, sustainable finance, and climate action in synergy with other tools	• EU Ecolabel as a key tool for the implementation of policies • Funding opportunities for the EU Ecolabel • Setting up strong synergies with EU SCP tools (Green Procurement Policy (GPP), Production Environmental Footprint (PEF), EMAS) and Sustainable Finance initiatives • EU Ecolabel in global/international initiatives
Maximise the effectiveness and efficiency of EU Ecolabel Regulation implementation including the development and maintenance of a successful criteria portfolio	• Strategic choice of product groups • Collaborating in a structured manner with other Type I Ecolabels[163] • Optimising efficiency and effectiveness of the EUEB Forum • Digitalising the awarding process • Monitoring the EU Ecolabel uptake
Enhance the EU Ecolabel presence on the market by boosting both industry uptake and consumer awareness	• Relief/incentive measures to foster EU Ecolabel uptake • Capacity building + technical assistance • Increase awareness through education • Increase awareness through communication activities • Optimisation of the EU Ecolabel Catalogue • Revamping the EU Ecolabel website

Product Groups and Criteria

The EU Ecolabel covers a wide range of products from major areas of manufacturing to tourist accommodation. Each product category has a different criterion as the lifecycle of every product and service is different. To conform to high environmental standards and reflect technical innovation, the criteria are revised every four years on average. A few examples of product groups and their criteria are given below.

Table 31- EU Ecolabel Certification: Sample of Product Categories

Product Category	Criteria
Electronic Displays – televisions, computer monitors and signage displays	• Energy efficiency and savings: limits are set on maximum on-mode energy consumption • Repairable: spare parts must be available for at least 8 years from production • Easy to dismantle • Use a minimum 10% post-consumer recycled plastic • Contain limited number of hazardous substances: reduce supply chain fluorinated GHG
Paints and varnishes	• White pigment and wet scrub resistance • Limit content of titanium dioxide pigment • Limit content of volatile and semi-volatile organic compounds • Restriction on use of hazardous substances and mixtures • Efficiency in use • Consumer information – minimise paint wastage, reuse of paints

[163] *Type I Ecolabel is defined by ISO as a voluntary, multiple-criteria based, third party programme that awards a license which authorises the use of environmental labels on products indicating overall environmental preferability of a product within a particular product category based on life cycle considerations.*

Product Category	Criteria
Furniture products	• Product description submission: technical drawings, bill of materials • Restriction of hazardous substances and mixtures • Use of sustainable wood, cork, bamboo, and rattan • Plastics: PVC free, limit recycled plastic content • Metals: Electroplating restrictions, limit Volatile Organic Compound (VOC) content in paints, primers, and varnishes • Limit VOC emissions • Extended product guarantee: minimum 5 years • No use of leaded glass • Product design for ease of disassembly
Graphic paper, tissue paper and tissue products	• Protect forests from deforestation: at least 70% of fibre material is recycled • Limit carbon emissions, electricity, and fuel consumption • Ban on toxic substances: chlorine-based bleaches, metal-based dies • Efficient waste management system: waste separation, reuse, and recycling • Limit inefficient use of paper

EU Ecolabel and Green Public Procurement

The EU Ecolabel is an important tool to facilitate Green Public Procurement (GPP), which plays a key role in the EU's efforts to become a more sustainable, resource-efficient economy, besides driving eco-innovation. The EU Ecolabel can help public authorities, as major consumers, to procure green products and/or services by drafting the technical specifications in the procurement criteria in conformity with the Ecolabel's requirements. In addition, Ecolabels can be a help as a means of proof of compliance with procurement requirements.

Eco-Management and Audit Scheme (EMAS)

Description	*The EMAS is a voluntary environment management instrument that helps companies and organisations to evaluate, report and improve their environmental performance.*

Key Facts	
Year Launched	1993
Key Agency	Member States designate Competent Bodies The European Commission (EC)
Responsibilities	Member States designate Competent Bodies are responsible for the registration of organisations in accordance with the EMAS Regulation. The European Commission (EC) oversees the scheme at the EU level and establishes procedures for peer evaluation of Competent Bodies to ensure effective implementation of the EMAS Regulation.
Geographic Boundaries: Global/ Regional	Global
Number of Participating Countries	The EMAS Regulation applies to all 27 EU Member States, the three European Economic Area Member States (i.e., Iceland, Liechtenstein and Norway) and European Union Accession Countries. Since the addition of EMAS Global in 2010, non-European organisations and European organisations operating in third countries[164] can apply for EMAS certification
Legally binding	No[165]

Background

EMAS is considered one of the most credible and effective environmental management tools. It was designed by the European Commission to improve and promote sustainable and responsible environmental performance and resource-efficient production. As a voluntary tool, EMAS helps companies and organisations to evaluate, report and improve their environmental performance. EMAS is applicable in all sectors and open to all types of organisations in the public and private sector that are seeking to improve their environmental performance.

The EU Regulation on EMAS was first published in 1993 and since then there have been three revisions. The current version of the EU regulation is EMAS III[166], which has been in force since 2010.
EMAS has three core elements:

- **Performance**: EMAS supports organisations to find the right tools to improve environmental performance and legal compliance.
- **Transparency**: The organisation's environmental performance is made public to achieve greater transparency through the annual environmental statement.
- **Credibility:** The environmental statement is verified by independent third-party environmental verifiers who guarantee the value of the information disclosed.

[164] https://ec.europa.eu/environment/emas/join_emas/faqs_en.htm
[165] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009R1221
[166] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009R1221

Salient Features

EMAS Registration Process

An organisation needs to carry out the following steps to implement EMAS. It is easier for companies and organisations already complying with an environmental management system such as ISO 14001 to step up to EMAS.

- **Conduct an environmental review:** Consider all environmental aspects of products and services, the organisation's legal and regulatory framework, and existing environmental management practices.
- **Adopt an environmental policy:** Compliance with all relevant environmental legislation and commitment to continuous improvement in environmental performance.
- **Establish an Environmental Management System (EMS):** Based on the results of the environmental review and objectives of policy.
- **Carry out an internal environmental audit:** Assess if the management system is in conformity with the organisation's policy and relevant environmental regulatory requirements.
- **Prepare an environmental statement:** A public statement mapping the results achieved against the environmental objectives and future course of action.
- **Validate and verify by an independent EMAS verifier:** The environmental review, the audit procedure and the environment statement need to be verified by an EMAS verifier accredited with an EMAS accreditation body of a Member State.
- **Register with the Competent Body of the Member State:** The validated statement is sent for registration and made publicly available.
- **Utilise the verified environmental statement:** It can be used to report performance data in marketing, assessment of supply chain and procurement.

Environmental Performance Assessment

The performance is assessed over a period based on six core indicators that have direct environmental aspects, which are included in the environmental statement and calculated per output.[167]

Table 32- EMAS: Areas of Impact Assessment

Key area	Input/impact	Output/activity
Energy efficiency	• Direct energy use • Renewable energy use	• Production sector: Annual gross value added or annual physical output • Services or public sector: Number of employees
Material efficiency	• Mass flow of different materials used (excluding energy carriers and water)	
Water	• Annual water consumption	
Waste	• Annual generation of waste • Annual generation of hazardous waste	
Biodiversity	• Land use (built-up area)	
Emissions	• Annual emissions of greenhouse gases (CO2 equivalent) • Annual air emissions	

[167] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009R1221

Benefits of EMAS Registration

EMAS helps organisations and companies reduce their energy consumption by effectively monitoring and systematically improving their environmental performance. The benefits of EMAS registration are:

- improved environmental and financial performance:
  - High quality environmental management;
  - Better resource efficiency and lower costs related to resources and waste management;
- better risk and opportunity management:
  - guarantee of full regulatory compliance with environmental legislation;
  - environmental regulatory relief;
  - access to deregulation incentives;
  - reduced risk of fines related to environmental legislation;
- enhanced credibility, transparency, and reputation:
  - independently validated environmental information;
  - increased business opportunities in green sustainable markets;
  - improved relations with stakeholders
- better identification of overall corporate responsibilities.

Smart Readiness Indicator

Description	*Smart Readiness Indicator (SRI) is a tool to assess a building's ability to adapt to smart technologies and ICT in terms of its performance capacity and energy flexibility. SRI aims to improve the energy performance of buildings, leading to clean energy transition and achieving EU's goal of climate neutrality by 2050.*

Key Facts	
Year Launched	2020
Key Agency	European Commission (EC)
Responsibilities	The EC developed the SRI in accordance with Article 8(10) of Directive 2010/31/EU Member States are responsible for implementing the scheme in their respective national territories
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	NA[168]
Legally binding	No[169]

Background

Building renovation has a critical role to play in achieving climate neutrality by 2050 as highlighted in the European Green Deal. The Renovation Wave initiative, a flagship EU initiative introduced to boost the energy performance of buildings, is crucial for the clean energy transition and in reducing the negative impacts of climate change. The Energy Performance of Buildings Directive (EPBD) is the EU's main legal instrument to promote the optimal energy performance of buildings. To modernise the EPBD and further encourage the use of smart building technologies and ICT, the Commission has introduced a Smart Readiness Indicator (SRI) for buildings[170].

The SRI[171] aims at making the added value of building smartness more tangible for building users, owners, tenants, and investors. More specifically, the SRI is designed to measure the capability of a building to use information and communication technologies and electronic systems to:

- adapt the operations of buildings to the needs of the occupants;
- adapt to signals from the grid (energy flexibility);
- optimise energy efficiency and overall performance of buildings.

Salient Features

Methodology

Under the European SRI methodology, the smart readiness score of a building is a percentage that indicates how far (or close) the building is from or to maximal smart readiness. The higher the percentage, the smarter the building. The methodology is multi-level and based on impact criteria, domain services and functionality levels. The SRI scheme includes seven impact criteria (energy savings, maintenance and fault prediction, comfort, convenience, health and well-

[168] https://smartreadinessindicator.eu/#:~:text=The%20smart%20readiness%20indicator%20was,for%20certain%20categories%20of%20buildings.

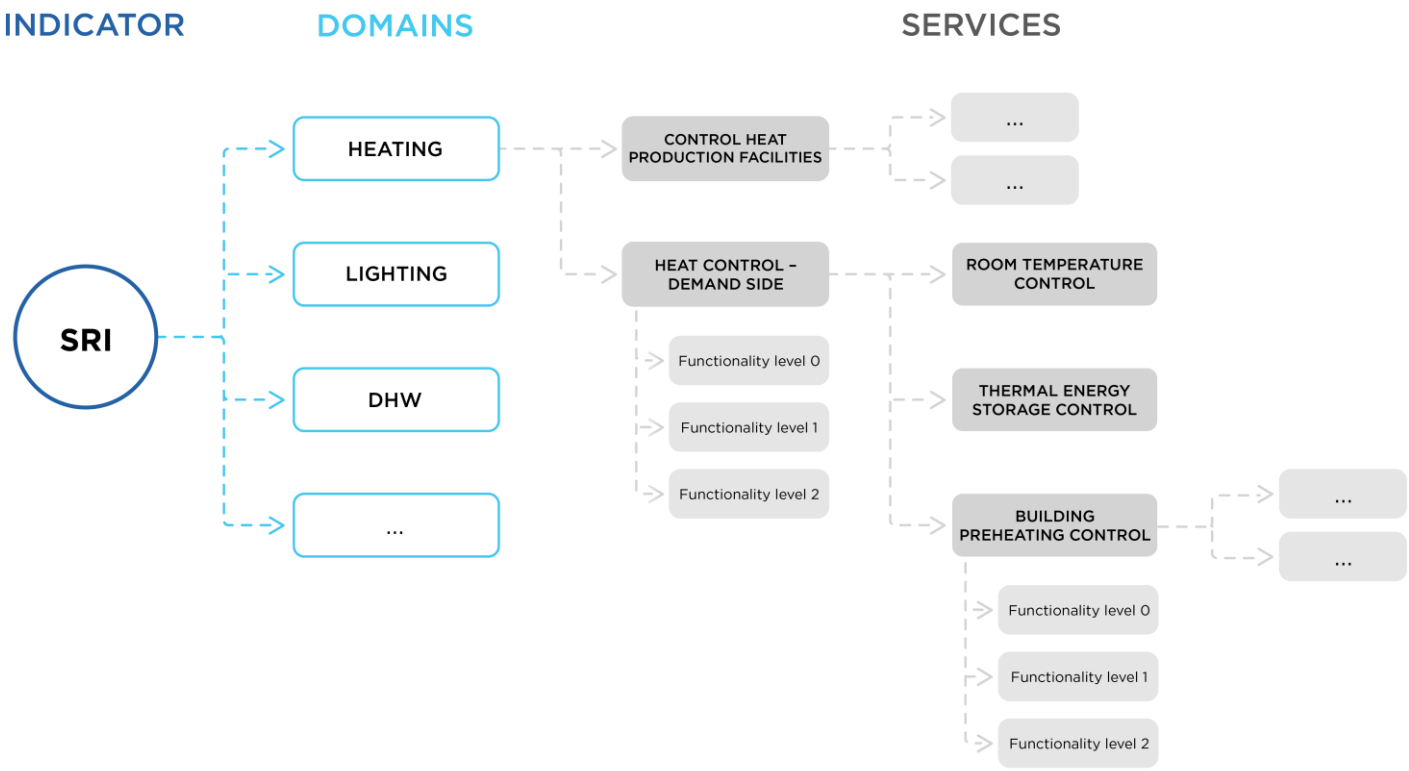
[169] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12364-Establishment-of-a-smart-readiness-indicator-for-buildings_en

[170] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12364-%E2%80%98Smart%E2%80%99-buildings-smart-readiness-indicator-definition-and-calculation-_en

[171] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2020.431.01.0009.01.ENG&toc=OJ%3AL%3A2020%3A431%3ATOC

being, information to occupants, energy demand flexibility) and nine domain services (heating, cooling, domestic hot water, controlled ventilation, lighting, dynamic building envelope, electricity generation, electric vehicle charging, monitoring and control). The structure of the SRI methodology is illustrated below.

Figure 5- Structure of the SRI methodology



Source: figure adapted by Deloitte from Catalogue of Smart Ready Services: A Technical Document for Stakeholder Feedback[172]

The aggregate SRI score is based on a weighted average of scores assigned to seven impact criteria, each evaluated within nine domains (this produces a 7x9 evaluation matrix). The total SRI score can be derived as follows:

- The smart readiness of a building or building unit is calculated on the basis of the assessment of smart-ready services present or planned, or relevant for, the building or building unit, and their functionality level.
- The smart readiness of a building or building unit is expressed as a rating, which is derived from a total smart readiness score expressed as a percentage and that denotes the ratio of the smart readiness of the building or building unit to the maximum smart readiness that it could reach.
- The calculation of the smart readiness scores is based on pre-defined weighting factors for the impact criteria and technical domains, the value of which may depend on climatic conditions and other aspects, such as the type of the building.
- Each impact criterion is considered for only one of the three key functionalities namely,
  - energy performance and operation;
  - response to the needs of the occupants; and
  - energy flexibility, including the ability of the building or building unit to enable participation in demand response
- For each key functionality, Member States define the respective weighting factors of relevant impact criteria. Similarly, each technical domain is weighted for each of the impact criterion and the Member States define the weighting factors based on relevant Union guidance. Technical domains' weighting factors are expressed as a

[172] https://smartreadinessindicator.eu/sites/smartreadinessindicator.eu/files/sri_for_buildings_catalogue_of_smart_ready_services_170613.pdf

percentage, and for each impact criterion, the sum of the weighting factors of the technical domains equals 100%.

- To arrive at the smart readiness of a building or a building unit, the methodology also allows the use of disaggregated smart readiness scores expressed as a percentage, which may express smart readiness for one or more of the following:
  - three key smart readiness functionalities
  - smart readiness impact criteria
  - smart readiness technical domains.
- The calculation of smart readiness scores relies on the assessment of smart-ready services that are defined in a smart-ready catalogue[173], made available by the Member States, and organised in pre-defined technical domains.
- In accordance with the catalogue of smart-ready services, for each technical domain, smart-ready services are assessed, and the functionality level is determined.
- In accordance with the catalogue of smart-ready services, for each smart readiness impact criterion, the score of each technical domain is calculated as a function of functionality level and service scores. Thereafter, maximum score of each technical domain for each impact criterion is determined.
- For each of the impact criterion, a smart readiness score is calculated as a weighted sum of the technical domain impact scores. The weighting given to each technical domain depends on its relative importance for the impact considered.
- The SRI score is then calculated as a weighted sum of the seven total impact scores (based on a 7x9 evaluation matrix) along the three key functionalities[174].
- The total smart readiness score can be calculated as a weighted sum of the key functionalities' smart readiness scores.

An aggregated SRI score represents the overall smartness level of the building, while sub-scores help to assess specific domains and impact categories.

Advantages of using the SRI

The SRI aims to become a cost-effective measure that can:

- assist in creating sustainable, healthier, and more comfortable buildings, which are energy-efficient and have a reduced carbon impact;
- promote use of advanced technologies and ICT solutions in buildings;
- support the uptake of technology innovations in the building sector;
- act as a key enabler of future energy systems based on more renewables, distributed supply, and demand-side energy flexibility.

[173] https://smartreadinessindicator.eu/sites/smartreadinessindicator.eu/files/sri_for_buildings_catalogue_of_smart_ready_services_170613.pdf

[174] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2020.431.01.0009.01.ENG&toc=OJ%3AL%3A2020%3A431%3ATOC

Building Research Establishment Environmental Assessment Method (BREEAM)

Description	*The Building Research Establishment Environmental Assessment Method (BREEAM) is a globally recognised green building rating system that sets standards and measures for environmental performance of buildings. BREEAM standards aim to provide economic and social benefits whilst mitigating the environmental impacts of built environment, thus stimulating demand for sustainable development.*

Key Facts	
Year Launched	1990
Key Agency	Building Research Establishment (BRE)
Responsibilities	BRE develops standards for assessment of BREEAM and is responsible for issuing the certification
Geographic Boundaries: Global/ Regional	Global
Number of Participating Countries	76 countries[175]
Legally binding	No[176]

Background

BREEAM, launched in 1990 in the United Kingdom by the Building Research Establishment (BRE), was the world's first environmental assessment method for new building design. Over the years, BREEAM has continuously evolved its methodology and established sustainability assessment methods across the building lifecycle (new construction, in-use, and refurbishment) and infrastructure, including master-planning of large-scale developments.

BREEAM provides independent third-party certification of sustainability performance of a building or project that is assessed by a qualified and licensed BREEAM Assessor to ensure compliance with quality and performance standards of the BREEAM scheme. There are certification bodies, which are organisations with government approval (through national accreditation bodies), to certificate products, services, and systems.

The main output from a certified BREEAM assessment is the rating that reflects the environmental performance achieved by a project, as measured against the standard and its benchmarks. The BREEAM ratings range from Acceptable (In-Use scheme only), Pass, Good, Very Good and Excellent to Outstanding.[177]

Salient Features

Methodology for assessment

BREEAM assessment uses a series of categories to assess the environmental performance of buildings and projects, ranging from energy to ecology. Each of these categories addresses the most significant factors for sustainability, including low impact design and design durability, carbon emissions reduction and adaptation to climate change, and ecological value and biodiversity protection.

The performance measures are set against ten categories, where each category is further sub-divided into a range of assessment issues. The ten categories and examples of assessment issues in each category are given below.

[175] https://www.breeam.com/worldwide/

[176] https://www.lexisnexis.co.uk/legal/guidance/breeam-key-requirements

[177] https://www.breeam.com/discover/how-breeam-certification-works/

Table 33- BREEAM Assessment Categories

Category	Description	Examples of assessment issues
Energy	Encourages use of energy efficient building solutions that support the sustainable use of energy in the construction and operations of a building	• Reduction of CO2 emissions • Sub-metering of substantial energy uses • External lighting • Cold storage • Low or zero carbon technologies • Lifts and escalators
Health and Well Being	Enhances the quality of life in buildings by recognising factors that encourage safe and healthy internal and external environment for a building's occupants	• Daylighting • Glare control • Indoor air quality • Thermal comfort and zoning • High frequency lighting • Volatile organic compounds
Land Use	Encourages long-term biodiversity management by including measures such as sustainable land use, habitat protection and maintenance of biodiversity at the building's site and surrounding land	• Reuse of land • Contaminated land • Ecological value of site and protection of ecological features • Long term impact on biodiversity
Materials	Encourages responsible material sourcing and reducing the impact of construction materials through design, construction, maintenance, and repair	• Materials specification • Hard landscaping and boundary protection • Reuse of building façade and building structure • Responsible sourcing of materials • Designing for robustness
Management	Promotes embedding sustainability management practices from the beginning to the end of a building's lifecycle	• Commissioning • Construction site impacts • Building user guide • Lifecycle costing
Pollution	Addresses the prevention and control of pollution caused by a building – air, water, light, and noise pollution	• Refrigerant Global Warming Potential (GWP) – building services and cold storage • NOx emissions from heating source • Flood risk • Minimising watercourse pollution • Reduction of night-time light pollution • Noise attenuation
Transport	Encourages better access to sustainable means of transport for the building's occupants	• Provision of public transport • Proximity to facilities • Pedestrian and cyclist facilities • Travel plan • Maximum car parking capacity
Waste	Promotes sustainable management and reuse of the construction and operational waste associated with a building	• Construction site waste management • Recyclable water storage • Composting • Recycled aggregates

Category	Description	Examples of assessment issues
Water	Encourages efficient and sustainable use of water during the building's lifecycle - construction and operations	• Water consumption • Water meters • Major leak detection • Water recycling • Irrigation systems • Sustainable on-site water treatment systems
Innovation[178]	Fosters cost-saving benefits of innovation and encourages uptake of innovative measures providing opportunities for exemplary performance and innovation to be recognised	

Each assessment issue has an aim, target, and benchmarks. There are minimum thresholds that must be achieved according to the targeted rating level. Once a target or benchmark is reached, as decided by the BREEAM Assessor, the building or development earns points, called credits. The category score is then calculated according to the number of credits achieved and its category weighting.

Once the building or development has been fully assessed, the final performance rating is the sum of the weighted category scores. The resulting final performance score is translated into a rating on a scale of BREEAM certification levels: Unclassified (<30%), Pass (>30%), Good (>45%), Very Good (>55%), Excellent (>70%) and Outstanding (>85%).

BREEAM technical standards

Building Research Establishment (BRE) offers the following technical standards for different types of developments/projects.

Table 34- BREEAM Technical Standards

Technical Standard	Description
Communities	Certifies the sustainability of large-scale development plans by providing a framework for the master-planning process.
Infrastructure	CEEQUAL assesses sustainability for civil engineering, infrastructure, and public realm projects. Version 6 was launched in 2019 as a successor to the BREEAM infrastructure pilot and CEEQUAL version 5.
New Construction	Assesses the design, construction, intended use and futureproofing of new building developments – homes and commercial buildings.
In-use	Measures a commercial building's operational performance – drives sustainable improvements for operational efficiency.
Refurbishment and Fit-Out	Assesses sustainability-related impacts during the design and refurbishment or fit out stages of a project.

BREEAM certification process

The BREEAM certification process involves the following steps:

- decide which BREEAM standard applies to the development or project;
- appoint a licensed BREEAM Assessor to evaluate the project according to the correct BREEAM standard;
- register the project for assessment through the appointed licensed BREEAM Assessor;
- conduct a pre-assessment with the help of the licensed Assessor, utilising their expertise and experience;
- collate the necessary project information and hand it over to the Assessor;
- the licensed Assessor reviews the information and determines compliance with the BREEAM standards;

[178] *This includes exemplary performance credits given to buildings that meet exemplary performance and innovation levels that are not included within or go beyond the requirements of the credit criteria.*

- the licensed Assessor submits the assessment to the certification body for a certification decision;
- BREEAM certification is awarded for the project.

Benefits of BREEAM certification

BREEAM certification has the following advantages:

- cost-effective: helps all stakeholders (developers, investors, designers, construction teams and occupiers of a building) to use energy and resources efficiently, thereby reducing operational costs.
- improves climate change adaptation and risk management: improves resilience to adapt to climate change and related risks by ensuring regulatory compliance.
- creates a healthier workplace by building sustainable environments that enhance wellbeing;
- contributes towards meeting the United Nations SDGs.

ISO 14001:2015

Description	*ISO 14001:2015 is an international standard that specifies requirements for an effective Environmental Management System (EMS). It is a systematic framework that helps to enhance the environmental performance of an organisation's products, processes, and services.*

Key Facts	
Year Launched	1993 (first edition), 2015 (third edition)
Key Agency	International Organisation for Standardization (ISO) Technical Committee 207, Sub-Committee 1: ISO/TC 207/SC 1
Responsibilities	Develop and publish voluntary, consensus-based, market-relevant international standards in the field of environmental management systems to support the achievement of sustainability
Geographic Boundaries: Global/ Regional	Global
Number of Participating Countries	171[179]
Legally binding	No[180]

Background

ISO 14001:2015 is a systematic framework that specifies the requirements for the formulation and maintenance of an effective EMS. It helps organisations control the environmental aspects, reduce immediate and long-term impacts and ensure legal compliance, thereby contributing to the environmental pillar of sustainability.

Prior to the publication of the ISO 14001 EMS, the British Standards Institute published BS 7750 in 1992, in response to a growing need by organisations that were being asked to exhibit environmental credentials. BS 7750 provided the foundation for the initial version of ISO 14001 published in 1996. Since then, ISO 14001 has undergone many revisions and the most recent version was published in 2015. This includes a risk-based approach to support organisations to develop a more comprehensive environmental strategy and action plan.

Salient Features

ISO 14001:2015 is relevant to any organisation, regardless of type, nature, and size, and applies to environmental aspects of its products, activities, and services that the organisation determines it can either influence or control from a lifecycle standpoint. ISO 14001:2015 does not stipulate specific environmental performance criteria.

Framework

The ISO 14001 high-level structure is split into ten sections[181]. The first three, namely scope, normative references, and terms and definitions, are introductory and set out parameters within which ISO 14001 can be used and give an overall intended outcome of the EMS, including enhancement of environmental performance, fulfilment of compliance obligations, and achievement of environmental objectives. The last seven contain the main requirements for the environmental management system. The structure is set out in more detail in the following Table.[182]

[179] https://www.iso.org/iso-14001-environmental-management.html

[180] https://www.iso.org/about-us.html

[181] https://www.nqa.com/en-in/certification/standards/iso-14001/implementation

[182] https://www.bsigroup.com/Documents/iso-14001/resources/ISO-14001-implementation-guide-2016.pdf

Table 35- ISO 14001:2015 Structure

Section	Description	Key elements
Context of the organisation	This section establishes the context of the EMS and how the business strategy supports its implementation, including defining the scope and identifying the processes required for the EMS.	• Understanding the organisation and its context • Understanding the needs and expectations of interested parties • Determining the scope of the EMS • EMS
Leadership	This section covers the role and dedication of top management in implementing the EMS by integrating environmental management into business processes.	• Leadership and commitment • Environmental policy • Organisational roles, responsibilities, and authorities
Planning	This section focuses on the organisation's action plan to address both risks and opportunities.	• Actions to address risks and opportunities (including aspects, impacts and compliance obligations) • Environmental objectives and planning to achieve them
Support	This section deals with the execution of the plans and processes, and management of all resources for the EMS.	• Resources • Competence • Awareness • Communication • Documented information
Operation	This section deals with the implementation of the plans and processes that enable the organisation to meet their environmental objectives.	• Operational planning and control • Emergency Preparedness and response
Performance evaluation	This section deals with measuring and evaluating the EMS to monitor its effectiveness and performance.	• Monitoring, measurement, analysis, and evaluation • Internal audit • Management review
Improvement	This section requires organisations to determine and identify opportunities for continual improvement of the EMS.	• Nonconformity and corrective action • Continual improvement

Benefits of ISO 14001:2015

ISO 14001:2015 has the following benefits for organisations:

- helps identify cost savings and improves resource efficiency: better water, resource and energy management and reduced waste;
- improves overall environmental impact, helps monitor and control the impact of operations on the environment;
- ensures legislative awareness and regulatory compliance;
- improves the environmental performance of the supply chain;
- enhances the corporate image and credibility, leading to an increase in new business opportunities;
- helps to consistently manage environmental obligations;
- increases stakeholder and customer trust.

Conclusion

Environmental management tools and systems are effective instruments that help an organisation to achieve its environmental goals and hence support sustainable development and value creation by efficiently reducing or eliminating the negative impacts of its operations, activities, services, and products. These systems provide a framework and a set of standards that improve the overall environmental performance of organisations implementing them by focusing on environmental aspects such as reducing GHG emissions, enhancing resource efficiency, and improving waste and energy management.

European Green Deal

Description	*The European Green Deal is a set of measures that aim to help EU transition to a green economy and achieve climate neutrality. The European Green Deal aims to transform the EU into a modern, resource-efficient and competitive economy, ensuring:* • *no net emissions of greenhouse gases by 2050* • *economic growth decoupled from resource use* • *no person and no place left behind* [183]

Key Facts	
Year Launched	2019[184]
Key Agency	European Commission
Responsibilities	To work with the EU and Member States to launch new initiatives and implement current legislation successfully
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Partially, as some of the initiatives will become legislation

Background

The European Green Deal is a programme set out in the political guidelines of the President of the European Commission, Ursula von der Leyen. It is a growth strategy that focuses on transforming the EU into "a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use."[185] It also aims to protect, conserve, and augment the EU's natural capital, and protect the health and well-being of citizens from environment-related risks and impacts.

This transition must also be inclusive and ensure equitable benefits. For this, it needs to include citizens from diverse backgrounds, authorities at all levels, civil society and industry working closely with the EU's institutions and consultative bodies. To successfully achieve the environmental goals in the Green Deal, the EU will exert international effort and build alliances by using its influence, expertise, and financial resources.

All EU actions and policies will have to contribute to the European Green Deal objectives as the challenges are interlinked. The Green Deal will require strong coordination to utilise possible opportunities of collaboration across all policy areas. It is a key aspect of the European Commission's plan to implement the United Nation's 2030 Sustainable Development Agenda and the Sustainable Development Goals, and the other priorities announced in President von der Leyen's political guidelines.[186]

To help the EU achieve its aim of becoming climate neutral in 2050, action by all sectors of the economy is required including:

- investments in environment friendly technologies;
- providing supporting industry to innovate;
- implementing cleaner, cheaper, and healthier forms of private and public transport;
- decarbonising the energy sector;
- making buildings more energy efficient;

[183] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

[184] https://www.consilium.europa.eu/en/policies/green-deal/

[185] https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

[186] https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

- coordinating with international partners to improve global environmental standards.[187]

Programme Structure: Operational

Implementation

The European Commission will focus on achieving the European Green Deal's objectives by launching new initiatives and working with the Member States to ensure that current legislation and policies relevant to the Green Deal are enforced and successfully implemented.

Financing

The European Green Deal Investment Plan will mobilise EU funding and create an enabling framework to facilitate and stimulate public and private investments to achieve the objective of climate neutrality

The Commission plans to mobilise At least EUR 1 trillion of sustainable investments in the decade from 2020 to 2030. The EU will enable the investors by focusing on sustainable finance within the financial system and will facilitate sustainable investment by public authorities through green budgeting and procurement, and by designing ways to facilitate procedures for approval of State aid for Just Transition regions.

The Just Transition Mechanism (JTM) will ensure that the transition to a green economy takes place in a fair manner. In addition to the European Green Deal Investment Plan, the Mechanism provides targeted support to help mobilise at least EUR 100 billion over the period 2021-2027 in the regions most affected by the transition.[188]

Salient Features

Targets

The European Green Deal envisaged various measures that range from aspiring to drastically cutting greenhouse gas emissions, to investing in radical research and innovation, to preserving Europe's natural environment. The initiatives which are a part of the European Green Deal include:

Table 36- EU Green Deal: Key Initiatives

Key areas	Initiatives
Finance	Green Deal Investment Plan Taxonomy Revised Energy Taxation Directive Sustainable Finance Strategy Just Transition Mechanism
Industry	Industrial Strategy New Circular Economy Action Plan Zero carbon steelmaking Carbon border adjustment mechanism European Bauhaus
Transport	Sustainable and Smart Mobility Strategy Funding for public recharging and refuelling points Stricter air pollution standards for combustion engines Alternative fuels infrastructure and Trans-European Transport Network (TEN-T) revisions Increased capacity for railways and inland waterways
Agriculture and Food	Recommendations on Common Agricultural Policy (CAP) National Strategic Plans Farm to Fork Strategy Carbon Farming Biological Pesticides Regulation Organic Farming Action Plan

[187] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

[188] https://ec.europa.eu/regional_policy/en/newsroom/news/2020/01/14-01-2020-financing-the-green-transition-the-european-green-deal-investment-plan-and-just-transition-mechanism#:~:text=The%20European%20Green%20Deal%20Investment%20Plan%20The%20European,to%20a%20climate-neutral%2C%20green%2C%20competitive%20and%20inclusive%20economy.

Key areas	Initiatives
Environment	Biodiversity Strategy 8th Environmental Action Plan Sustainable Product Policy Initiative EU Forest Strategy Zero Pollution Action Plan Blue Economy Strategy Sustainable Batteries Regulation Sustainable Chemicals Strategy
Energy	Renovation Wave Offshore Renewable Energy Strategy Review of the Trans-European Networks for Energy (TEN-E) Regulation Methane Strategy Hydrogen Strategy
Climate	European Climate Law: Climate neutrality by 2050 European Climate Pact Climate Change Adaptation Strategy New EU NDC: -55% emissions by 2030

The European Green Deal is an ambitious package of initiatives to make the EU climate neutral by 2050 by transitioning it to a green economy. The following sections explore some of the initiatives highlighted in blue, in the table above.

New European Climate Pact

Description	*The New European Climate Pact was launched online in December 2020. It is an EU-wide initiative that connects people and businesses to share knowledge and create awareness about climate change. The Pact invites all Europeans to come together to develop, implement and multiply the positive impact of solutions. The Climate Pact will bring together "regions, local communities, civil society, industry, and schools. Together they will design and commit to a set of pledges to bring about a change in behaviour, from the individual to the largest multinational."*[189]

Key Facts	
Year Launched	2020[190]
Key Agency	European Commission
Responsibilities	Provides a space for everyone to share information, debate and offer solutions on the climate crisis in areas such as green areas, green mobility, green buildings, and green skills.
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	No

Background

The success of the solutions defined in the Green Deal depends on government policies and the participation of citizens, communities and businesses in their design and implementation. This led to the launch of the European Climate Pact to help Europe recover from the COVID-19 pandemic, support a greener Europe, and achieve the Sustainable Development Goals (SDGs) through these solutions. The European Climate Pact was first mentioned in President Ursula von der Leyen's Political Guidelines, published in July 2019, and the Pact was launched in December 2020. The Pact is still in its starting phase where it will focus only on a few sectors before expanding to other areas.

Companies, small businesses, and communities are using research and innovation to develop solutions to become more sustainable and engaging citizens and encouraging participation in the process. Adapting to climate change requires mobilising organisations or individuals to improve on existing solutions or develop new ones and encourage other peers, businesses, and political leaders to also be proactive. The Climate Pact will provide a platform for such solutions to be recognised and inspire others to act.

Programme Structure: Operational

Implementation

The implementation of the Pact is overseen by a dedicated Secretariat under the European Commission. The Secretariat is helping the Commission provide information and communication, engage with stakeholders and support the setup of Pact's governance and implementation.

The success of the Pact is measured through the level of demands for climate action or environmental initiatives and the number of pledges made or ambassadors joining the platform.

[189] https://europa.eu/climate-pact/system/files/2020-12/20201209%20European%20Climate%20Pact%20Communication.pdf

[190] https://europa.eu/climate-pact/events/launch-event-european-climate-pact_en

Monitoring

The European Climate Pact indicates some of the measures that will be taken to monitor the progress of the initiatives that will be taken up. The Pact focuses on encouraging participant contributions to actions with clear and measurable outcomes, sharing relevant information on their actions, methodologies and results, and tracking progress, registering pledges in a manner that ensures that the participants' commitments are tangible and transparent. The European Commission will develop methods for monitoring progress of the initiatives depending on the participant's capacity.

Salient Features

Targets

As a platform, the Pact will provide an opportunity to create or highlight science-based, transparent, inclusive action on climate change driven by local issues and demands. The Climate Pact has three primary targets to achieve:

- encouraging participation;
- making the best use of digital tools;
- building on and supporting existing initiatives.[191]

More information is provided below.

1. **Encouraging participation**

   Involving people and businesses directly in citizen dialogues, assemblies and decision making creates cooperation, co-ownership and inspires technical and social innovation. The Pact focuses on:

   - acting as a link between the various levels of government, civil society and citizens of Europe and encouraging debate to bring in various perspectives;
   - allowing participants to become involved in various ways, such as registering their own climate initiatives, pledges, joining others' initiatives or connecting with them to generate momentum for an initiative;
   - working with the 'Count Us In' global campaign and platform. This campaign aims to encourage 1 billion people to take practical steps that collectively make a significant impact in reducing carbon pollution and embolden political leaders to take clear measures;[192]
   - engaging youth in regular dialogue, as it is recognised that the involvement and support of youth on climate action is needed. The European Commission will work to provide them a prominent space within the Pact.

2. **Making the best use of digital tools**

   With the help of information technology, the Climate Pact will: do the following.

   - improve participation, implement actions, and speed up the green transition using the latest digital technologies and services, such as sensors and Artificial Intelligence;
   - empower people to bring about sustainable changes at individual and collective level. For example, the use of integrated IT systems by local communities to capture data on air quality, soil health, wildlife, or climate on mobile phones. This data can be automatically compared with observations from Copernicus and European trends so as to adjust measures accordingly;
     - Copernicus is the European Union's earth observation programme and one of its services is to provide free and open access to climate data and support the mitigation policies of the European Union.[193]
   - allow online interactive citizen dialogues where attendees are invited to contribute their ideas on the importance of zero emissions and zero pollution Europe. The European Commission plans spaces for individual and team competitions, setting targets and sharing progress on solutions and submission of pledges.

3. **Building on and supporting existing initiatives**

   The European Climate Pact will support and work on the numerous initiatives that already exist, or which are upcoming. The European Commission will enable this by setting up a knowledge hub that will provide all the relevant information and expertise through the Pact's online platform.
   The Pact's knowledge hub will support expanding initiatives and recreate successful innovative projects together with competence centres for social innovation. Financed by the EU Programme for Employment and Social Innovation, the goal of the latter is to raise awareness about the potential of the social economy in tackling environmental

[191] https://europa.eu/climate-pact/system/files/2020-12/20201209%20European%20Climate%20Pact%20Communication.pdf
[192] https://www.count-us-in.org/en-gb/about/
[193] https://www.copernicus.eu/en/copernicus-services/climate-change

challenges through local projects. The European Commission is preparing an Action Plan for Social Economy to be launched by the end of 2021 with a focus on boosting social innovation.

The Pact will provide information on available or required finance for climate-related initiatives, including for smaller grassroots projects. Various financing sources such as the EU, Member States, philanthropic organisations, and the private sector can be utilised to support grassroot climate initiatives that can have several major positive impacts multiplying across communities. Horizon Europe Missions, partnerships and projects started by stakeholders and citizens will provide opportunities for collective discussion and goal-setting, and for making climate-related pledges.

Priority areas

The initial focus of the Climate Pact will remain on green areas, green mobility, efficient buildings, and training for green jobs within the current Commission support systems. The Climate Pact website will start by providing updated information on EU initiatives, actions and awards supporting climate action. The Pact will gradually expand to include areas such as sustainable consumption and production, the quality of soils, healthy food and sustainable diets, oceans, rural and coastal areas.[194]

1. **Green areas**
   - To support the increase in green areas the European Commission has already announced in its Biodiversity Strategy[195] its support for planting three billion extra trees in Europe by 2030. The Pact will support new tree planting and caring initiatives started by individuals, organisations, and communities through increased visibility and information. It will also provide a platform for discussion between communities, businesses, landowners, and local governments so that enough land area is returned to vegetation to provide benefits to the climate, health, and ecosystems.
   - EU-supported agricultural plans in Member States and EU funds such as cohesion funds, the LIFE (L'Instrument Financier pour l'Environnement) programme and platforms like the European Urban Greening Platform, which is a part of the Biodiversity Strategy, will be linked with the Pact.
     - The LIFE programme is one of the European Union's funding instruments for the environment and climate action.
     - The European Platform for Urban Greening is working towards increasing the knowledge, skills and expertise required to address biodiversity, climate adaptation and well-being in the urban, green living environment
   - The Pact will focus on the critical role of rural areas as agents of resilient landscapes with healthy ecosystems. It will provide solutions based on current policies and initiatives to restore, protect, and increase the size of green urban areas.
   - The Pact will provide information to mayors and various local and regional authorities based on existing resources, networks and platforms, such as the EU Covenant of Mayors for Climate and Energy, the European Green Capital, the Green Leaf Networks, the Green City Tool and the Green City Accord.
     - The EU Covenant of Mayors for Climate and Energy brings together thousands of local governments voluntarily committed to implementing EU climate and energy objectives;
     - The European Green Capital Award is a title given to a city every year for its performance in pioneering environmental actions, leading the way, and developing innovative solutions to environmental challenges;
     - The European Green Leaf Network offers its members the opportunity to collaborate and exchange ideas and exchange experiences with those from other city administrations who are equally committed to the environment;
     - The Green City Tool is a simple self-assessment and benchmarking tool for cities and generates information and advice to understand about making cities greener and more sustainable;
     - The Green City Accord is a movement of European mayors committed to improving the quality of life of all Europeans and accelerating the implementation of relevant EU environmental laws.
2. **Green Mobility**
   - The transition to green mobility is supported by digital solutions and their accessibility, public transport, cycling, walking and other forms of clean mobility, and can make our cities and towns cleaner and create new opportunities for jobs and innovation. In many European cities, safer, healthier, and more cost-effective mobility options are being explored, such as improving cycling infrastructure, developing vehicle-sharing schemes, or

[194] https://europa.eu/climate-pact/system/files/2020-12/20201209%20European%20Climate%20Pact%20Communication.pdf

[195] https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en

procuring green buses, vessels and trains. The Pact will provide information and support the various options available for healthy, efficient, and green mobility, including discussions with the necessary authorities to use EU cohesion funding.

- The European Climate Pact will encourage innovative solutions, practices such as electric carpooling or car-sharing, urban and long-distance cycling infrastructure, and transport on demand. This needs to consider access to public transport for all, including addressing the specific transport needs of women, accessibility for persons with disabilities and older persons.
- The Pact can link up with other initiatives, such as the Clean Bus Platform for cities to purchase clean buses together, the CIVITAS network of 'cities for cities', particularly for cleaner urban mobility, and the European Platform on Sustainable Urban Mobility Plans, so that cities can decarbonise their transport. The impact of Pact pledges on green transport can be amplified through European Mobility Week, the Urban Mobility Awards, the Urban Mobility Days, and the European Year of Rail (2021).
- Considering such initiatives, the Pact can be the meeting point for stakeholders, city, or regional pledges for:
  - purchasing zero-emission means of transport;
  - expanding the length and quality of safe cycling infrastructure;
  - solutions in mobility and logistics, and designing participatory and sustainable urban mobility plans;
  - offering travellers carbon-neutral choices of transport, mainly for short-distance travel within the EU.

3. **Green building**

People and businesses spend a lot of time inside buildings. Presently, the whole lifecycle of design, construction, use, renovation, and demolition, shows that the building sector is the single-largest energy consumer in the EU (40%) and the largest raw materials user (50% of extracted materials). This is one reason why the EU is one of the largest greenhouse gas emitters (36% of energy-related direct and indirect emissions). Climate-friendly buildings require the use of low-carbon materials, improved construction of new buildings, and renovation of existing buildings. The Pact will:

- provide support to the renovation of buildings to reduce their greenhouse gas emissions in line with the European Commission's Renovation Wave:
  - The Renovation Wave was launched in October 2020 and aims to remove barriers to building renovation;
- share guidance and technical assistance for mayors and citizens in the EU Renovation Wave for improved energy production, and use and resilience of buildings with a focus on affordability and energy poverty;
- ensure availability of information on the benefits of improving the energy and materials performance of various residential, commercial and government buildings;
- encourage pledges, discussion and measurement of progress of the supply chain leading to renovation;
- support co-creation of solutions with citizens through Horizon Europe;
- generate ideas for the European Bauhaus, a space where architects, artists, students, engineers, and designers work together to make buildings less wasteful and more sustainable;
- coordinate the availability of funds under the LIFE programme and the European Fund for Regional Development to help the renovation efforts of citizens, communities, and regions, specifically vulnerable communities.[196]

4. **Green Skills**

The European Commission estimates 1.2 million additional green jobs will be created between December 2020 and 2030 to comply with Europe's Paris Agreement commitments alone.

The Climate Pact will provide support around green skills by:

- helping those seeking employment in the green economy by promoting and supporting equal access to and development of green skills among people, educational and training institutions, and public authorities. This also includes encouraging businesses to utilise opportunities available from the transition to the green economy;
- encouraging involvement of organisations and sectors important for the transition to a climate-friendly economy in the Pact for Skills:
  - The Pact for Skills aims to mobilise private and public stakeholders to create partnerships for the upskilling and reskilling of people of working age;
- acting as a platform for good practices and success stories on skilling across the numerous European initiatives, such as the European Vocational Skills Week, Skills for Life, the European Alliance for Apprenticeships and Erasmus+ funded projects. This also includes good practices from Member States such as the Youth Guarantee to

[196] https://europa.eu/climate-pact/system/files/2020-12/20201209%20European%20Climate%20Pact%20Communication.pdf

offer opportunities in the green sectors to unemployed or inactive young people. The Erasmus+ Programme 2021-2027 will provide opportunities to develop skills and partnership projects related to environment and climate for organisations in the fields of education and youth;

- supporting the new European Social Fund Plus for 2021-2027, the Recovery and Resilience Facility, which will enable millions of people to be trained for green jobs and green recovery, and a new platform to support innovation, to be launched in 2021;
- promoting the use of the Just Transition Fund and Just Transition Mechanism to help stakeholders endorse re-skilling and actively create new local employment opportunities in the targeted regions:
    - The Just Transition Fund (JTF) is the first pillar of the Just Transition Mechanism (JTM) and will be essential for supporting the territories most affected by the transition to climate neutrality with tailored support;
- mobilising support available for higher education institutions to develop and teach programmes on lifecycle, environmental and climate impacts, and footprints and short courses on environmental sustainability.[197]

Conclusion

The European Climate Pact is a platform for people, businesses, and communities to come together to share knowledge about climate change and offer solutions. The Pact is working to encourage participation, making the best use of digital tools, and building on and supporting existing initiatives. To achieve these targets, four areas are currently being taken up in the starting phase: green areas, green mobility, green buildings, and green skills.

The Climate Pact provides technical and knowledge-sharing support to the initiatives in these areas and helps mobilise financial resources. It also coordinates with various networks to provide information to stakeholders, as in the case of initiatives related to green skills, such as European Vocational Skills Week and the European Alliance for Apprenticeships. The European Climate Pact is an attempt to build on existing initiatives and resources and to accelerate and multiply the positive impacts of the solutions.

[197] *https://europa.eu/climate-pact/system/files/2020-12/20201209%20European%20Climate%20Pact%20Communication.pdf*

New Circular Economy Action Plan

Description	*The New Action Plan was adopted by the European Union in March 2020. It covers how products are designed, promotes circular economy processes, encourages sustainable consumption, and aims to ensure that wastage is prevented, and the resources used are kept in the EU economy for as long as possible.*[198] *The mission of the action plan is "to make sustainable products that last and to enable our citizens to take full part in the circular economy and benefit from the positive change that it brings about."*[199]

Key Facts	
Year Launched	2020[200]
Key Agency	European Commission
Responsibilities	The European Commission will work towards making sustainable products the norm in the EU, empowering consumers and public buyers, focusing on the sectors that use most resources and where the potential for circularity is high, ensuring less waste, making circularity work for people, regions and cities and leading global efforts on the circular economy.
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Some of the initiatives are legally binding

Background

Rising global consumption of materials, increases in annual waste generation, along with greenhouse gas emissions and biodiversity loss, are some of the issues resulting from resource extraction and processing. One of the main pillars of the European Green Deal is a climate-neutral, resource-efficient and competitive economy.

Introducing the circular economy to the mainstream economic players will be a major factor in achieving climate neutrality by 2050, reducing dependence on resources for inclusive economic growth while ensuring the long-term competitiveness of the EU.

To achieve this goal, the EU needs to work to transition to a regenerative growth model that keeps its resource consumption within limits and therefore reduces its consumption footprint and doubles its circular material use rate in the next ten years.

The European Commission adopted the new circular economy action plan (CEAP) in March 2020. The plan is one of the pillars of the European Green Deal to help reduce pressure on natural resources and create sustainable growth and jobs. The CEAP introduces legislative and non-legislative measures targeting areas where the EU can ensure maximum positive impact.[201]

[198] https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en#ecl-inpage-875

[199] https://ec.europa.eu/commission/presscorner/api/files/attachment/863182/EU_Greendeal_Circular_economy_en.pdf.pdf

[200] https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en

[201] https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en

Programme Structure: Operational

Implementation

The European Commission is responsible for the implementation of the New Circular Economy Action Plan. The Member States are encouraged to adopt or update their national circular economy strategies, plans and measures in line with the Action Plan.

Monitoring

The European Commission will support the monitoring of national plans and measures to increase the pace of transition to a circular economy. It will also change the Monitoring Framework for the Circular Economy to include new indicators for focus areas in the New Circular Economy Action Plan.

Indicators on resource use such as consumption and material footprints related to production and consumption patterns will be improved further and linked to monitoring and assessing the progress towards sustainable economic growth.

Salient Features

Goals

The Circular Economy Action Plan provides a forward-looking agenda for achieving a cleaner and more competitive Europe with the help of stakeholders, including people, civil society and businesses. The Plan has several priorities:

- to help in swift transformation while building on the work done for circular economy actions implemented since 2015 as required by the European Green Deal;
- ensuring that the regulatory framework is in place and simplified for transition to a circular economy so that any new opportunities are capitalised on, while reducing burdens on people and businesses;
- providing a set of interrelated initiatives supporting a strong, clear product policy framework to ensure sustainable products, services and business models, and transform consumption patterns, along with a product policy framework, measures on key product value chains, reducing waste, and a well-functioning internal market for high quality secondary raw materials;
- ensuring that the circular economy works for people, regions and cities and contributes to climate neutrality with the help of research, innovation, and digitalisation;
- anticipating the need for further development of a sound monitoring framework to measure well-being.

Mission Areas

1. A sustainable product policy framework

Designing sustainable products

- The environmental impact of up to 80% of products is decided at the design phase itself and the constant pattern of “take-make-use-dispose” does not encourage producers to make their products more circular. Products can often not be easily reused, repaired, or recycled, and are designed for single use only.

The single market is a large market and can enable the EU to set global standards in product sustainability, product design and value chain management. The European Commission will propose a sustainable product policy legislative initiative, which will work towards expanding the Ecodesign Directive so that the framework is applicable to a broad range of products and make it deliver on circularity. It will also increase the effectiveness of the current Ecodesign framework for energy-related products.

  - The Ecodesign Directive provides a framework under which manufacturers of energy-using products must reduce the energy consumption and other negative environmental impacts occurring during the product lifecycle.[202]

- Along with the supporting legislative proposals, the Commission will focus on regulating aspects including designing the products to last longer, reusability, reducing hazardous chemicals in products, increasing recycled content, and reducing carbon and environmental footprints.
- Legislation will be prepared to ensure clarity in existing instruments, regulating products during all stages of the lifecycle. The Commission will also assess and bring in mandatory requirements on aspects linked to the environmental and social impacts of products and services along the value chain.
- The Commission will support the application of the new sustainable product framework by:
  - establishing a common European Dataspace for Smart Circular Applications with data on value chains and product information;

[202] https://www.eceee.org/ecodesign/process/

- improving efforts to enforce applicable sustainability requirements for products placed on the EU market in cooperation with national authorities.[203]

Empowering consumers and public buyers

- To further the participation of consumers in the circular economy, the Commission will recommend revision of EU consumer law to ensure availability of relevant information on products at the point of sale on aspects such as repairability and durability. It will strengthen consumer protection laws such as those against greenwashing and premature obsolescence.
- A new 'right to repair' will also be established and new horizontal material rights for consumers will be examined, for example the right to availability of spare parts or access to repair.
- Companies will also have to substantiate their environmental claims using Product and Organisation Environmental Footprint methods. The Commission will test the integration of these methods in the EU Ecolabel and include durability, recyclability, and recycled content in the EU Ecolabel criteria more systematically.
- The Ecolabel (q.v.) is a label of environmental excellence awarded to products and services meeting high environmental standards throughout their lifecycle. It promotes the circular economy by encouraging producers to generate less waste and CO2 during the manufacturing process.[204]
- Public authorities can use their purchasing power to choose environmentally friendly goods, services and works, and contribute to sustainable consumption and production. This is Green Public Procurement (GPP).[205] The Commission will propose minimum mandatory green public procurement (GPP) criteria and targets, and slowly phase in compulsory reporting to monitor the application of Green Public Procurement (GPP).

Circularity in production processes

Circularity can help industry transition to climate neutrality and long-term competitiveness. It can help obtain substantial material savings from value chain and production processes, and generate economic opportunities. The Commission will enable greater circularity in industry by examining the possibilities for further promoting circularity in industrial processes, supporting the sustainable and circular bio-based sector, and encouraging the use of digital technologies for tracking, tracing, and mapping resources

2. Key product value chains

The sustainability issues within key value chains require urgent and comprehensive action that will contribute to the response to the climate emergency and are part of the EU industrial, biodiversity, farm to fork, and forest strategies.[206]

Electronics and ICT

Partially or fully functional products become useless because they cannot be repaired, the software is no longer supported, or the battery cannot be replaced. The Circular Electronics Initiative will address these issues by promoting longer product lifetimes. Actions such as regulatory measures for electronics and ICT devices under the Ecodesign Directive, implementing the 'right to repair', better collection and treatment of waste electrical and electronic equipment, and improving clarity in legislation such as REACH and Ecodesign with regard to restrictions on hazardous substances are being taken up by the New Circular Economy Action Plan.

- REACH is an EU regulation adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals while improving the competitiveness of the chemicals industry.[207]

Batteries and vehicles

- The European Commission will propose a new regulatory framework for batteries to improve the sustainability of the emerging battery value chain for electro-mobility and the circular potential of all batteries. The legislative proposal will be based on the evaluation of the Batteries Directive and the work of the Batteries Alliance and will consider measures to improve the collection and recycling rates of all batteries, phasing out and replacing non-rechargeable batteries with alternatives and strengthening the sustainability and transparency requirements for batteries, such as the carbon footprint of battery manufacturing.

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[203] https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF

[204] https://ec.europa.eu/environment/ecolabel/

[205] https://ec.europa.eu/environment/gpp/index_en.htm#:~:text=Green%20Public%20Procurement%20Europe%27s%20public%20authorities%20are%20major,call%20Green%20Public%20Procurement%20%28GPP%29%20or%20green%20purchasing.

[206] https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF

[207] https://ec.europa.eu/environment/chemicals/reach/reach_en.htm

- The Batteries Directive establishes rules on the placing on the market of batteries and accumulators and the prohibition of batteries and accumulators containing hazardous substances. It also provides specific rules for the collection, treatment, recycling, and disposal of waste batteries and accumulators.[208]
- The Batteries Alliance was launched by the European Commission to build up battery technology and production capacity in the EU to promote low-emission mobility and energy storage.[209]

- The Commission will also propose a revision of rules regarding end-of-life vehicles to promote more circular business models by linking design issues to end-of-life treatment, considering rules on mandatory recycled content for certain materials or components, and improving recycling efficiency.
- The Comprehensive European Strategy on Sustainable and Smart Mobility[210] examines the possible synergies with the circular economy transition, in areas such as the use of sustainable alternative transport fuels, optimising infrastructure and vehicle use and reducing waste and pollution.
  - The Sustainable and Smart Mobility strategy presents a roadmap to ensure sustainable and smart European transport in the future. It identifies ten flagship areas with an action plan to work towards delivering a 90% reduction in the transport sector's emissions by 2050.[211]

Packaging

Consumption of packaging materials is growing steadily. To ensure that all packaging on the EU market is reusable or recyclable in an economically viable way by 2030, the Commission will review the current Packing and Packaging Waste Directive of 1994[212] to strengthen the mandatory requirements for packaging allowed on the EU market. It will also consider other measures such as setting targets and other waste prevention measures to reduce overpackaging and packaging waste, and lowering the complexity of packaging materials, including the number of materials and polymers used. Rules for the safe recycling into food contact materials of plastic materials other than Polyethylene terephthalate (PET) will also be established by the European Commission.

Plastics

The EU Strategy for Plastics in the Circular Economy[213] provides a comprehensive set of initiatives, but the Commission will take additional steps to tackle the sustainability challenges of plastic, including a systematic approach to tackling plastics pollution at the global level. The additional steps include:

- mandatory requirements for recycled content and waste reduction measures for key products such as packaging, construction materials and vehicles for better acceptance of recycled plastics and more sustainable use of plastics;
- addressing the presence of microplastics in the environment through measures such as:
  - preparing labelling, standardisation, certification, and regulatory measures on the unintentional release of microplastics;
  - increasing the capture of microplastics at all stages of the products' lifecycle;
  - narrowing down methods for measuring unintentionally released microplastics, especially from tyres and textiles;
  - providing data on microplastics concentrations in seawater.
- developing a policy framework on sourcing, labelling, and use of bio-based plastics along with biodegradable or compostable plastic based on positive benefits to the environment and other criteria;
- timely implementation of the new Directive on Single-Use Plastic Products and fishing gear to tackle the problem of marine plastic pollution:
  - the Directive on Single-Use Plastic Products aims to lower the impact of certain plastic products on the environment and promote the transition to a circular economy by introducing several measures for the products covered by the directive, including an EU-wide ban on single-use plastic products when alternatives are available.[214]

[208] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02006L0066-20180704

[209] https://ec.europa.eu/growth/industry/policy/european-battery-alliance_en

[210] https://ec.europa.eu/transport/themes/mobilitystrategy_en

[211] https://ec.europa.eu/transport/sites/default/files/2021-mobility-strategy-and-action-plan.pdf

[212] https://ec.europa.eu/environment/topics/waste-and-recycling/packaging-waste_en#ecl-inpage-510

[213] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:28:FIN

[214] https://eur-lex.europa.eu/legal-content/EN/LSU/?uri=CELEX:32019L0904

Textiles

The European Commission will propose a comprehensive EU Strategy for Textiles, which will work towards strengthening industrial competitiveness and innovation in the sector, boosting sustainable and circular textiles in the EU market, and promoting new business models. This requires a series of measures, including:

- a better business and regulatory environment for sustainable and circular textiles in the EU, by providing incentives and support to product-as-a-service models, circular materials and production processes, and more transparency through international cooperation;
- providing the Member States with guidance to achieve high levels of separate collection of textile waste by 2025;
- increasing the sorting, re-use and recycling of textiles through innovation, encouraging industrial applications, and regulatory measures such as extended producer responsibility.[215]

Construction and buildings

- To explore the possibility of increasing material efficiency and reducing climate impacts, the Commission will launch a Strategy for a Sustainable Built Environment which will introduce clear guidelines across areas such as climate, energy and resource efficiency, management of construction and demolition waste, accessibility, digitalisation, and skills. It will bring in circularity principles throughout the lifecycle of buildings by:
  - considering the sustainability performance of construction products including potential usage of recycled content in certain construction products;
  - encouraging improvement in the durability and adaptability of built assets for buildings design and developing digital logbooks for buildings;
  - revising material recovery targets set in EU legislation for construction and demolition waste, especially insulation materials, which is leading to a growing waste stream;
  - promoting initiatives that reduce soil sealing, rehabilitate abandoned or contaminated brownfields, and increase the sustainable and circular use of excavated soils.
- The Renovation Wave initiative published in October 2020 will bring significant improvements in energy efficiency in the EU in line with circular economy principles, notably optimised lifecycle performance and longer life expectancy of built assets.

Food, water, and nutrients

The circular economy can reduce the negative impacts of resource extraction and use. The Commission will work towards:

- ensuring the sustainability of renewable bio-based materials, including by following the Bioeconomy Strategy and Action Plan[216];
- working on a proposal for a target on food waste reduction for the future EU Farm-to-Fork Strategy to address the food value chain;
- ensuring specific measures to increase the sustainability of food distribution and consumption;
- launching the analytical work to determine the scope of a legislative initiative for substituting reusable products for single-use packaging, tableware, and cutlery in food services;
- enabling water reuse and efficiency, including in industrial processes. The Water Reuse Regulation[217] will help in the implementation of circular approaches to water reuse in agriculture;
- developing an Integrated Nutrient Management Plan, with a view to ensuring more sustainable application of nutrients and stimulating the market for recovered nutrients;
- reviewing directives on wastewater treatment and sewage sludge and assessing natural means of nutrient removal such as algae.

3. Less waste, more value

Enhancing waste policy in support of waste prevention and circularity

- Besides framing the sustainable product policy and translating it into specific legislation, there is a need to further strengthen and improve the implementation of EU waste laws. These laws need to be modernised periodically to work for the circular economy and the digital age.
- The Commission will:
  - put forward waste reduction targets for specific streams as a waste prevention measure;
  - improve the implementation of the requirements for extended producer responsibility schemes;

[215] https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF

[216] https://ec.europa.eu/info/research-and-innovation/research-area/environment/bioeconomy/bioeconomy-strategy_en#whatisthebioeconomy

[217] https://ec.europa.eu/environment/water/reuse.htm

- provide incentives and encourage sharing of information and good practices in waste recycling;
- propose synchronisation of separate waste collection systems by finding the most effective combinations of separate collection models, the density and accessibility of separate collection points, common bin colours, and so on;
- propose using standardisation and quality management systems to determine the quality of the collected waste being used in products, particularly food contact material;
- organise high-level exchanges on the circular economy and waste, and improve cooperation with Member States, regions, and cities while making the best use of EU funds.[218]

Enhancing circularity in a toxic-free environment

- EU chemicals policy and legislation, such as REACH, encourage shifting to 'safe-by-design' chemicals by substituting secondary raw materials for hazardous substances. However, to ensure the safety of secondary raw materials and prevent banned substances from being used in recycled feedstock, the Commission will:
  - support the development of solutions for high-quality sorting and elimination of contaminants from waste;
  - develop methodologies to minimise the presence of substances that pose problems to health or the environment in recycled materials and made articles;
  - enhance the classification and management of hazardous waste to maintain clean recycling streams.
- The Chemicals Strategy for Sustainability[219] also examines the interface between chemicals, products, and waste legislation to improve synergies with the circular economy.

Creating a well-functioning EU market for secondary raw materials

Secondary raw materials find it difficult to compete with primary raw materials due to safety concerns, performance, availability, and cost. Apart from bringing in requirements for recycled content in products to ensure the smooth expansion of the recycling sector in the EU, the Commission will help establish a market for secondary raw materials by:

- assessing the scope for further development of EU-wide end-of-waste criteria for certain waste streams and support cross-border initiatives for cooperation in standardising national end-of-waste and by-product criteria;
- timely utilisation of the restrictions on the use of substances of very high concern in articles where the use of the substance is subject to authorisation, and continued improvement of enforcement at borders.

Addressing waste exports from the EU

- Millions of tonnes of European waste have been exported to non-EU countries, mostly without proper waste treatment, thus resulting in negative environmental and health impacts in the destination countries, and loss of resources and economic opportunities for the EU recycling industry. Some third countries (countries outside the EU and its economic structures) have placed import restrictions on this waste. This has mobilised the recycling industry to increase its capacity and add value to waste in the EU.
- In the light of these developments, the Commission will:
  - act to ensure that the EU does not export its waste challenges to third countries. Improving product design, quality, and safety of secondary materials and their markets will help make recycling in the EU a benchmark for qualitative secondary materials;
  - review EU rules on waste shipments to allow improvements to preparation for re-use and recycling of waste in the EU. The review will also aim at restricting exports of harmful waste to third countries, or of waste which can be treated domestically within the EU.
  - support multilateral, regional, and bilateral efforts to reduce the environmental crime of illegal exports and illicit trafficking, improve controls on shipments of waste, and support the sustainable management of waste in these countries.

4. Making circularity work for people, regions, and cities

- Circularity is expected to have a positive impact on employment once workers obtain the necessary skills for the green transition. To achieve this, the Commission will:
  - ensure the contribution of its instruments to the faster transition to a circular economy in support of skills and job creation, including through the update of its Skills Agenda, the Pact for Skills with large-scale multi-stakeholder partnerships, and the Action Plan for Social Economy. The European Social Fund Plus will also promote more investment in education and training systems, lifelong learning, and social innovation;

[218] https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF

[219] https://ec.europa.eu/environment/strategy/chemicals-strategy_en

- utilise the potential of EU financing instruments and funds to support the investments needed at the regional level and ensure that all regions benefit from the transition.

- The European Commission will utilise the EU financing instruments and funds to support investments at the regional level and ensure all regions benefit by transitioning to the circular economy. Along with awareness-raising, cooperation, and capacity-building, the cohesion policy funds will support the regions in the implementation of circular economy strategies and reinforce their industrial fabric and value chains.
- There will be specific circular economy solutions to meet the needs of the outermost regions and islands, due to their dependence on resource imports, high waste generation from the tourism sector, and waste exports.
- The European Urban Initiative, the Intelligent Cities Challenge Initiative, and the Circular Cities and Regions Initiative will provide key assistance to cities. The circular economy will be among the priority areas of the Green City Accord.
  - the European Urban Initiative (EUI) offers support to cities by bringing together different urban initiatives and support tools;[220]
  - the Intelligent Cities Challenge (ICC) is a European Commission initiative that supports cities in using cutting-edge technologies to help their local economies recover, create new jobs, and strengthen citizen participation and wellbeing;[221]
  - the Circular Cities and Regions Initiative will implement circular solutions at local and regional scale and help achieve the European Green Deal and the EU Bioeconomy Strategy.[222]

5. Crosscutting actions

Circularity as a prerequisite for climate neutrality

- To improve the synergies between circularity and greenhouse gas emission reduction, the Commission will:
  - analyse ways of measuring the impact of circularity on climate change mitigation and adaptation;
  - develop better modelling tools to capture the benefits of the circular economy on greenhouse gas emission reduction at EU and national levels;
  - help strengthen the role of circularity in future revisions of the National Energy and Climate Plans and other climate policies as required.
- Climate neutrality requires not only the reduction of GHG emissions but also the removal of carbon from the atmosphere. This removal can be nature-based, including through restoration of ecosystems, forest protection, afforestation, sustainable forest management, or based on increased circularity, for example, re-use and storage of carbon in products such as mineralisation in building materials.
- To incentivise the acceptance of carbon removal and increased circularity of carbon, the Commission will examine the possibility of developing a regulatory framework for certification of carbon removals based on a transparent mechanism to monitor and verify the authenticity of carbon removals.

Getting the economics right

- To increase the pace of green transition, the Commission has taken several initiatives to ensure financing of more sustainable production and consumption patterns. These include:
  - integrating the circular economy objective in the EU Taxonomy Regulation and carrying out preparatory work on EU Ecolabel criteria for financial products;
  - setting up the Circular Economy Finance Support Platform to provide guidance to project promoters on circular incentives, capacity building, and financial risk management;
  - EU financial instruments, such as SME (Small and Medium-sized Enterprises) guarantees and InvestEU to mobilise private financing in support of the circular economy.

    The Commission will also:
  - improve disclosure of environmental data by companies in the proposed review of the non-financial reporting directive;
  - support the integration of sustainability criteria into business strategies through a better corporate governance framework;
  - encourage the broader application of well-designed economic instruments, including environmental taxation, such as landfill and incineration taxes.

[220] *European Urban Initiative State of Play | European Week of Regions and Cities (europa.eu)*

[221] *Home | Intelligent Cities Challenge*

[222] *Circular cities and regions initiative | European Commission (europa.eu)*

Driving the transition through research, innovation, and digitalisation

- Initiatives such as the European Regional Development Fund, LIFE and Horizon Europe along with private innovation funding will support the whole innovation cycle for solutions.
- Digital technologies can be used to track the products, components, and materials and secure the resulting data.
- The European Institute of Innovation and Technology will collaborate with universities, research organisations, industry, and SMEs on innovation initiatives on the circular economy within the Knowledge and Innovation Communities.
- To ensure that intellectual property continues to be an enabler for the circular economy, the Commission will propose an Intellectual Property Strategy for a robust regime that will support the new digital age and green transition.

6. Leading efforts at the global level

The success of efforts made by the EU will be determined by whether they contribute to a global transition to a just, climate-neutral, resource-efficient, and circular economy. To support such a shift, the Commission will:

- build on the European Plastics Strategy to support efforts to reach a global agreement on plastics and promote the acceptance of the EU's circular economy approach on plastics;
- recommend a Global Circular Economy Alliance to identify gaps in knowledge and governance for boosting a global circular economy and to advance partnership initiatives;
- ensure that Free Trade Agreements align with improved circular economy objectives;
- increase outreach activities through European Green Deal diplomacy and Circular Economy missions;
- work with the Member States to further coordination and joint efforts for a global circular economy.[223]

Conclusion

The New Circular Economy Action Plan will enable the European Commission to take a more systematic approach to the circular economy process. The various initiatives within the Action Plan focus on the complete lifecycle of products from design and manufacturing to consumption, repair, reuse, and recycling.

The New Circular Economy Action Plan has introduced both legislative and non-legislative measures that can be taken by the EU. Steps towards a circular economy taken at a global level will also be a measure of the success of the Action Plan. The Action Plan provides many actions and initiatives that are being developed or are being strengthened further to help boost the circular economy and increase the number of mainstream players who are part of the process.

[223] *https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF*

8th Environment Action Programme

Description	*The 8th EAP is a response to the challenges of environmental and climate change faced by the EU. The proposal is a call for all stakeholders at all levels to implement EU climate and environmental laws effectively. The 8th EAP sets out six thematic objectives and enabling conditions to achieve them with the help of the EU and its Member States. The 8th EAP aims at accelerating the transition to a climate-neutral, resource-efficient, clean, and circular economy in a just and inclusive way and endorses the environmental and climate objectives of the European Green Deal and its initiatives.*[224]

Key Facts	
Year Launched	2020 (Proposal presented)[225]
Key Agency	European Commission, EU, and the Member States
Responsibilities	• Help achieve the environment and climate action objectives of the European Green Deal • Support a faster transition to a regenerative economy • Set up a new monitoring framework to track the progress of headline indicators
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Yes. It is proposed to make the 8th EAP binding[226]

Background

Environment action programmes since the 1970s have provided guidelines for the development of EU environment policy. The Seventh Environment Action Programme (7th EAP) for 2014-2020 ended on 31 December 2020 and one of its articles states that the Commission must present a proposal for an Eighth Environment Action Programme (8th EAP) in a timely manner to prevent any gaps between the 7th and the 8th EAPs. The European Commission published a proposal for decision of the European Parliament and of the Council on 8th EAP on 14 October 2020.

The evaluation conducted by the European Commission established that the 7th EAP had anticipated the United Nation's 2030 Agenda by recognising that economic growth and social wellbeing depend on a healthy natural resource base and facilitating the achievement of Sustainable Development Goals. The key elements of the vision set out in the 7th EAP of what the EU should achieve by 2050 include:

- living within the planet's ecological limits;
- prosperous and healthy environment due to an innovative, circular economy;
- sustainable management of natural resources;
- protecting and restoring biodiversity in ways that enhance society's resilience;
- decoupling low-carbon growth from resource use;
- setting the pace for a safe and sustainable global society.

The 7th EAP identified three key objectives:

- to protect, conserve and augment the EU's natural capital;
- to make the EU a resource-efficient, green, and competitive low-carbon economy;
- To safeguard EU's citizens from environment-related issues and risks to health and wellbeing.

[224] https://webapi2016.eesc.europa.eu/v1/documents/com652-2020_part1_ext_EN.docx/content

[225] https://ec.europa.eu/environment/strategy/environment-action-programme-2030_en

[226] https://www.ceep.eu/european-commission-presents-the-8th-environment-action-programme/

Two additional horizontal priority objectives of the programme were to make the Union's cities more sustainable and to help the Union address international environmental and climate challenges more effectively.[227]
The 8th Environment Action Programme shares its long-term vision and environmental priority objectives with the Green Deal and will work towards ensuring the fulfilment of the EU's common commitment to a green recovery. The 8th EAP will continue to resonate with the vision of the 7th EAP, "to ensure wellbeing for all while staying within the planetary boundaries."[228] Its long-term priority objective for 2050 is "citizens live well, within the planetary boundaries in a regenerative economy where nothing is wasted, no net emissions of greenhouse gases are produced, and economic growth is decoupled from resource use and environmental degradation."[229]

Programme Structure: Operational

Implementation

Environment and climate policy is an area of shared competence in the EU, and it is left to the Member States to adopt and implement measures related to the environment with the support of the policymakers and other stakeholders such as regions and cities, businesses, civil society organisations, and citizens.
It is required of the Member States that the relevant data, information, and indicators for monitoring the implementation of the 8th EAP are accessible to the public, user friendly, of high quality, and up to date.

Monitoring

The European Commission, along with the European Environment Agency (EEA) and the European Chemicals Agency (ECHA) are responsible for monitoring and reporting the progress of the EU and the Member States. This is discussed briefly in 'Article 4: Monitoring framework' within Salient Features below.

Financing

The proposed EU Multiannual Financial Framework 2021-2027 indicates a requirement for additional resources for the European Environment Agency (EEA) and the European Chemicals Agency (ECHA) to support the new monitoring, measuring and reporting framework of this Programme. The necessary resources for the EEA and ECHA will be taken from the LIFE budget according to a split of 2/3 of costs for the Directorate-General (DG) for Environment and 1/3 of costs for the Directorate-General (DG) for Climate Action for the EEA, while the resources needed for ECHA will be completely covered by DG Environment, European Chemicals Agency (ECHA). Total appropriations committed for the EEA are EUR 23 379 million and the appropriations for ECHA are EUR 2 369 million.[230]

Salient Features

Provisions

Article 1: Subject matter

The proposal provides an Environmental Action Programme till 31 December 2030 ('8th EAP'). It explains the priority objectives, provides enabling conditions for achieving them, and creates a framework to measure if the EU and the Member States can meet the priority objectives.
The 8th EAP "aims at accelerating the transition to a climate-neutral, resource-efficient, clean and circular economy in a just and inclusive way and endorses the environmental and climate objectives of the European Green Deal and its initiatives."
The 8th EAP provides a road map for attaining the environmental and climate-related goals and targets of the United Nations 2030 Agenda and its Sustainable Development Goals. The monitoring framework prepared within the Programme is an effort by the EU to measure progress towards achieving climate neutrality and resource efficiency.

Article 2: Priority Objectives

The 8th EAP has six thematic priority objectives:

- a gradual and permanent reduction in greenhouse gas emissions and increased carbon removals in the EU;
- achieving continuous progress in improving adaptive capacity, strengthening resilience, and lowering susceptibility to climate change;

[227] https://ec.europa.eu/environment/action-programme/#:~:text=The%207th%20Environment%20Action%20Programme%20%28EAP%29%20will%20be,we%20live%20well%2C%20within%20the%20planet%E2%80%99s%20ecological%20limits.
[228] https://ec.europa.eu/environment/strategy/environment-action-programme-2030_en
[229] https://ec.europa.eu/environment/pdf/8EAP/2020/10/8EAP-draft.pdf
[230] https://ec.europa.eu/environment/pdf/8EAP/2020/10/8EAP-draft.pdf

- progress towards a regenerative growth model, dissociating economic growth from resource use, and faster transition to a circular economy;
- pursuing a zero-pollution ambition for a toxic free-environment and protecting the health and well-being of citizens from environment-related negative impacts; protecting, preserving, and restoring natural capital, such as air, water, soil, and forest, freshwater, wetland, and marine ecosystems;
- encouraging environmental sustainability and reducing key environmental and climate pressures related to production and consumption in areas such as energy, industrial development, buildings, and infrastructure.

Article 3: Enabling conditions to achieve the programme's priority objective

The proposal for the 8th EAP lists several enabling conditions to achieve its priority objectives such as:

- ensuring appropriate administrative and compliance assurance capacity, and stringent action against environmental crime for effective and efficient implementation of legislation on the environment and climate;
- improving the integrated approach to policy development and implementation by:
  - including the priority objectives in all relevant strategies, legislative and non-legislative initiatives, programmes, investments, and projects;
  - considering the synergies and potential trade-offs between economic, environmental, and social objectives to meet citizens' needs for nutrition, housing, and mobility in a sustainable and inclusive manner;
  - consistently examining existing policies and preparing impact assessments for new initiatives based on wide consultations and in consideration of the anticipated impacts on the environment and climate;
- ensuring successful integration of environmental and climate sustainability in the European Semester of economic governance, including in the National Reform Programmes and National Recovery and Resilience plans;
- organising sustainable investments from public and private sources, including the EU budget, the European Investment Bank, and at the national level;
- gradually removing environmentally harmful subsidies at the EU and national level by utilising market-based instruments and green budgeting tools, and supporting businesses and other stakeholders in developing standard natural capital accounting practices;
- ascertaining that environmental policies and action are based on scientific and environmental knowledge and improving the knowledge base through research, innovation, and environmental and ecosystem accounting;
- utilising nature-based solutions and social innovation;
- providing public access to the data and evidence linked to the implementation of the 8th EAP while considering confidentiality in domain-specific legislation;
- supporting the global uptake of the priority objectives by ensuring coherence between internal and external approaches and coordinated action regarding:
  - engaging with partner countries on climate and environmental action by supporting them in adopting and implementing ambitious legislation and confirming that all products placed on the EU market are compliant with relevant EU laws and align with its international commitments;
  - furthering partnership and alliances with governments, businesses, and civil society in third countries and international organisations for environment protection and promoting environmental cooperation in G7 and G20;
  - improving implementation of the Paris Agreement, the Convention on Biological Diversity, and other multilateral environmental agreements, including transparency and accountability on the progress on the commitments made;
  - promoting the UN 2030 Agenda for Sustainable Development by providing financial assistance to third countries.

Achieving the 8th EAP's priority objectives will require the support of citizens, social partners, and other stakeholders and cooperation for the development and implementation of strategies, policies, or legislation at the national, regional, and local levels.[231]

Article 4: Monitoring framework

The European Commission, along with the European Environment Agency (EEA) and the European Chemicals Agency (ECHA), will regularly monitor and report the progress of the EU and the Member States in achieving the priority objectives. The assessment will be made based on the latest availability and relevance of data and indicators in the Member States and at the EU level. It will specifically build on the data operated by the European Environment Agency

[231] https://ec.europa.eu/environment/pdf/8EAP/2020/10/8EAP-draft.pdf

and the European Statistical System without any detriment to the current monitoring, reporting, and governance frameworks and exercises covering environment and climate policy.

The EEA and ECHA will aid the Commission in ensuring better availability and relevance of data and knowledge by:

- using modern digital tools to gather, process, and report evidence and data;
- working to close the relevant monitoring data gaps;
- contributing policy-relevant and systemic analyses to support the implementation of policy objectives at the EU and national level;
- improving access to data through EU programmes and providing better transparency and accountability;
- guiding public authorities, civil society, citizens, social partners, and the private sector in identifying climate and environmental risks and taking action to prevent, mitigate and adapt to them.

The Commission will regularly examine data and knowledge needs and assess the capacity of the EEA and ECHA to carry out these tasks.

Article 5: Evaluation

The European Commission will evaluate the performance of the 8th EAP by 31 March 2029 and submit a report to the European Parliament and to the Council on the findings of their evaluation and a legislative proposal for the next environmental action programme as required.

Article 6: Entry into force

The 8th EAP will come into force on the twentieth day after it is published in the Official Journal of the European Union. [232] The 8th EAP had not been adopted at the time of this report, but was expected to be in 2021.

Conclusion

The 8th EAP provides a path for the EU and its Member States to implement EU environmental laws effectively. It aims to help achieve a quicker green transition in an equitable manner by setting out six thematic objectives and the enabling conditions that will help achieve them. The 8th EAP enables the European Commission and the EEA and ECHA to monitor the progress of the Member States through relevant data by creating a new monitoring framework.

The Programme has set out some key aspects that will help achieve the United Nation's 2030 Agenda and its Sustainable Development Goals and help the EU become climate neutral by 2050.

[232] *https://ec.europa.eu/environment/pdf/8EAP/2020/10/8EAP-draft.pdf*

New Batteries Regulation

Description	*The New Batteries Regulation aims to modernise EU legislation on batteries to ensure the sustainability and competitiveness of EU battery value chains. The aim of the proposed Regulation is for batteries placed on the EU market to be sustainable, circular, high-performing and safe all along their entire lifecycle, be collected, repurposed and recycled, becoming a true source of valuable raw materials.*[233]

Key Facts	
Year Launched	2020 (proposal)[234]
Key Agency	European Commission
Responsibilities	The Commission is responsible for the overall conformity assessment of the Regulation and has the power to direct Member States to take corrective measures in case of non-compliance.
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Yes[235]

Background

Given that global demand for batteries is set to increase fourteenfold by 2030 and the EU could account for 17% of that demand, there is a need for a new regulatory framework for the green transition of batteries.

The European Union realised that the existing EU Batteries Directive of 2006 was not adequate to meet the present circumstances of new socio-economic conditions, technological advances, and changes in markets which have posed new environmental challenges to battery usage.

Hence, in its work programme for 2020[236], the European Commission announced the aim of revising the EU Batteries Directive of 2006 with the aim of better factoring in circularity, improving sustainability and keeping pace with technological developments. [237] [238]

The current regulatory framework covers only the end-of-life stage of batteries through the Batteries Directive. There are currently no legal provisions in the EU that cover other aspects of the production and use phases of batteries, such as electrochemical performance and durability, GHG emissions, or responsible sourcing.

In line with the 'one-in-one-out principle, the proposed Regulation will replace the current Batteries Directive of 2006.

Scope of the Existing Regulation (2006 Directive)

Directive 2006/66/EC on batteries and accumulators (the Batteries Directive), which was last amended in 2018, is the main legal act regulating batteries at the EU level. With some exceptions, the directive applies to all types of batteries, no matter their chemical nature, size, or design, and classifies them according to their use. Categories of battery include: [239]

[233] https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_2311

[234] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0798&qid=1613426366165

[235] https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_2311

[236] Refers to the European Commission, Commission Work Programme 2020 - A Union that strives for more, COM(2020)37

[237] https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689337/EPRS_BRI(2021)689337_EN.pdf

[238] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-the-eu-battery-directive-(refit)

[239] https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689337/EPRS_BRI(2021)689337_EN.pdf

- portable batteries (e.g. those used in laptops or smartphones, or typical cylindrical AAA or AA-size batteries);
- automotive batteries (excluding traction batteries for electric cars);
- industrial batteries (e.g. for energy storage or for mobilising electric vehicles or bikes).

The proposed regulation on batteries and waste batteries would replace the Batteries Directive. The salient features of the new proposal are detailed below.[240]

Financing

As part of the EU's budget for 2021-2027, EUR 30.6 billion will be invested in the transportation sector, a portion of which will support research and development in battery technologies.[241]

Salient Features[242]

Chapter I: General Provisions

Article 1 deals with the subject matter and scope of the Regulation. It establishes the requirement for sustainability, safety, labelling, and information, and states that the regulation will apply to all types of batteries, namely portable batteries, automotive batteries, electric vehicle batteries, and industrial batteries.[243]

- The exceptions include:
  - equipment connected with the protection of Member States' essential security interests, arms, munitions, and war material, with the exclusion of products that are not intended for specifically military purposes;
  - equipment designed to be sent into space.

Article 2 defines the terms used in the Regulation, including the types of batteries, carbon footprint, and other technical terms.

Article 3 lays down the principle of free movement in the single market for batteries that comply with the requirements of the Regulation.

- The article prohibits Member States from affecting the availability of the batteries that comply with the Regulation for reasons relating to sustainability, safety, labelling, and information requirements of batteries or management of waste batteries.
- At trade fairs, exhibitions, demonstrations, or similar events, Member States may not prevent the showing of batteries, which do not comply with the Regulation, provided that a visible sign indicates that such batteries do not comply wite Regulation and that they are not for sale until they have been brought into conformity.

Article 4 aims for batteries only to be placed on the market or put into service if they meet the sustainability and safety requirements, and the labelling and information requirements set out in Chapters II and III, respectively.

- For any aspects not covered by Chapters II and III, batteries may not present a risk to human health, safety, property, or the environment.

Article 5 states that the Member States are required to designate a competent authority to carry out the obligations, and monitor and verify compliance of the producers.

- The Member States are also required to provide the details of the authority and three months after the date of entry into force of the Regulation, they need to share the details of the authority with the Commission

Chapter II: Sustainability and Safety requirements

Article 6 deals with restrictions on hazardous substances. Together with Annex I, it lays down restrictions on the use of hazardous substances in batteries, in particular mercury and cadmium.

- The article states that batteries may not contain hazardous substances for which Annex I to the Regulation contains a restriction unless they comply with the conditions of that restriction.

Article 7 lays down rules on the carbon footprint of electric vehicle batteries and rechargeable industrial batteries.

- The requirements are staged in such a manner that there is first an information requirement in the form of a carbon footprint declaration. Thereafter, the batteries are subject to classification into carbon footprint performance classes. Informed by the results of a dedicated impact assessment, the batteries will need to comply with maximum lifecycle carbon footprint thresholds

[240] https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689337/EPRS_BRI(2021)689337_EN.pdf

[241] https://www.innovationnewsnetwork.com/a-new-regulatory-framework-to-support-sustainable-batteries/12039/

[242] https://ec.europa.eu/environment/pdf/waste/batteries/Proposal_for_a_Regulation_on_batteries_and_waste_batteries.pdf

[243] *In the 2006 Directive batteries for electric vehicles are not a separate category.*

- The timeline for the three requirements is 1 July 2024 for the carbon footprint declaration, 1 January 2026 for the performance classes, and 1 July 2027 for the maximum lifecycle carbon footprint thresholds

Article 8 talks about recycled content in industrial batteries, electric vehicle batteries and automotive batteries.

- The Regulation requires that, as of 1 January 2027, the technical documentation for industrial and electric-vehicle batteries with internal storage that contain cobalt, lead, lithium or nickel in active materials must contain information about the amount of these materials present in each battery model and batch per manufacturing plant.
- The article also lays down the limits of recovered cobalt, lead, lithium, or nickel from the waste of these elements present in active materials in those batteries.
- As of 1 January 2030, those batteries must contain the following minimum share of recovered cobalt, lead, lithium, or nickel from the waste of the cobalt, lead, lithium, or nickel present in active materials in those batteries: 12% cobalt, 85% lead, 4% lithium and 4% nickel.
- As of 1 January 2035, the minimum share of recovered cobalt, lithium, or nickel must increase to 20% cobalt, 10% lithium, and 12% nickel. For lead, the minimum share stays at 85%. Where justified and appropriate due to the availability of cobalt, lead, lithium, or nickel recovered from waste, or the lack thereof, the Commission will be empowered to adopt a delegated act to amend the targets.

Article 9 lays down performance and durability requirements for portable batteries of general use.

- As of 1 January 2026, portable batteries of general use would only be placed on the market if the electrochemical performance and durability parameters were fulfilled.
- The Commission could lay down the minimum requirements for those parameters through delegated acts and amend them given technical and scientific progress.
- By 31 December 2030, the Commission is to assess the feasibility of measures to phase out the use of non-rechargeable portable batteries of general use and submit a report to the European Parliament and the Council.

Article 10 talks about the performance and durability requirements for rechargeable industrial batteries and electric vehicle batteries.

- It lays down information requirements for the electrochemical performance and durability parameters for rechargeable industrial batteries and electric vehicle batteries with internal storage.
- The article requires that batteries be provided with technical documentation containing values for the electrochemical performance and durability parameters.
- From 1 January 2026, rechargeable industrial batteries are required to comply with the minimum values that the Commission will be empowered to adopt by a delegated act.

Article 11 talks about the removability and replaceability of portable batteries. It requires the manufacturer to design appliances with portable batteries such that waste batteries can be removed and replaced by the end-user or by independent operators.

Article 12 deals with the safety of stationary battery energy storage systems. It states that stationary battery energy storage systems need to have a technical document to ensure that they are safe to use along with the evidence of their testing for safety parameters.

Chapter III: Labelling and information requirements

Article 13 requires battery labels to provide information about the lifetime, charging capacity, the requirement on separate collection, the presence of hazardous substances, and safety risks. The Commission will be empowered, by implementing the act, to establish harmonised specifications for certain labelling requirements.

- The QR codes printed on the batteries provide access to the information that is relevant to the battery in question;

Article 14 deals with the information on the state of health and expected lifetime of batteries;

- It requires rechargeable industrial batteries and electric vehicle batteries to have a battery management system that stores the information to determine the health and expected lifetime of batteries whose access will be provided to the person who legally purchased the battery or any third-party acting on their behalf at any time for evaluating the residual value of the battery or facilitating the reuse.

Chapter IV: Conformity of batteries

- Contains rules on the conformity assessment of batteries and is mostly made up of standard provisions.

Article 15 deals with the presumption of conformity of batteries while Article 16 talks about the specifications of such conformities.

Article 17 concerns the conformity assessment procedures and lays down two different assessment procedures depending on the product required to be assessed while **Article 18** concerns the EU declaration of conformity.
Article 19 and 20 concern CE marking. The CE marking will be subject to the general principles of Article 30 of Regulation (EC) No 765/2008. **Article 20** details the rules and conditions for CE markings

Chapter V: Notification of conformity assessment bodies

- Consists of standard provisions for the Member States around establishing conformity assessment bodies.

While Article 21 talks about requiring the States to notify the Commission about the Body, Articles 22 and 23 lay down the rules and regulations concerned with the establishment and powers of these conformity bodies.
According to Article 23, notifying authorities are required to be objective and impartial in their activity and must safeguard the confidentiality of the information they obtain. They should nonetheless be able to exchange information on notified bodies with national authorities, the notifying authorities of the other Member States, and the Commission to ensure consistency in the conformity assessment.

- Article 25 lays down that conformity bodies and their employees should be independent of economic operators in the battery value chain and from other companies. The article also highlights the capability required for employees carrying out the assessments in terms of technical expertise, knowledge, and training.

Article 27 deals with subsidiaries of and subcontracting by notified bodies. While notified bodies can subcontract parts of their activities linked to the assessment of conformity or have a subsidiary carry it out, certain activities and decision-making processes may only be carried out by the individual notified body that carries out the conformity assessment.
Articles 28 to 37 lay down requirements in areas such as application for notifications, notification procedures, identification numbers, and list of notified bodies and changes to notifications. It also deals with challenges of the competence of notified bodies, as well as their operational obligations, coordination, and exchange of experiences.

Chapter VI: Obligations of economic operators other than the obligations in Chapter VII

Article 38 talks about the obligations for manufacturers and lays down rules about providing access to the data on the parameters in the battery management system and the technical documentation required for batteries to demonstrate the conformity of the battery with the requirements set out in Chapters II and III.
Article 39 lays down obligations for economic operators that place rechargeable industrial batteries and electric vehicle batteries with internal storage and a capacity above 2 kWh on the market to establish a supply chain due to diligence policies. The Commission is empowered to review the list of substances and risk categories concerned by this obligation.
Articles 40-44 provide detailed obligations for authorised representatives, importers, distributors, fulfilment service providers, and a special case in which obligations on manufacturers apply to importers and distributors respectively.

Chapter VII: End-of-life management of batteries

- This chapter contains obligations relating to the end-of-life management of batteries. It refers specifically to the provisions on registration, extended producer responsibility, collection, treatment and recycling, including recycling efficiencies, end-of-life information, repurposing of batteries, and reporting.
  - Article 46 deals with the registration of producers. Each Member State is required to have a register of producers that needs to serve to monitor compliance of producers with the requirements on end-of-life management of batteries. The Register will be managed by the competent authority in a Member State and producers are obliged to register.
  - Article 47 establishes extended producer responsibility for batteries that are supplied in a Member State for the first time. It contains the requirement for producers of batteries to ensure waste management obligations are met. To meet their obligations, producers may also organise collectively in a producer responsibility organisation.
- This responsibility includes notably the obligations to finance and to organise the separate collection and treatment of waste batteries, report to the competent authority, promote the separate collection of batteries and provide information, including on the end-of-life aspects of batteries.

Article 48 pertains to the collection of waste portable batteries by producers. They are required to establish a network of collection points in cooperation with other relevant operators, waste electrical equipment and end-of-life vehicle facilities, public authorities, and voluntary collection points. Producers are to provide the necessary practical arrangements for the collection and transport of waste batteries from that collection point to ensure that the waste portable batteries are subject to treatment and recycling.

- The collection arrangements are subject to authorisation by the competent authority, who must verify that producers comply with the obligations regarding the collection of waste portable batteries, including ensuring that the targets are met.

Article 49 talks about the collection of waste automotive batteries, industrial batteries, and electric vehicle batteries by producers free of charge without having any obligation for the end-user to purchase a new battery.

Articles 50-54 detail the waste collection obligations for distributors, end-users, and treatment facilities and covers voluntary waste collection points.

Article 55 deals with the collection rates for waste portable batteries, excluding waste batteries from light means of transport. The collection rates are to gradually increase so as to ensure that by the end of 2025 65% of waste portable batteries are collected and by the end of 2030, 70% of such batteries are collected.

Article 56 relates to the process of recycling and treatment of such batteries. The batteries may not be landfilled or incinerated. In all cases, treatment is to be carried out providing for the best available techniques. Where batteries are collected while still incorporated in a waste appliance, they are to be removed from the collected waste appliance in accordance with the requirements laid down in Directive 2012/19/EU (on waste electronic and electrical equipment). [244]

Article 57 deals with recycling efficiencies and material recovery targets. The recycling processes are to achieve minimum recycling efficiencies laid down in Annex XII to the Regulation. These will increase over time. These requirements are set out for lead-acid batteries, nickel-cadmium batteries, lithium-based batteries, and other batteries.

Article 58 talks about the shipment of waste batteries. It states that batteries can be treated and recycled outside the Member State concerned or outside the Union, but the shipment of waste batteries complies should with Regulation (EC) No 1013/2006 and Regulation (EC) No 1418/2007.

- Moreover, exported batteries will only be considered as fulfilling obligations set out in Article 56 and Article 57 if the recycler or other waste holder exporting the waste batteries for treatment and recycling can prove that the treatment took place in conditions equivalent to the requirements of the Regulation.

Article 59 contains requirements related to the operations of repurposing and remanufacturing for a second life of industrial and electric-vehicle batteries. It lays down requirements to facilitate such operations, including for producers of the respective batteries to provide access for repurposing operators to the battery management system to determine the state of health of a battery.

- Moreover, operators carrying out the repurposing and remanufacturing are required to assure adequate quality control of the batteries and that the product complies with environmental and human health protection, and technical requirements for its specific purpose of use when placed on the market.
- To document that a battery is no longer waste, the operator carrying out the relevant operation must demonstrate the following upon request from a competent authority:
  - evidence of state of health evaluation or testing;
  - certainty of further use (using an invoice or sale contract);
  - appropriate protection against damage during transport, loading, and unloading.

  This information must be made available to end-users and third parties acting on their behalf, on equal terms and conditions, as part of the technical documentation accompanying the repurposed battery when placed on the market or put into service.

Article 60 states that producer responsibility organisations are required to provide the end-users and distributors with information on the prevention and management of waste batteries concerning the types of batteries that the producer supplies within the territory of a Member State.

- The Article also sets out obligations to provide information relevant to safety during collection and storage of waste batteries to distributors and operators involved in the collection and waste treatment, as well as providing operators with information to facilitate removal of waste batteries and subsequent treatment.

Article 61 talks about the requirements for reporting to competent authorities. This includes requirements for producers, or producers' responsibility to organisations acting on their behalf, to report the number of batteries placed on the market and of waste batteries collected and delivered for treatment and recycling. Recycling operators are required to report on waste batteries entering recycling, the recycling efficiencies, and levels of materials recovered from waste batteries, and the number of batteries that have been treated and recycled.

Article 62 concerns reporting from the Member States to the Commission. The Member States will be required to report to the Commission for each calendar year, per battery type and their chemistry, the number of batteries supplied for the

[244] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0019

first time for distribution or use within the territory of a Member State, the number of waste batteries collected, and the data concerning the levels of recycling achieved. They must also report on, whether the recycling efficiencies and levels of material recovery set out in the Regulation have been met. The Commission will lay down the format of the reporting in implementing acts.

Chapter VIII: Electronic Exchange of Information

Article 64 mentions that the Commission should set up an electronic exchange system for battery information by 1 January 2026.

- The system will contain information and data on rechargeable industrial batteries and electric vehicle batteries with internal storage and a capacity above 2 kWh, as laid down in Annex XIII to the Regulation. The data must also be in line with open standards for third party use.
- The Commission is required to publish through the system certain information mentioned in Article 62. It will lay down details of the architecture of the system, the format in which the information is to be submitted, and the rules for accessing, sharing, managing, exploring, publishing and reusing the information and data in the system in an implementing act.

Article 65 concerns the battery passport and requires that by 1 January 2026, industrial batteries and electric-vehicle batteries will have to have an electronic record for each battery they place on the market.

- The records must be unique for each battery, to be identified through a unique identifier.
- The data system will be linked, via each battery's QR code, to individual digital **Battery Passports**. This will enable consumers to make informed decisions, manufacturers to develop innovative products and services and provide national authorities and the Commission with a market intelligence tool.
- The battery passport will be linked to the information about the basic characteristics of each battery type and model stored in the data sources of the system established according to Article 64 and must be accessible online.

Chapter IX: Union market surveillance, control of batteries entering the Union market, and Union safeguard procedures

Article 66 deals with the procedures for dealing with batteries presenting a risk at the national level. It requires an evaluation of the battery concerned to be carried out. It enables market surveillance authorities to require economic operators to take corrective actions based on findings that either the battery is not compliant, or the economic operator is infringing an obligation that follows from the rules on the single market or sustainability, safety, labelling, and due diligence.

Article 67 lays down the Union's safeguard procedures on what happens if objections are raised to the measures taken by the Member States to take corrective measures, or they are contrary to the Union legislation. In such cases, the Commission will use an implementing act to determine whether the national measure is justified or not.

Articles 68 and 69 deal with non-compliance issues within and outside the purview of the Regulation. If the Member State finds that the battery is compliant with the Regulation, but nevertheless poses a risk to human health, it may require the relevant economic operator to take all appropriate measures to ensure that the battery concerned no longer presents that risk, to withdraw the battery from the market, or to recall it. Where a Member State finds that a battery falling outside the scope of Article 68 is non-compliant with this Regulation or an economic operator has infringed an obligation set out in this Regulation, they must require the relevant economic operator to put an end to the non-compliance.

Chapter X: Green public procurement, the procedure for amending restrictions on hazardous substances and Commission recognition of supply chain due diligence schemes

- Concerns green public procurement, the procedure for introducing new and amending existing restrictions on hazardous substances, and Commission recognition of supply chain due diligence schemes.

Article 70 concerns green public procurement and requires that contracting authorities and contracting entities, when procuring batteries or products containing batteries, consider the environmental impacts of batteries over their lifecycle.

- To this effect, the contracting authorities and contracting entities need to include technical specifications and award criteria to ensure that a product is chosen that has lower environmental impacts over their lifecycle.

Article 71 contains the procedure for amending the restrictions on hazardous substances further to Article 6 and Annex I of the Regulation.

Article 72 concerns supply chain due diligence schemes and the Commission's recognition of these. Governments, industry associations, and groupings of an interested organisations that have developed and overseen due diligence schemes may apply to the Commission to have their supply chain due diligence schemes recognised.

Chapter XI sets out delegated powers and the committee procedure

Chapter XII sets out an amendment to Regulation (EU) 2019/1020

Chapter XIII sets out the final provisions

Conclusion

The new Batteries Regulation will provide legal certainty and ensure that only sustainable batteries are placed on the EU market. Moreover, sustainable batteries will help make road transportation lean more towards electric vehicles, which should help reduce emissions. Greater adaptation will lead to fewer emissions, which should bring the EU closer to achieving climate neutrality.

Level(s) - European framework for sustainable buildings

Description	*Levels is a common assessment and reporting framework for sustainable buildings in Europe. It promotes lifecycle thinking while measuring and improving residential buildings and offices from the design to the end-of-life stages.*
Mission Statement	"…a cost-effective framework that helps [users] future-proof their building projects in line with circular economy, whole-life carbon performance, and other green policy goals."[245]

Key Facts	
Year Launched	2020[246]
Key Agency	European Commission's Directorate-General for the Environment (DG ENV)
Responsibilities	To enable Europe to meet UN Sustainable Development Goals, abide by the Paris Agreement, and achieve the vision set out in its Circular Economy Action Plan
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States in the testing phase (21) and the UK
Legally Binding	Voluntary; however, as Level(s) is part of EU sustainable building policy, it might be made legally binding in the future

Background

Buildings and the construction sector are one of the EU Green Deal's key areas of action[247], owing to its focus on **carbon neutrality**. Kestutis Sadauskas, Director for ENV.B – Circular Economy and Green Growth at **the Directorate-General for Environment (DG ENV) of the European Commission (EC)** has stated that "the concept behind the Level(s) framework started to take form once the building sector became a key area of action for the European Commission in terms **of resource efficiency and circular economy."**[248] **DG ENV** started developing Level(s) in **2015** to enable Europe to meet UN Sustainable Development Goals, abide by the Paris Agreement and achieve the vision set out in its Circular Economy Action Plan. Level(s) started as a collaboration amongst building professionals with pan-EU knowledge and expertise. The publication of the Level(s) beta version in **2017** marked the beginning of the framework's testing phase. It was formally launched in October **2020**.

In April **2018**[249], the European Commission officially opened the two-year testing phase for Level(s) to organisations looking to be part of Europe's shift towards circular and lifecycle thinking. Between **2017 and 2019**, the Level(s) indicators were tested by over 130 projects (both residential and non-residential, in both newly built and renovation categories) in 21 EU Member States (including the UK). It was tested amongst manufacturers, investors, and property developers, who were keen on assessing the value added by Level(s) to sustainability, circularity, and quality of life. The German Sustainable Building Council (DGNB) was deeply involved in the development and testing phase of Level(s) both theoretically and practically. The Level(s) framework was officially launched in **October-November 2020.**[250]

[245] https://ec.europa.eu/environment/document/download/3f9963b0-625b-4c59-bc2b-52023a3537f7_en

[246] https://ec.europa.eu/environment/publications/levels-putting-circularity-practice_en

[247] http://www.ectp.org/fileadmin/user_upload/documents/ECTP/Miscellaneous_doc/Levels_-_specialised_article_Group_C_FINAL.pdf

[248] https://ec.europa.eu/environment/document/download/3f9963b0-625b-4c59-bc2b-52023a3537f7_en

[249] https://ec.europa.eu/environment/publications/background-levels-and-overview-testing-phase_en

[250] https://lifelevels.eu/official-launch-of-levels-by-the-european-commission/

Testing Phase

Overview

- A total of 136 projects (74 residential and 62 non-residential) were part of the Level(s) testing phase across 21 EU Member States (including the UK). This ensured a balance in terms of the stakeholders whose views and suggestions helped shape Level(s).
- The aim of the testing phase was to support stakeholders across the construction and real estate value chain (e.g. investors, developers, designers, manufacturers) in testing the Level(s) indicators on their building projects.
- The participants could apply the framework at different stages of the building lifecycle, such as design, construction, completion, and operation. The preferred stage was design, followed by construction. Some organisations tested it on more than one stage.

Testing Process and Results

- The **German Sustainable Building Council (DGNB)** was deeply involved in the Level(s) development and testing phase.
  - The DGNB, through multiple discussions, provided practical inputs on the development of the framework
  - It supported users with the application of Level(s) indicators and methods to their projects.
  - The DGNB incorporated Level(s) into their own certification scheme.
- The **Swedish National Board of Housing, Building, and Planning (Boverket)** helped spread awareness about the Level(s) testing phase and encouraged companies to sign up for the pilot test activities.
- The **Irish Green Building Council** is working towards aligning its own building certification scheme, the Home Performance Index, with Level(s).[251]
- The Level(s) framework was also tested in Southern Europe, often through Interreg projects and within the context of the **Common European Sustainable Built Environment Assessment (CESBA).** It was tested in collaboration with regional and municipal authorities in Croatia, France, Greece, Italy, Malta and Spain.
- Level(s) was also tested through **the LIFE Level(s) project**, which was led by the Spain Green Building Council and involved seven other Green Building Council entities. The project explored the way Level(s) indicators could be implemented on a pan-European scale through certification, data, procurement, and training.

Bionova / One Click LCA was part of the Level(s) pilot process in Finland through their **Carbon Heroes Benchmark Programme for 1000 buildings.** The Joint Research Centre (JRC) provided the users with technical assistance and guidance throughout the testing period.[252]

The feedback from the testing phase informed the final version of the Level(s) framework, which was launched in October 2020.

Concept and Objectives

- Level(s) is an assessment and reporting framework designed to encourage users to think about the whole life cycle of a building, in the form of environmental impact (lifecycle assessment[253] (LCA)) and cost-effective ways of limiting it (lifecycle costing (LCC)).
- It provides a common language for the sustainability performance of buildings and a robust approach to measuring and supporting improvement from design to end of life, for both residential buildings and offices.
- Level(s) uses core sustainability indicators to measure carbon, materials, water, health, comfort, and climate change impacts. It considers lifecycle costs and value assessments.

Salient Features

- Level(s) provides stakeholders in the construction sector with a simple solution to reflect on objectives linked to sustainability performance and imbibe circularity and lifecycle thinking throughout their projects. A Level(s) journey can start by implementing standard data as an entry point, and then later working with more specific data items that better represent the building project, as familiarity with the framework increases.
- Level(s) is expected to ensure a streamlined assessment and reporting process and quicker generation of comparable data. This is because of its provisions for knowledge-sharing across countries, companies, and throughout all stages of a building project.

[251] https://www.igbc.ie/certification/levels-eu-sustainable-buildings-framework/

[252] https://ec.europa.eu/environment/eussd/pdf/1._Level(s)_Workshop_Background_Report.pdf

[253] https://www.igbc.ie/certification/levels-eu-sustainable-buildings-framework/

- It supports initial discussions between contractors and clients regarding what to focus on to make the project more sustainable and perhaps taking it further to detailed design and construction.
- It identifies hotspots and future-proofs buildings by making them more sustainable and carbon-efficient.
- It provides flexibility to the users during implementation, adapting it to their needs, pace, and understanding of the framework.
- It combines a minimum number of indicators with maximum leverage to deliver sustainability.
- It leverages the globally adopted CEN/TC 350 standards for sustainable construction.
- Level(s) supports communication on value based on Environmental, Social, and Governance factors (ESG).
- It is not associated with projects seeking certification alone, rather has much broader applications.

Implementation

Level(s) is to be implemented across the lifecycle of a building by stakeholder-led groups in the following areas:

1. **Planning**: public authorities, policymakers, and procurers at the national, regional, and local level
2. **Design**: architects, designers, engineers, and quantity surveyors
3. **Financing**: clients and investors, including property owners, and developers
4. **Execution**: construction companies and contractors, asset managers facilities managers, and building occupants.

Level(s) are delivered in the form of User Manuals and reporting templates that explain sustainability concepts, their implementation, and ways to record and measure the results. They can be used individually as standalone concepts; however, they give better results when approached as a suite.

Indicators[254]

Level(s) includes a set of tools called indicators to help each of these groups think about the various aspects of sustainability. It is based on six overarching macro-objectives and their measurement units.

Table 37- Level(s): Indicators and Unit of performance measurement[255]

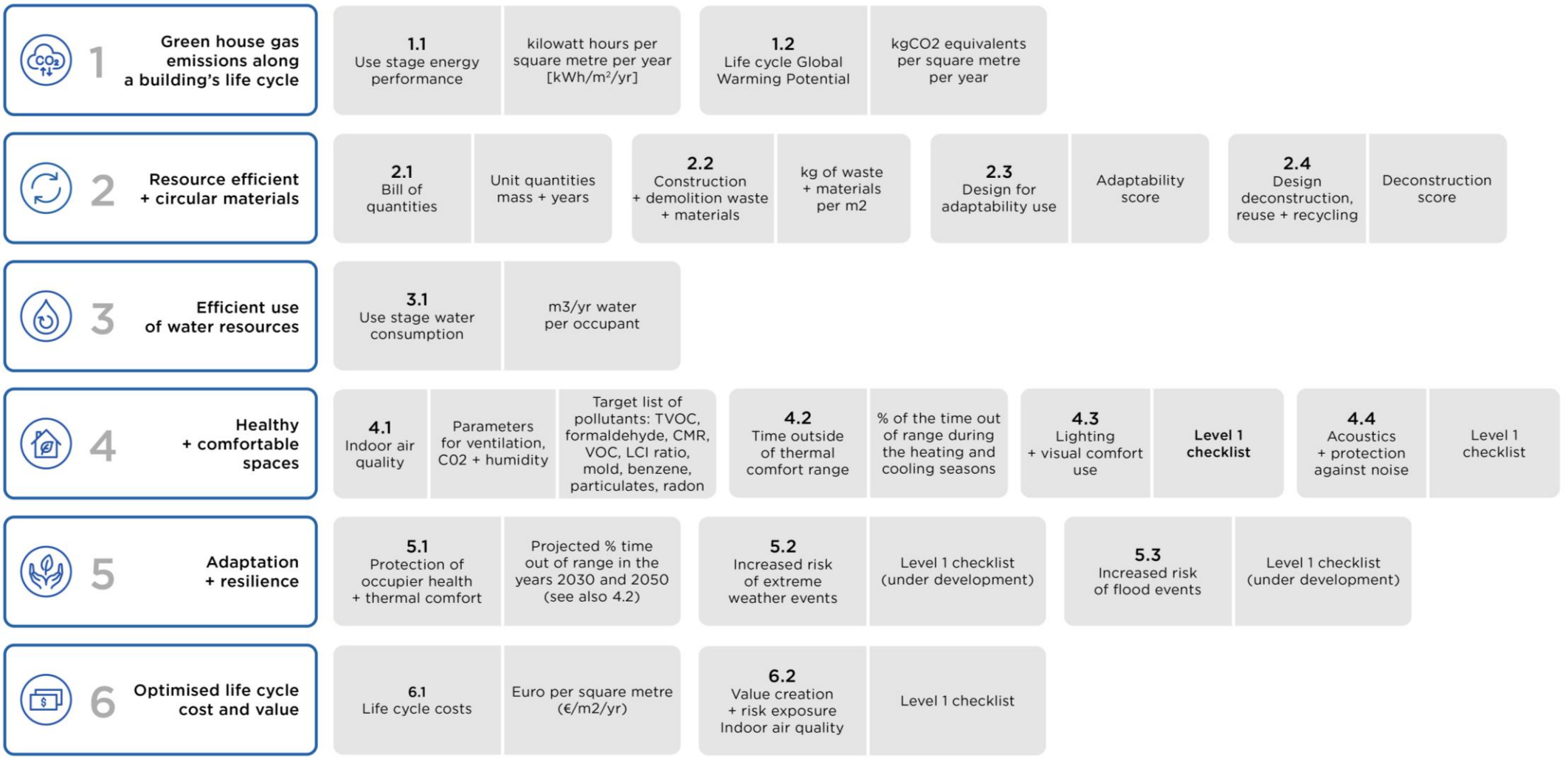
Indicator	Unit of performance measurement
Macro-objective 1: Greenhouse gas emissions along a building's lifecycle	
1.1 Use stage energy performance 1.1.1 Primary energy demand 1.1.2 Delivered energy demand (supporting indicator)	Kilowatt-hours per square metre per year (kWh/m2/yr)
1.2 Lifecycle Global Warming Potential	kg CO^2 equivalents per square metre per year (kg CO^2 eq./m^2/year)
Macro-objective 2: Resource-efficient and circular material lifecycles	
2.1 Lifecycle tool: Building bill of materials	Reporting on the bill of materials for the building **and** the four main types of materials used
2.2 Lifecycle tools: scenarios for building lifespan, adaptability, and deconstruction	According to the performance assessment level: 1. Design aspects that are proposed/have been implemented (common performance assessment) 2. Semi-qualitative assessment giving a score (comparative performance assessment) 3. LCA-based assessment of scenario performance (design optimisation)

[254] https://www.oneclicklca.com/levels-framework-for-sustainable-buildings/

[255] https://ec.europa.eu/environment/levels/lets-meet-levels/how-does-levels-work_en (however it contains certain omissions from the original text)

Indicator	Unit of performance measurement
2.3 Construction and demolition waste and materials	kg waste and materials per m^2 of total useful floor area (per lifecycle and project stage reported on)
2.4 Overarching assessment tool: Cradle to grave Lifecycle Assessment	Seven environmental impact category indicators
Macro-objective 3: Efficient use of water resources	
3.1 Total water consumption	m3 of water per occupant per year
Macro-objective 4: Healthy and comfortable spaces	
4.1 Indoor air quality	4.1.1 Good quality indoor air: parameters for ventilation, CO2 and humidity 4.1.2 Target list of pollutants: emissions from construction products and external air intake
4.2 Time outside thermal comfort range	% of the time out of range of defined maximum and minimum temperatures during the heating and cooling seasons
4.3 The quality of artificial and natural light and associated visual comfort	Level 1 checklist
4.4 Acoustics and protection against noise	Level 1 checklist
Macro-objective 5: Adaptation and resilience to climate change	
1.1 Lifecycle tools: scenarios for projected future climatic conditions	Scenario 1: Protection of occupier health and thermal comfort Simulation of the building's projected time out of thermal comfort range for the years 2030 and 2050
1.2 Increased risk of extreme weather	Make the building more resilient and resistant to extreme weather events (including flooding: fluvial, pluvial and coastal)
1.3 Sustainable drainage	Improve the building design to reduce the chances of pluvial/fluvial flood events in the local area (i.e. increasing sustainable drainage)
Macro-objective 6: Optimised lifecycle cost and value	
6.1 Lifecycle costs	Euros per square metre of useable floor area per year (EUR/m2/year)
6.2 Value creation and risk factors	Reliability ratings of the data and calculation methods for the reported performance of each indicator and lifecycle scenario tool

Figure 6- Level(s): Macro objectives and indicators

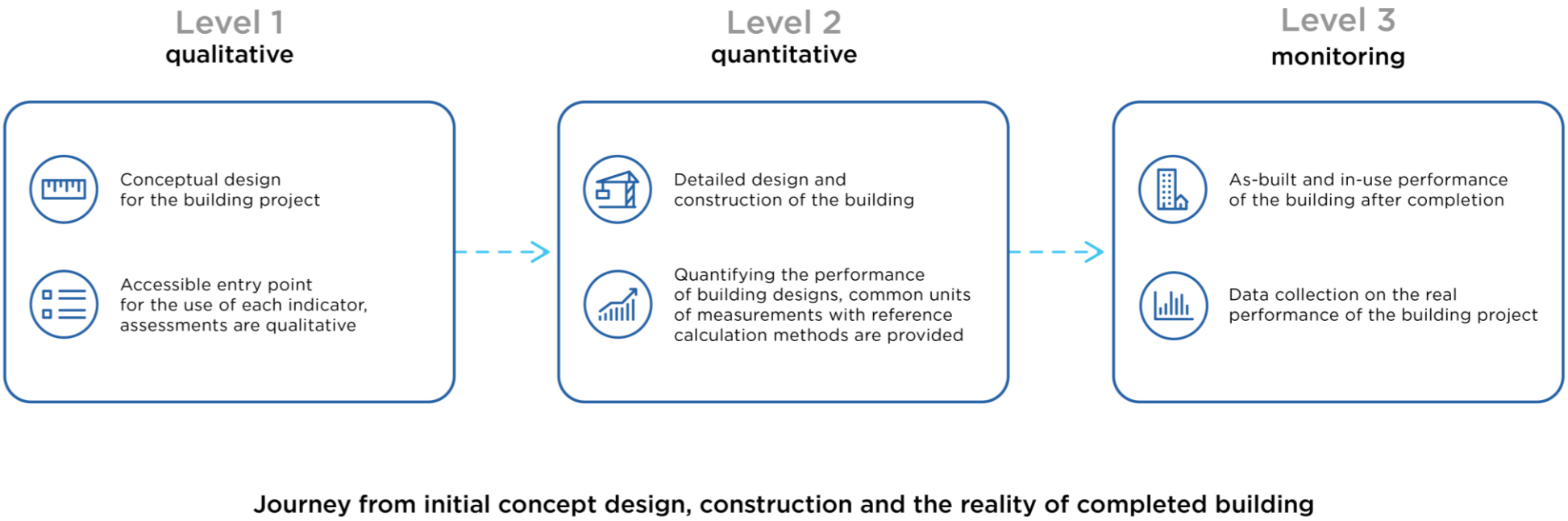


Source: figure adapted by Deloitte from Irish Green Building Council[256]

[256] https://www.igbc.ie/certification/levels-eu-sustainable-buildings-framework/

Level(s) Structure

Figure 7- Level(s): Structure



Source: figure adapted by Deloitte from Irish Green Building Council[257]

[257] https://www.igbc.ie/certification/levels-eu-sustainable-buildings-framework/

There are three levels across the building lifecycle to be considered in the framework.

Level one: Qualitative

This level is applicable in the early stages of design. It involves information and awareness of the subject to guide the design and thinking process on relevant aspects. This level does not involve the usage of any metrics.

Level two: Quantitative

This level involves taking a deeper dive into the areas identified as priorities and quantifying actuals in the technical designs and making data-driven decisions. It contains recommendations on international standards and the methodologies.

Level three: Monitoring

Level three looks at actual monitoring and feedback, whether it is a comparison of actual on-site waste recycling to the level two estimates or ongoing post-occupancy monitoring of comfort, energy, water, or other building performance. This level establishes what works in practice in comparison to the models.

Alignment with other sustainability initiatives

Level(s) works in tandem with and supports several other EU sustainability initiatives.

- Bauhaus Initiative[258]: Level(s) can support the Bauhaus initiative, as it provides a robust, tried and tested methodology to assess and report on the sustainability and circularity of buildings.
- SDGs[259]: Level(s) contributes to several of these goals, especially SDG 11 Sustainable Cities and Communities and SDG 13 Climate Action.
- European Green Deal: Level(s) provides the bridge between the ambition of the European Green Deal initiative on sustainable buildings and the realities of professional building operations within the EU.
- Circular Economy Action Plan: Level(s) helps understand the full lifecycle of a building and brings the circular economy into building design and use.
- Renovation Wave: Level(s) guides the user to apply circular economy principles to both new buildings and renovation projects. It encourages the Member States to base their initiatives on lifecycle thinking.
- Energy Performance of Buildings Directive: Level(s) can inspire and support the revision of this directive to take a lifecycle approach when discussing performance.
- Energy Efficiency Directive: Level(s) can support the revision of this directive to include a lifecycle approach when it comes to the procurement of public buildings.
- Green Public Procurement: Level(s) will be the basis for the revision of the GPP Criteria for office buildings. These criteria will be expanded to cover schools and social housing and will pay particular attention to renovation.
- Sustainable Finance: Level(s) guides part of the technical screening criteria used to identify new buildings for sustainable finance.
- Reporting into sustainable frameworks and initiatives: International sustainability certification tools are aligning their schemes to Level(s), ensuring common EU policy objectives are integrated. Level(s) enables those using this framework to report under sustainable frameworks, such as the Task Force on Climate-related Financial Disclosures (TCFD) and the Global Real Estate Sustainability Benchmark (GRESB).

Outlook

- Level(s) is not just a voluntary performance reporting framework - it provides a foundation for European sustainable building policy.
- Several key European industry representatives, such as the Architects Council of Europe, Construction Products Europe, the European Construction Industry Federation, RICS, and WorldGBC, have been working closely with the European Commission to understand how Level(s) can help set out a trajectory for future policy.
- Given the focus that Europe has on the Circular Economy Action Plan and its 2050 greenhouse gas emissions strategy, lifecycle emissions and resource efficiency in the construction and real estate sector also need to be tracked to meet the requirements of the Paris Agreement.

Recommendations of the WorldGBC Europe Regional Network[260]

[258] https://www.eugreenweek.eu/virtual-conference/search-sustainable-buildings-innovative-solutions-levels-and-new-european

[259] https://ec.europa.eu/environment/levels/lets-meet-levels/how-levels-applies-you_en

[260] https://www.worldgbc.org/sites/default/files/WorldGBC%20European%20Advocacy%20Manifesto%20June%202019.pdf

The **World Green Building Council (WorldGBC) Europe Regional Network** represents Green Building Councils across 20 countries. The network works with nine regional partners and over 4,500 diverse members across the construction and real estate sector.

Its recommendations on Level(s) are:

- Although Level(s) is a key tool to enable the construction sector to achieve the EU's collective sustainability aims, European leaders and policymakers must give Level(s) greater political support and resources to realise its potential to drive circularity in the built environment sector.
- The European Commission must consider Level(s) as a frame of reference during the development of the buildings criteria within the classification system or 'taxonomy' for sustainable economic activity.
- Further support should be given to facilitate the implementation of the resilience indicators within the Level(s) framework.

Conclusion

The introduction of a full lifecycle sustainability assessment methodology such as Level(s) has been welcomed by the European construction sector. Level(s) has been extensively and successfully tested across 21 European Union Member States[262], in collaboration with all the major stakeholders. It has taken their inputs to revise the indicators and their measurement. This approach has ensured their buy-in and set the framework, which is still in its nascent stages, and set it on the path that could lead to success.

However, the EC is expected to release its Construction Product Regulation (CPR) revision proposal in Q2 2021[263]. While the taxonomy performance criteria for buildings do use Level(s) as a frame of reference for new and large-sized buildings, it is yet to be seen if the common future language adopted by the EC will be in line with the uniform LCA method used in Level(s).

[261] *https://eurobuildcee.com/en/news/30680-tender-announced-for-frontexs-new-warsaw-hq*

[262] *Including the UK*

[263] *https://ec.europa.eu/growth/sectors/construction/product-regulation/acquis_en*

European Climate Law

Description	*The European Climate Law is a legally binding target of net-zero greenhouse gas emissions by 2050. The EU Institutions and the Member States are bound to take the necessary measures at the EU and national level to meet the target, taking into consideration the importance of promoting fairness and solidarity among the Member States. The law aims to achieve net-zero greenhouse gas emissions for EU countries, mainly by cutting emissions, investing in green technologies, and protecting the natural environment.*[264]

Key Facts	
Year Launched	2021[265]
Key Agency	European Commission
Responsibilities	The Commission is empowered to adopt delegated acts setting out a trajectory to reach carbon-neutrality by 2050, starting from the 2030 target. The power of delegation is conferred on the Commission for an indeterminate period and can be revoked at any time by the European Parliament or by the Council.[266]
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Yes[267]

Background

The European Climate Law sets out a set of legally binding EU-wide climate targets of net-zero greenhouse gas emissions by 2050. The law was first proposed by the European Commission in March 2020 as a part of the EU Green Deal. The proposal was revised in September 2020 to include updated emission reduction targets of 55% by 2030 from 1990 levels and eliminate them by 2050. The Regulation also requires EU institutions and Member States to take measures to achieve climate neutrality by 2050. [268] [269] It was promulgated on 9 July 2021.[270]

After a series of trialogue meetings in 2020, the Council and the EU Parliament reached a provisional political agreement on the proposal in April 2021. On 25 June 2021, the EU Parliament approved the law by 442 votes in favour, to 203 against and 51 abstentions. Ministers from all EU-27 Member States approved the law in Council on 28 June 2021, with the exception of abstention by Bulgaria, which stated that the final compromise did not reflect its national position sufficiently.[271] The Regulation came into effect at end-July 2021.

The approval of the law will be followed by a new package of policies to meet the new targets. These will aim to reshape industry, energy, transport, and housing to emit less carbon dioxide (CO2). The proposals will include EU carbon market reforms, tougher CO2 standards for new cars, and more ambitious renewable energy targets.

[264] https://ec.europa.eu/clima/policies/eu-climate-action/law_en
[265] https://www.consilium.europa.eu/en/press/press-releases/2021/06/28/council-adopts-european-climate-law/
[266] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0080
[267] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0080
[268] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0080
[269] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0080
[270] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119
[271] https://www.reuters.com/world/europe/climate-law-laws-gets-european-parliaments-green-light-2021-06-24/

The Union has put in place the regulatory framework to achieve its 2030 greenhouse gas emission reduction target. The legislation implementing this target consists, inter alia, of Directive 2003/87/EC of the European Parliament and of the Council, which establishes a system for greenhouse gas emission allowance trading within the Union; Regulation (EU) 2018/842 of the European Parliament and of the Council, which introduced national targets for reduction of greenhouse gas emissions by 2030; and Regulation (EU) 2018/841 of the European Parliament and of the Council, which requires Member States to balance greenhouse gas emissions and removals from land use, land use change and forestry.

Programme Structure:

Objectives

- Set the long-term direction of travel for meeting the 2050 climate-neutrality objective through all policies, in a socially fair and cost-efficient manner.
- Create a system for monitoring progress and take further action, if needed.
- Provide predictability for investors and other economic actors.
- Ensure that the transition to climate neutrality is irreversible.

Implementation

The Regulation will require EU institutions and Member States to improve adaptation to climate change by enhancing adaptive capacity, strengthening resilience, and reducing vulnerability. Member States will have to develop and implement adaptation strategies and plans that include comprehensive risk management frameworks to ensure that the objective is met.[272]

Monitoring

The Climate Law includes measures to keep track of progress and adjust EU action accordingly, based on existing systems such as the governance process for Member States' national energy and climate plans, regular reports by the European Environment Agency, and the latest scientific evidence on climate change and its impacts.

By 30 September 2023, and every five years thereafter, the Commission will assess the progress made towards climate neutrality and monitor the consistency of relevant EU and Member State measures with the climate neutrality objective and the adequacy of relevant EU and national measures for progressing on climate adaption.

If the Commission finds that Member State measures are falling short of achieving the climate neutrality objective with respect to adaptation, it will take corrective actions to ensure that the collective progress of the Member States is in line with the required objective.

The conclusions of the assessment of national measures will be included in the annual State of the Energy Union Report. If the Commission finds a Member State's measures to be inconsistent with the trajectory towards climate neutrality or inadequate with respect to adaptation, it may issue recommendations to that Member State. Such recommendations will be publicly available and be complementary to the latest country-specific recommendations issued in the context of the European Semester. A Member State concerned by a recommendation will have to take due account of it and report how it has done so in its first progress report under the Regulation on the Governance of the Energy Union and Climate Action[273] in the year following the recommendation. If a Member State decides not to address a recommendation or a substantial part of it, it will have to communicate its reasons to the Commission.[274]

The Climate Law also addresses the necessary steps to achieve the 2050 target. They are:

- based on a comprehensive impact assessment, the EU has set a new target for 2030 of reducing net greenhouse gas emissions by at least 55% compared to levels in 1990. The new EU 2030 target is included in the Law;
- in July 2021, the Commission adopted a series of proposals to revise all relevant policy instruments to deliver the additional emissions reductions for 2030;
- the Law also includes a process for setting a 2040 climate target.[275]

Details of the Provisions[276]

Article 1: Subject Matter and Scope

- Establish a framework for the irreversible and gradual reduction of anthropogenic greenhouse gas emissions by sources and enhancement of removals by sinks regulated in Union law.

[272] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0080

[273] https://eur-lex.europa.eu/legal-content/EN/TXT/?toc=OJ:L:2018:328:TOC&uri=uriserv:OJ.L_.2018.328.01.0001.01.ENG

[274] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0080

[275] https://ec.europa.eu/clima/policies/eu-climate-action/law_en

[276] https://data.consilium.europa.eu/doc/document/PE-27-2021-INIT/en/pdf

- Set out a binding objective of climate neutrality in the Union by 2050 for the long-term temperature goal set out in point (a) of Article 2(1) of the Paris Agreement and provide a framework for the global adaptation goal established in Article 7 of the Paris Agreement. This Regulation also will also set out a binding Union target of a net domestic reduction in greenhouse gas emissions for 2030.

Article 2: Climate-neutrality Objective

- Union-wide greenhouse gas emissions and removals regulated in Union law shall be balanced within the Union at the latest by 2050, thus reducing emissions to net zero by then, and the Union shall aim to achieve negative emissions thereafter.
- Take relevant measures to enable the collective achievement of the climate neutrality objective set out above, while also promoting both fairness and solidarity among Member States and cost-effectiveness in achieving this objective.

Article 3: Scientific advice on climate change

- The European Scientific Advisory Board on Climate Change established under Article 10a of Regulation (EC) No 401/2009 (the 'Advisory Board') shall serve as a point of reference for the Union on scientific knowledge relating to climate change by virtue of its independence and scientific and technical expertise.
- The advisory board shall be guided by the scientific evidence and remain transparent in publishing its reports. It may also consider the work done by national climate advisory bodies, which needs to be established by each Member State, after informing the European Environmental Agency (EEA). These national bodies will provide expert scientific advice on climate policy to the relevant national authorities.

The tasks of the advisory board will include:

- considering the latest scientific findings of the Intergovernmental Panel on Climate Change (IPCC) reports regarding information relevant to the Union;
- providing scientific advice to the Union on measures relating to climate targets and indicative greenhouse gas budgets, and their coherence with the objectives of this Regulation and the Union's international commitments under the Paris Agreement;
- contributing to the exchange of independent scientific knowledge in the field of modelling, monitoring, promising research, and innovation;
- identifying actions and opportunities needed to successfully achieve the Union climate targets;
- raising awareness on climate change and its impacts, as well as stimulating dialogue and cooperation between scientific bodies within the Union, complementing existing work and efforts.

Article 4: Intermediate Union Climate Targets

- To reach the climate neutrality target, the binding Union 2030 climate target shall be a domestic reduction of net greenhouse gas emissions (emissions after deduction of removals) by at least 55% compared to 1990 levels by 2030.
- To ensure that sufficient mitigation efforts are deployed up to 2030, the contribution of net removals to the Union 2030 climate target shall be limited to 225 million tonnes of CO2 equivalent. To enhance the Union's carbon sink in line with the objective of achieving climate neutrality by 2050, the Union shall aim to achieve a higher volume of its net carbon sink by 2030.
- By 30 June 2021, the Commission is required to review the relevant Union legislation, wherein it can access the adequacy of instruments and incentives to mobilise the investments required and propose necessary measures, to enable the achievement of the GHG targets and the climate neutrality targets and consider adopting legislative proposals and taking other necessary steps if required, in accordance with the Treaties.
- The Commission may also report to the European Parliament and the Council on the foreseen results of the legislative proposal to achieve GHG targets.
- To achieve climate neutrality by 2050, a Union-wide climate target for 2040 shall be set. To ensure that, the Union shall make a legislative proposal within six months of the first global stocktake referred to in Article 14 of the Paris Agreement, to amend this Regulation to include the Union 2040 climate target based on conclusions of the impact assessment conducted by the Union.
- While making this legislative proposal for the Union 2040 climate target, the Commission shall, at the same time, publish in a separate report the projected indicative Union greenhouse gas budget for the 2030-2050 period, defined as the indicative total volume of net greenhouse gas emissions (expressed as CO2 equivalent and providing separate information on emissions and removals) that are expected to be emitted in that period without putting

at risk the Union's commitments under the Paris Agreement. The budget would be based on science and take the recommendations of the advisory board as well.

- Moreover, while proposing the 2040 climate target, the Commission shall include factors such as the best available and the most recent scientific evidence, the social, economic and environmental impacts of inaction, cost effectiveness, etc
- Within six months of the second global stocktake referred to in Article 14 of the Paris Agreement, the Commission may propose revision of the Union 2040 climate target. The provisions of this Article shall be kept under review considering international developments and efforts undertaken to achieve the long-term objectives of the Paris Agreement.

Article 5: Adaptation to climate change

- The relevant Union institutions and the Member States shall ensure continuous progress in enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change in accordance with Article 7 of the Paris Agreement.
- The Commission shall adopt a Union strategy on adaptation to climate change in line with the Paris Agreement and shall regularly review it regularly.
- The relevant Union institutions and Member States shall ensure that policies adopted by the Union and Member States are mutually supportive, are in line with existing environmental and socioeconomic policies and provide co-benefits for sectoral policies
- Member States shall adopt national strategies and plans taking into consideration the Union strategy on adaptation to climate change referred to in paragraph 2 of this Article and based on climate change and vulnerability analysis, taking into consideration the Union's strategy on climate change. The national strategies would focus on sectors such as agriculture and food security and promote nature-based solutions. Member States are required to update the strategies with relevant information regularly.
- By 30 July 2022 the Commission shall adopt guidelines setting out common principles and practices for the identification, classification, and prudential management of material physical climate risks when planning, developing, executing, and monitoring projects and programmes for projects.

Article 6: Assessment of Union progress and measure

- By 30 September 2023, and every five years after that, the Commission shall assess the collective progress made by the Member States towards the achievement of climate neutrality and on the adaptation to climate change mentioned in Article 5. The Commission shall submit the conclusions of that assessment, together with the State of the Energy Union report prepared in the respective calendar year in accordance with Article 35 of Regulation (EU) 2018/1999, to the European Parliament and to the Council.
- The Commission will also review the consistency of the Union's measures with the objectives and the adaptation to climate neutrality during those same years.
- In case of inconsistency, necessary measure would be taken in accordance with the Treaties.
- The Commission shall assess the consistency of legislation and the budget proposals with the 2030 and 2040 climate targets before adoption and make the results publicly available before adoption.

Article 7: Assessment of national measures

- By 30 September 2023, and every five years thereafter, the Commission shall assess the consistency of national measures identified based on their climate and energy plans, biennial progress and long-term energy strategies and the adaptation measures mentioned in Article 5.
- The Commission shall submit the conclusions of that assessment along with the State of Energy report prepared in the respective calendar year in accordance with Article 35 of Regulation (EU) 2018/1999, to the European Parliament and the Council.
- In case of inconsistencies with the climate-neutrality objective set out in Article 2(1) or with ensuring progress on adaptation as referred to in Article 5, the Commission shall make recommendations to the Member States for taking corrective action. This information shall be publicly available.
- Upon receiving the Commission's recommendations, the Member States shall:
  - within six months of receipt of the recommendations, notify the Commission on how it intends to take due account of the recommendations in a spirit of solidarity between Member States and the Union and between Member States;

- in the climate progress report following the year when recommendations were introduced, the Member States need to mention how they have taken due account of the recommendations;
- the recommendations shall be complementary to the latest country-specific recommendations issued in the context of the European Semester.

Article 8: Common Provisions on Commission Assessment

- The Commission shall base its first and second assessments referred to in Articles 6 and 7 on an indicative, linear trajectory, which will set out the pathway for the reduction of net emissions at Union level and links the Union 2030 climate target referred to in Article 4(1), the Union 2040 climate target, when adopted, and the climate-neutrality objective set out in Article 2(1).
- Following the first and second assessments referred to in paragraph 1, the Commission shall base any subsequent assessments on an indicative, linear trajectory linking the Union 2040 climate target and the climate neutrality objective.
- In addition to the national measures, the Commission shall base its assessment on:
  - the information submitted under Regulation 2018/1999, reports of the EEA, the Advisory Board and the Commission's Joint Research Centre;
  - European and global statistics from the European Earth Observation Programme Copernicus, recent scientific evidence and any supplementary information on environmentally sustainable investment by the Union or by Member States;
  - the best available and most recent scientific evidence, including the latest reports of the IPCC, IPBES and other international bodies; and
  - any supplementary information on environmentally sustainable investment by the Union or by Member States, including, when available, investment consistent with Regulation (EU) 2020/852[277].
- The EEA shall assist the Commission in the preparation of the assessments as part of its annual work programme.

Article 9: Public Participation

- The Commission shall engage with all parts of society and enable and empower them to take action towards a just and socially fair transition to a climate-neutral and climate-resilient society. The Commission shall facilitate an inclusive and accessible process at all levels, including at national, regional and local level and with social partners, academia, the business community, citizens and civil society, for the exchange of best practice and to identify actions to contribute to the achievement of the objectives of this Regulation. The Commission may also draw on the public consultations and on the multilevel climate and energy dialogues as set up by Member States in accordance with Articles 10 and 11 of Regulation (EU) 2018/1999.
- It shall use all appropriate instruments, including the European Climate Pact, to engage citizens, social partners and stakeholders, and foster dialogue and the diffusion of science-based information about climate change and its social and gender equality aspects and ensure inclusive and accessibility processes at all levels

Article 10: Sectoral Roadmaps

- The Commission shall engage with sectors of the economy within the Union that choose to prepare indicative voluntary roadmaps towards achieving the climate-neutrality objective set out in Article 2(1) and monitor the development of such roadmaps. Its engagement shall involve the facilitation of dialogue at Union level, and the sharing of best practice among relevant stakeholders.

Article 11: Review

- Within six months of each global stocktake referred to in Article 14 of the Paris Agreement, the Commission shall submit a report to the European Parliament and to the Council, together with the conclusions of the assessments with the best available scientific evidence and considering international developments and efforts undertaken to achieve the long-term objectives of the Paris Agreement.

[277] *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R0852*

Article 12: Amendments to Regulation (EC) No 401/2009

Article 13: Amendments to Regulation (EU) 2018/1999

Article 11: Entry into force

- The Regulation entered into force on the twentieth day following that of its publication in the Official Journal of the European Union.
- This Regulation is binding in its entirety and directly applicable in all Member States.

Conclusion

The Climate Law aims to ensure that all EU policies contribute to the goal of net zero greenhouse gas emissions for EU countries by cutting emissions, investing in green technologies and ensures that all sectors of the economy and society play their par

2030 Climate Target Plan

Description	*As part of the European Green Deal and following the European Commission's December 2019 announcement of the 2050 zero carbon target across the EU, the EC presented its 2030 Climate Target Plan on 17 September 2020. The plan envisages increasing the EU's greenhouse gas (GHG) emissions reduction target for 2030 to a minimum of 55%, compared to the earlier target of 40% of the 1990 levels.[278] The plan aims to set a more ambitious and cost-effective path to achieving climate neutrality by 2050; stimulate the creation of green jobs and continue the EU's track record of cutting greenhouse gas emissions whilst growing its economy; encourage international partners to increase their ambition to limit the rise in global temperature to 1.5ºC and avoid the most severe consequences of climate change.[279]*

Key Facts	
Year Launched	2021[280]
Key Agency	European Commission
Responsibilities	Presents an EU-wide GHG emissions reduction target of at least 55% of 1990 levels by 2030. It proposes to revise several pieces of EU climate legislation, setting out in real terms ways to reach the EU climate targets under the European Green Deal.[281]
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Yes[282]

Background

Global average temperature increased by 1.1ºC above the pre-industrial levels by 2019, which recorded the warmest temperatures during the previous five years. Weather extremes are frequently witnessed as droughts, storms, and other calamities. The IPCC reported that if climate change and the 1.5ºC global warming were not quickly halted, it would result in dire impacts.

In 2019, EU emission levels were down by approximately 25% compared to 1990, while the economy grew by 62% over the same period. The Impact Assessment accompanying the 2030 Climate Target Plan Communication demonstrated that an emission reduction of 55% by 2030 compared to 1990 levels would be economically feasible and beneficial for Europe. It is in line with the Fit for 55 package proposals. But projections show that the current policies in force would only yield a 60% reduction in GHG emissions by 2050. If actions taken during the next ten years remain weak, the path beyond 2030 would be challenging.

[278] https://www.jonesday.com/en/insights/2020/11/european-commission-announces-2030-climate-target-plan
[279] https://ec.europa.eu/clima/policies/eu-climate-action/2030_ctp_en
[280] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-2030-climate-target-plan
[281] https://ec.europa.eu/clima/policies/eu-climate-action/2030_ctp_en
[282] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-2030-climate-target-plan

Programme Structure[283]

The EU's current policy framework would not single-handedly suffice to reach the 2050 climate goals and meet the commitments under the Paris Agreement. The Commission proposes to change the current emissions reduction pathway to reach climate neutrality by 2050. It proposed the 2030 Climate Target Plan with the following objectives[284]:

- set a more cost-effective and ambitious goal to achieving climate neutrality by 2050;
- stimulate green jobs creation and continue to cut GHG emissions while developing the economy;
- encourage international partners to raise their ambition to limit the rise in global temperature to 1.5ºC and avoid the most severe consequences due to climate change.

This Communication therefore:

- presents an EU-wide GHG emissions reduction target of at least 55% by 2030 compared to 1990 levels;
- previews actions required across all sectors of the economy and acts as a launchpad for revisions of key legislative measures to lead towards the higher ambition;
- prepares for a public debate to increase the EU's contribution to the Paris Agreement and sets the stage for the Commission to make detailed legislative proposals by June 2021.

In implementing the 55% target the following will be taken into account:

- while some sectors which are energy-intensive have shown large reductions in emissions when shifting to clean energy sources, other sectors such as transport and agriculture have not yielded such significant reductions. If actions are not stepped up within these sectors during the coming decade, the changes required beyond 2030 would have to happen unrealistically fast;
- clear investment signals are required in present planning to transition to climate neutrality;
- the climate crisis needs to be addressed at this stage where there are choices available, rather than wait for the last minute to act.

The EU could become a model for other governments and citizens on how to implement the transition to a green, circular, and resilient economy. It could also demonstrate that growing prosperity can be combined with paths that control global climate change to 2ºC and strive to limit it to 1.5ºC.

The Economic and Social Benefits of Increased Climate Ambition[285]

Through the Impact Assessment, the Commission emphasised that achieving 55% GHG emissions reduction by 2030, would keep the EU on track to achieve climate neutrality. It would also spur sustainable economic growth, while social consequences need to be addressed at the EU and Member State level.

Despite net GHG emissions in 2020 being estimated to have reduced to 30 to 35% below 1990 levels, the economic rebound from COVID-19 crisis is estimated to increase emissions, unless additional action is taken. Some of the actions to reduce this jump in emissions could include:

- enabling EU companies to get into a position to develop, deploy and commercialise low-carbon solutions;
- significant work on mobility to transform it to a substantially cleaner sector, utilising zero emissions vehicles, developing public transport and using sustainable transport mode solutions through a well-integrated range of clean mobility options;
- ensuring digital technologies and transformations, such as 75% of EU companies using cloud by 2030, 100% online public services, etc., play a key role in ensuring the EU reaches its climate neutrality goals by 2030;[286]
- avoiding negative impacts on vulnerable consumers from the fact that low-income households utilise highly polluting fuels like coal within many regions of Europe and thus targeting energy efficiency policies on the renovation of their houses and keeping the impact on their heating and electricity bills in check;
- lowering energy bills and GHG emissions, as well as creating local jobs by renovating Europe's building. This activity will focus on the worst performing buildings, especially public buildings such as schools, hospitals, and care facilities.

Increased Investment Requirements

The recovery and greening of the economy can benefit from policy reforms that incentivise competition in product markets and deliver the necessary education and training for skill development.

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[283] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0562

[284] https://ec.europa.eu/clima/policies/eu-climate-action/2030_ctp_en

[285] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0562

[286] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

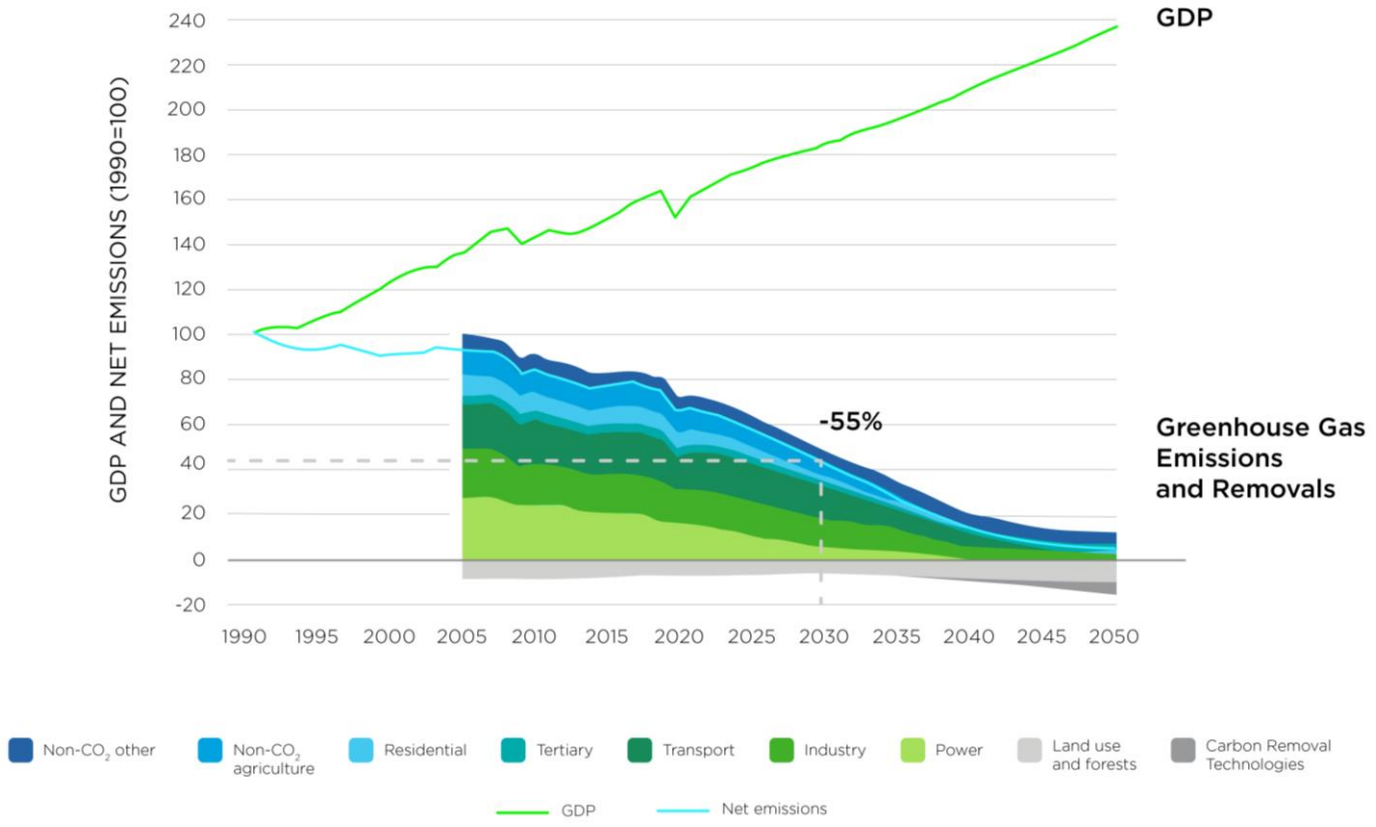
A key feature of the green transition is upgrading the EU's capital stock by making upfront investments. Annually during 2021-30, the EU will need to invest EUR 350 billion more than in 2011-20. Tools such as the EU Taxonomy, the EU Green Bond Standard and climate benchmarks will be essential to raise finance.

Economic Improvement

The increased climate ambition can also have positive impacts on GDP and total employment within the EU, while new investments will promote an increase in the GDP.

- More than half EU energy needs are covered by imports. Fossil fuels are exposed to volatile fuel prices and supply disruptions. Generating renewable energy reduces this exposure, thereby increasing the security of supply. Achieving the emission and climate targets would save the EU EUR 100 billion on its import bill over the period of 2021-2030 and up to EUR 3 trillion by 2050.
- Achieving the 55% target would reduce health damage compared to 2015 levels by at least EUR 110 billion in 2030.
- Increased climate action would reduce air pollution control costs by at least EUR 5 billion in 2030.

Figure 8- EU's pathway to sustained economic prosperity and climate neutrality 1990-2050



Source: figure adapted by Deloitte from EU's pathway to sustained economic prosperity and climate neutrality 1990-2050[287]

Ambitious Action in all Sectors of the EU Economy[288]

CO_2 emissions from burning fossil fuels are the largest source of GHG emissions in the EU. Together with fugitive non-CO_2 emissions in the energy system, these constitute over 75% of EU GHG emissions. Hence, the energy system will need to be fully decarbonised, while being mindful of technological neutrality.

Energy system transformation including buildings, transport, and energy are explained below.

Buildings

[287] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0562&from=EN

[288] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0562

- Buildings and power generation can result in the largest and most cost-efficient emissions reductions, 60% and more compared to 2015 levels, to achieve the 55% GHG emissions reduction target;
- By 2030, the EU renewable electricity production is envisioned to at least double from the present level of 32% to around 65%. Renewable energy sources will also be integrated within the heating and cooling systems in buildings and industry. The impact assessment suggests that around 40% penetration would be achieved in this segment by 2030;

Transportation

- The transport sector had the lowest share of renewable energy in 2015, with only 6%. Through deployment of electric vehicles, advanced biofuels and other renewable fuels, this value is set to increase to 24% by 2030. Clean hydrogen will be crucial for decarbonising heavy-duty transport.
- Other sustainable transport modes such as inland waterways and short sea shipping will also be used, particularly for freight transport, to increase decarbonisation. The Strategy for a Sustainable and Smart Mobility will pave the way for the sector to master the green and digital transitions.
- The Impact Assessment projects reduction levels in 2030 corresponding to a decrease of around 50% of the CO_2 emissions per kilometre for passenger cars as compared to 2021 targets.
- The ReFuelEU Aviation and FuelEU Maritime initiatives aim to increase the production and uptake of sustainable fuels for these sectors.

Bioenergy

- To ensure the land use sink can continue to strengthen and improve, biomass for energy use in the EU should be produced sustainably, reducing environmental impacts.
- Bioenergy production should be focused on usage of biomass wastes and residues and sustainable cultivation of energy crops.
- The Revision of the Renewable Energy Directive sets rules for the EU to achieve its 40% renewables target by 2030[289]. The promotion of sustainable forest management, strong enforcement of the existing legislation and quicker implementation of the sustainability criteria in the Renewable Energy Directive can play a key role in sustainable food-based biofuels.

Fossil Fuels

- By 2030, coal consumption is expected to reduce more than 70% compared to 2015, oil by 30% and gas by more than 25%. Renewable energy utilisation would reach 38% to 40% of gross final consumption.
- EU certification systems based on GHG performance for low-carbon basic materials and for carbon removals should be developed to create a market for low-carbon products.

Non-CO2 emissions

- Emissions such as methane, nitrous oxide and so-called F-gases (fluorinated gases) constitute 20% of the EU's GHG emissions. By 2030, these could be reduced by 35% compared to 2015 levels.
- **Waste treatment:** The waste sector is expected to strongly reduce its emissions through existing policies, due to the obligation to collect bio-waste separately as of 2024 and to ban bio-waste landfilling. Further reduction is possible through wastewater treatment and better management of sludge. Finally, converting waste into a resource is an essential part of closing the loop towards a circular economy.
- **Agriculture:** The majority of these emissions are generated through the agriculture sector. The decline in these emissions within the sector has stagnated and in some cases emissions have risen. Land use management, cultivating perennials on cropland in a sustainable manner, accelerating the growth of sustainable shellfish and algae production which are low emitter could contribute.

The land use sector

The EU land use, land use change and forestry (LULUCF) sector emits GHG and absorbs CO_2 in its soil. However, in recent years, the EU's sink has been under pressure from increased economic use and the adverse effects of climate change. Growth of the sink is required to achieve climate neutrality by 2050. But reversing the current trend demands significant short-term action due to long lead times, such as in forestry. Improved soil management, including activities such as restoration of wetlands, peatlands and degraded land could aid in climate neutrality targets.

Updating the 2030 Climate and Energy Policy Framework[290]

[289] https://ec.europa.eu/energy/topics/renewable-energy/renewable-energy-directive_en

[290] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0562

As per the Communication from the Commission, the Impact Assessment noted the broad changes required within the current policy framework to trigger the sectoral contributions, which can only be achieved through a whole of government approach. The EU is implementing its current 2030 climate target of at least 40% GHG emissions reductions through three key pieces of climate legislation:

- the **Emissions Trading System** Directive which mentions a cap for large industrial and power sector installations and the aviation sector to reduce emissions by 43% by 2030 compared to 2005;
- the **Effort Sharing Regulation** (ESR) with binding GHG emissions at Member State level for other emissions, adding up to a reduction of 30% by 2030 compared to 2005;
- the **Land Use, Land Use Change and Forestry** (LULUCF) Regulation that obliges Member States to ensure the net carbon reduction from land use does not deteriorate.

Energy legislation is also an essential instrument to achieve the 2030 EU binding targets of at least 32% of renewable energy sources in the EU's energy mix and at least 32.5% energy efficiency. The Renewable Energy Directive (RED II), the Energy Efficiency Directive and the Regulation on the Governance of the Energy Union and Climate Action contain these targets in legislation. A set of transport and other sectoral policies also contribute to the climate target achievement.

Current projections indicate that with present policies fully implemented, the GHG emissions reductions by 2030 would be only 45% compared to the 1990 levels: the present frameworks and regulations would not be sufficient to meet the 55% for 2030. Higher ambition, therefore, requires adjustments to the current policy framework for a more balanced pathway towards climate-neutrality.

Emissions Trading Systems[291]

An increasing role for emissions trading and energy taxation

- The EU Emissions Trading Systems (ETS) has been effective in countering GHG emissions, resulting in a decline of 33% from sectors subject to the ETS between 2005 and 2018. The introduction of the Market Stability Reserve[292] increased the carbon price, which caused a further drop of almost 9% year on year in 2019.
- The revision of the Energy Taxation Directive could contribute to putting a price on carbon, thereby reducing emissions. Well-designed tax reforms could foster economic growth, job creation and resilience.
- For example, in road transport, the CO_2 emissions performance standards for vehicles will be the main driver to ensure a supply of innovative green vehicles, including electric cars.

Therefore, the existing regulatory and enabling framework will be further enhanced to achieve targets.

Next steps on emissions trading

The EU ETS, set up in 2005, is the world's first international emissions trading system. It follows a cap-and-trade principle, whereby a cap is set on the total amount of GHG that can be emitted from installations within the trading system. The cap is reduced over time to reduce total emissions. Within the cap, installations buy or receive emission allowances, which can be traded with other installations as needed. An installation must provide enough allowances to cover its emissions and can keep the spare allowances in case of reduced emissions[293]. This market for trading emissions requires monitoring, reporting and verification processes.

Emissions trading: maritime and aviation

Since 1990, the EU's international emissions from navigation and aviation have grown by more than 50%. This calls for immediate action with these sectors. Currently, the legislative framework focuses only on monitoring, reporting, and verifying emissions from maritime transport. Within aviation, the application of the EU ETS is on hold with regards to international flights outside the European Economic Area to allow the development of corresponding international instruments.

For both sectors, the EU needs to regulate at least intra-EU aviation emissions within the EU ETS and include intra-EU maritime transport in the ETS.

International cooperation on maritime transport and aviation through international instruments such as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is designed to be effective in this context. The Commission will also consider the international aspects of EU ETS, taxation, and fuel policies to ensure gradual decarbonisation.

[291] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0562

[292] https://ec.europa.eu/clima/policies/ets/reform_en

[293] https://ec.europa.eu/clima/policies/ets_en

Agriculture, Land Use, Land Use Change and Forestry sector[294]

The Land Use, Land Use Change and Forestry Regulation currently requires EU Member States to maintain their natural carbon sink based on existing land use practices. It includes the activities of both the forestry and agriculture sectors. But these sectors require more action to achieve the 2030 target.

The Farm to Fork Strategy, the Biodiversity Strategy, the EU Nature Restoration Plan, the New EU Forest Strategy for 2030[295], and the new Adaptation Strategy will ensure strong policies are in place to enhance the natural sink and resilience of the EU's forests to climate change.

Land Use, Land Use Change and Forestry remove more CO_2 by storing it in biomass or in soil than it releases outside. An increase in the ambition for the Land Use, Land Use Change and Forestry sector beyond the current requirements demands careful assessment given the diverse situation across Member States.

Carbon farming and certification of carbon removals should be deployed to encourage individual farmers and forest managers to store carbon on their land and forests.

The Commission sees benefits in the creation of an Agriculture, Forestry and Land Use sector with its own specific framework covering all emissions and removals. It could also be the first sector to deliver net zero GHG emissions. A robust carbon removal certification system could also generate carbon removals to balance emissions in other sectors.

Renewable energy policies

There is a need to deploy renewables on a larger scale to contribute to higher climate ambitions and promote the Union's industrial leadership on renewable technologies.

- Stepping up the renewables target will provide the necessary predictability and investment certainty for further deployment of renewable energy across all sectors.
- EU actions will focus on cost-effective planning and development of renewable energy technologies, reducing market barriers and providing incentives for increased renewable energy utilisation, particularly in end-use sectors such as heating and cooling or transport.
- The Commission will undertake capacity building schemes for a citizen-driven renewable energy community development financed by the EU and support will also be provided for corporate sourcing of renewable energy.
- A European system of certification of renewable and low-carbon fuel based on GHG emissions savings and sustainability criteria would support the further development of renewables.

Energy efficiency policies

As per the Communication from the Commission, the Impact Assessment points out that energy efficiency improvements will require a significant step-up to around 36% in terms of final energy consumption. Analysis accompanying the Commission's Communication indicates that most savings are to come from buildings. The Renovation Wave will launch a set of actions to increase the renovation rate of individual buildings and at district level, switch fuels towards renewable heating solutions, uptake smart systems, building infrastructure for charging e-vehicles, etc. The Commission will also consider the possibility of establishing a mandatory requirement for worst performing buildings and gradually tightening the minimum energy performance requirements.

Other policies will also be required for energy efficiency. The existing energy efficiency requirements and product standards will be reviewed. The Sustainable Product legislative initiative announced in the Circular Economy Action Plan will widen the eco-design approach to other products.

The EU Digital Strategy has committed the EU to making data centres climate-neutral by 2030, as at present the Information and Communication Technologies Sector accounts for between 5% and 9% of global electricity consumption and more than 2% of global GHG emissions.

Road transport CO2 vehicle standards[296]

As per the Communication from the Commission, the Impact Assessment indicates that to reach the overall climate neutrality target in 2050, most cars on road must generate zero emissions. This transition to alternative model vehicles, such as electric cars, will require appropriate infrastructure for recharging and refuelling of those vehicles. The revision of the Alternative Fuels Infrastructure Directive will tackle this.

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[294] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0562

[295] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0572

[296] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0562

Mainstreaming of climate action across all policies

Climate policy objectives need to be in line with other EU policies to enable an inclusive transformation based on a just transition. The following are certain programmes and funds with their objectives.[297]

Table 38- Climate Target Plan: Programmes and Objectives

Fund/Programme	Objective
Sustainable Europe Investment Plan	Aims to boost sustainable investments
Just Transition Fund	Accelerates transition in coal, peat, oil shale and carbon-intensive regions
InvestEU program	Attracts private investments and proposes to use at least 30% of its overall financial envelope to contribute directly to achieve climate objectives
Modernisation Fund	Supports the transition of the energy system in lower income Member States
European Regional Development Fund and Cohesion Fund	Assists with complementary investments in energy efficiency, renewables, innovation, and research
European Social Fund Plus	Provides funds for up- and re-skilling workers
European Pillar of Social Rights	Promotes just transitions, access to training and essential services
Horizon Europe	Dedicates at least 35% of its fund to achieve climate goals
Innovation Fund	Supports the demonstration of breakthrough technologies at commercial scale in the energy and industry sectors
Renewed Sustainable Finance Strategy	Guides private investments more towards green recovery and sustainable economic activities
Sustainable and Smart Mobility Strategy	Aims for a 90% reduction in overall transport emissions by 2050 compared to 1990 levels
European Battery Alliance	Supplies batteries in line with the strategic action plan for decarbonisation
Zero Pollution Action Plan	Addresses pollution of air, water, and soil from large industrial installations consistent with circular economy policies

Along with government policies and regulations, citizens and organisations must play their part to achieve the climate targets.

International dimension

Raising the EU ambition to 55% for the next decade will reinforce the EU's global leadership position for the UN climate change negotiations in late 2021 (COP 26). The Commission has urged the European Parliament and the Council to view this as the EU's new contribution to the Paris Agreement.

Through its external assistance, the EU will support third countries in their effort to raise their climate ambitions. In parallel, in order to contain global climate change effectively and achieve the UN Sustainable Development Goals, all countries especially G20 members will need to come forward with much more ambitious actions to reduce the consequences of climate change.

In the absence of comparable worldwide increases by partners, the Commission will propose a carbon border adjustment mechanism for selected sectors to reduce carbon leakage.

Conclusion

Raising the EU's ambition of GHG emissions reductions to 55% by 2030 is beneficial for the health and well-being of citizens. A higher ambition for 2030 will contribute to a more gradual emissions reduction path and a more balanced economic transition towards climate neutrality over 30 years. Proactive changes will provide the EU and its businesses a first-mover advantage in the international market. A planned transition will also support EU citizens, businesses and partners with increased certainty and predictability on the path towards climate neutrality.

[297] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0562

EU Strategy for Energy System Integration

Description	*Energy production and consumption cause the release of 75% of the GHG emissions within the EU. Therefore, enhancing the energy system is crucial to achieving the European Green Deal's objective of reaching climate neutrality by 2050.* *Energy sector integration aims to combine renewable energy supply with efficient technologies such as electric motors, heat pumps and fuel cells. High levels of GHG emissions reduction can be achieved only through such a combination. provides guidelines to such a development.*[298] *The strategy sets out a vision to accelerate the transition towards a more integrated energy system, in support of clean energy and a climate neutral economy while strengthening energy security, protecting health and environment, and promoting growth and global industrial leadership.*[299]

Key Facts	
Year Launched	2020[300]
Key Agency	European Commission
Responsibilities	Link the various energy carriers – electricity, heat, cold, gas, solid and liquid fuels - with each other and with the end-use sectors, such as buildings, transport, or industry
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	NA

Background

A recent decline in the cost of renewable energy technologies, the digitalisation of the economy and emerging technologies in batteries, electric vehicles, and hydrogen open up opportunities to accelerate sustainability in the energy sector till 2050. The energy system has multiple parallel vertical energy value chains that link specific energy resources with specific end-use sectors. Market rules are also largely specific to different sectors. This model, which includes separate silos for each category, cannot deliver a climate-neutral economy. It is technically and economically inefficient and leads to losses in the form of heat waste and low energy efficiency.

The coordinated planning and operation of energy systems across multiple energy carriers and infrastructures is called energy system integration. This path towards effective and deep decarbonisation of the European economy is in line with the Paris Agreement and the UN's 2030 Agenda for Sustainable Development. Relying on greater use of clean and innovative processes and tools will trigger new investments, jobs, and growth. The Commission's recovery plan presented on 27 May 2020[301] highlighted the need to better integrate the energy system and increase economy wide resilience.

[298] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2020:299:FIN

[299] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2020:299:FIN

[300] https://ec.europa.eu/energy/topics/energy-system-integration/eu-strategy-energy-system-integration_en

[301] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A442%3AFIN

The Clean Energy Package put forward in 2018 and adopted in 2019[302] provides a basis for better integration across infrastructure, energy carriers and sectors, but regulatory and practical barriers block the process. This Strategy sets out a vision to accelerate the transition towards a more integrated energy system. It also proposes concrete policy and legislative measures at EU level to gradually shape a new integrated energy system.

The strategy is founded on three complementary and mutually supportive elements.

1. The creation of a circular energy system is required, where no energy is wasted, such as facilitating the reuse of waste heat from industrial sites.
2. The usage of cleaner electricity produced from renewable sources. With the development of renewables, this will become cheaper, thereby providing cleaner electricity.
3. The promotion of renewable and low-carbon fuels in sectors that require powerful high-carbon fuels such as heavy transport. This can be done by utilising the potential of sustainable biomass, renewable hydrogen, synthetic fuels, enabling carbon capture, etc.[303]

Programme Structure[304]

Energy system integration helps reduce GHG emissions in sectors that are difficult to decarbonise, for example, using renewable electricity in buildings and road transport, or renewable and low carbon fuels in maritime, aviation or certain industry processes.
This strategy identifies six pillars where coordinated measures are outlined to address existing barriers to energy system integration.

A more circular energy system, with 'energy-efficiency-first' at its core

Energy efficiency reduces the overall investment requirements and costs of energy production, infrastructure, and use. It also decreases the related land and material resources used and the associated pollution. While energy efficiency has many advantages, achieving this target has multiple challenges.
Challenge 1: Apply the energy-efficiency-first principle consistently across the entire energy system. The Energy Efficiency Directive and Energy Performance of Buildings Directive already supply incentives for customers, but they do not cover the entire supply chain. Further measures are required to ensure customers efficiently use energy that properly reflects the lifecycle energy use and footprint of the different energy carriers, from extraction to transportation, storage, and usage. In certain industries, where the shift from fossil fuels to electricity will result in higher consumption, trade-offs must be carefully considered.
The Primary Energy Factor (PEF) is an important tool to facilitate comparisons of savings across energy carriers. The Commission will review the level of the PEF and assess the current provisions in EU legislation to ensure application of the PEF by Member States. The Renovation Wave initiative will propose actions to uptake renewable energy in buildings across the EU.
Challenge 2: Local energy sources are insufficiently or not effectively used in buildings and communities. A significant, yet largely unused potential is the reuse of waste heat from industrial sites, data centres and other sources. Energy reuse can take place on-site, such as through re-integration of process heat within manufacturing plants, or through district heating and cooling networks.
The barriers to this step are lack of awareness about these solutions, reluctance of companies to enter a new business, lack of regulatory frameworks to share the costs, and barriers related to planning, transaction costs and pricing signals. For the data centres specifically, the Digital Strategy has announced that these should be climate-neutral and highly energy-efficient by no later than 2030.
Challenge 3: Untapped use of wastewater and biological waste and residues for bioenergy production, including biogas. Biogas can be utilised to reduce fossil fuel consumption or upgraded to biomethane to allow injection into the natural gas grid or use in transport.
Key Actions
To better apply the energy-efficiency-first principle, the Commission:

[302] https://ec.europa.eu/energy/topics/energy-strategy/clean-energy-all-europeans_en
[303] https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_1258
[304] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0299&from=EN

- issues guidance to Member States to make the energy-efficiency-first principle operational across the energy system when implementing legislations;
- promotes the energy-efficiency-first principle in all upcoming relevant methodologies and legislative revisions;
- is reviewing the Primary Energy Factor to recognise energy efficiency savings via renewable electricity and heat. This is occurring as part of the Energy Efficiency Directive.

To build a more circular energy system, the Commission:

- facilitates the reuse of waste heat from infrastructures through strengthened requirements for connection to district heating networks, energy performance accounting and contractual frameworks. This is as part of the Renewable Energy Directive and of the Energy Efficiency Directive.
- incentivises the mobilisation of bio-waste from the agriculture, food, and forestry sectors. It supports capacity-building for rural circular energy communities through various programmes such as LIFE, the Structural Funds and the Common Agriculture Policy.

Accelerating the electrification of energy demand, building on a largely renewables-based power system

Electricity demand is projected to increase significantly on the path to climate neutrality. The share of electricity in final energy consumption is set to grow from 23% today to around 30% in 2030, and about 50% in 2050. This growing electricity demand needs to be largely based on renewable energy. By 2030, the share of renewable energy in the electricity mix should double to 55-60% and projections show a share of around 84% by 2050. The need for increased electricity supply can, along with relevant onshore renewable power technologies such as solar or wind energy, be partly met by offshore renewable energy production. The potential for offshore wind energy in the EU is between 300-450 GW by 2050, against the capacity of 12 GW in 2020. This represents a huge opportunity for the EU industry to become the global leader in offshore technology but will require considerable efforts to increase European industrial capacity and build new value chains.

The Commission will use the new recovery instrument NextGenerationEU to support the deployment of renewable energy, but challenges for increased electrification remain and differ per sector and across Member States.

Buildings

The electrification of buildings is expected to play a central role, particularly through the roll-out of heat pumps for heating and cooling. In the residential sector, the share of electricity in heating should grow to 40% by 2030 and to 50-70% by 2050. In the services sector, it is expected to grow to around 65% by 2030 and 80% by 2050. The most crucial barrier is the high level of taxes and levies applied to electricity, and the lower level of taxation on fossil fuels for the heating sector. Progress is also hampered by other barriers such as unfit infrastructure planning, lack of a skilled workforce and lack of financing instruments.

Industry

Within this sector, heat represents more than 60% of the energy use. Industrial heat pumps can help decarbonise the low temperature heat supply within industry. Other technologies are being developed for higher temperature heating such as microwave or ultrasound. The barriers to deployment include lack of information and long pay-back due to the high price of electricity relative to gas.

Transport

This strategy will set out how the transport system needs to decarbonise and modernise to reduce emissions by 90% by 2050. Electric means of transport are key to accelerating sustainability in the sector. The rapidly falling cost of electric vehicles means that they could be competitive around 2025. The European Green Deal call for recharging infrastructure to be stepped up, with the initial objective of having at least one million publicly accessible recharging points by 2025.

Key Action

To ensure continued growth in the supply of renewable electricity, the Commission:

- ensures cost-effective planning and deployment of offshore renewable electricity, considering the potential for on-site or nearby hydrogen production, through the Offshore Renewable Strategy and follow-up regulatory and financing actions. This also strengthens EU's industrial leadership in offshore technologies.
- explores minimum mandatory green public procurement criteria and goals in relation to renewable electricity, supported by capacity building financing under the LIFE programme.
- tackles left over barriers to a high level of renewable electricity supply that matches the expected growth in demand in end-use sectors.

To further accelerate the electrification of energy consumption, the Commission:

- is promoting further electrification of building heating systems, the deployment of on-building renewable energy, and the roll-out of electric vehicle charging points, as part of the Renovation Wave;
- is developing specific measures for the use of renewable electricity in transport, heating, and cooling in buildings, through the revision of the Renewable Energy Directive;
- is financing pilot projects for the electrification of low-temperature process heat in industrial sectors;
- is assessing options to support decarbonisation of industrial processes, through electrification and energy efficiency;
- is proposing the revision of CO_2 emission standards for cars and vans.

To accelerate the roll-out of electric vehicle infrastructure and ensure the integration of new loads, the Commission:

- is supporting having 1 million charging points in place by 2025, using EU funding, and communicates regularly on the funding opportunities and regulatory environment for these charging points;
- is accelerating the roll-out of alternative fuels infrastructure, including for electric vehicles, and strengthening interoperability requirements through the revision of the Alternative Fuels Infrastructure Directive. It ensures adequate customer information, cross-border usability of charging points, and the efficient integration of electric vehicles in the electricity system;
- is developing a Network Code on Demand Side Flexibility to unlock the potential of electric vehicles, heat pumps and other electricity consumption.

Promote renewable and low-carbon fuels, including hydrogen, for hard-to-decarbonise sectors[305]

While direct electrification and renewable heat are the most cost-effective and energy-efficient decarbonisation options, there are many applications where these options are not feasible. In such cases, low-carbon fuels, and renewable resources such as biogas, biomethane and biofuels, hydrogen, and synthetic fuels could be used.

Unlocking the potential of renewable fuels produced from sustainable biomass

As of 2020, biofuels accounted for only 3.5% of all gas and fuel consumption. These are largely based on food and feed crops. Biofuels will play an important role in hard-to-decarbonise transport modes, such as aviation and maritime, but they need to achieve their full potential sustainably.

Promoting the use of renewable hydrogen in hard-to-decarbonise sectors

As of 2020, hydrogen contributed less than 2% of Europe's energy consumption and was almost exclusively produced from fossil fuels. Hydrogen from renewables can play an important role in reducing emissions, especially for transport. CO_2 and hydrogen can also be combined to be processed into synthetic fuels. The Hydrogen Strategy presents measures to create the conditions for hydrogen to contribute to decarbonising the economy cost-effectively.

Enabling carbon capture, storage and use to support deep decarbonisation, including synthetic fuels

Fully integrating the energy system cannot alone eliminate CO_2 emissions. Alternative process technologies, such as carbon capture and storage (CCS), can play a key role in a climate-neutral energy system. Post capturing, an alternative to storing CO_2, combines CO_2 with hydrogen to produce synthetic gases and fuels. The GHG emissions from these synthetic fuels depend on the CO_2 source. The upscaling of these processes is relevant to particularly high energy density liquid fuels utilised in sectors such as aviation.

The uptake of CO2 capture and usage in Europe is slow, owing to high investment requirements and operational costs.

Key Actions

The Commission is undertaking several steps:

- proposing a comprehensive terminology for all renewable and low-carbon fuels and a European system of certification of such fuels. This is based on full lifecycle GHG emission savings. It also develops the existing provisions of the Renewable Energy Directive
- establishing additional measures to support renewable and low-carbon fuels, possibly through minimum shares in specific sectors, including aviation and maritime, through revision of the Renewable Energy Directive.
- promoting the financing of flagship projects for integrated, carbon-neutral industrial clusters, producing and consuming renewable and low-carbon fuels, through the Horizon Europe, InvestEU and LIFE programmes and the European Regional Development Fund.
- stimulating the production of fertilisers from renewable hydrogen through the Horizon Europe programme.
- demonstrating carbon capture for the production of synthetic fuels through the Innovation Fund.
- developing a regulatory framework for the certification of carbon removals based on carbon accounting to verify the authenticity of carbon removals.

[305] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0299&from=EN

Making energy markets fit for decarbonisation and distributed resources[306]

In an integrated system, efficient markets should guide customers towards the most energy-efficient option.

Ensuring non-energy price components contribute to decarbonisation across energy carriers

In many EU Member States, the taxes and levies on electricity are higher than on coal, gas, or heating oil, both in absolute value and as a share of the total price. This causes an asymmetry between the different sources of energy. For example, in households, the taxes and levies now add up to 40% of the final price on electricity prices, compared to 26% for gas or 32% for heating oil. In addition, fossil fuel subsidies persist in the EU for certain sectors. In addition, the specificities of electricity used for energy storage or for hydrogen production should be considered, avoiding double taxation and unjustified double grid charges.

Placing consumers at the centre

Clear and easily accessible information is essential to enable citizens to change energy consumption patterns and switch to solutions that support an integrated energy system. Customers should be informed of their rights on the technology options that are available. The Commission will launch a consumer information campaign on their rights related to the energy market.

Making electricity and gas markets fit for decarbonisation

The Clean Energy Package has already set up electricity markets fit to integrate large amounts of variable electricity, while improving the market signals to stimulate investments and empower electricity customers. The present challenge is to implement the measures properly, and the completion of market coupling through day-ahead and intraday trading. The gas market regulatory framework should be re-examined to facilitate both the uptake of renewable gases and customer empowerment while ensuring an interoperable EU internal gas market.

Other issues to consider include the connection to infrastructure and the market access for distributed production of renewable gases.

Updating the State aid framework

The review of the State aid framework, and its guidelines on energy and environmental protection, will contribute to energy system integration.

Key Actions

To promote a level playing field across all energy carriers, the Commission's plans include:

- guidance to all Member States to address the high charges borne by electricity to ensure consistency of non-energy price components across energy carriers;
- alignment of the taxation of energy products with EU environment policies and avoidance of double taxation through the revision of the Energy Taxation Directive;
- provision of more consistent carbon price signals across energy sectors, including through a possible proposal for extension of the ETS to other sectors such as maritime;
- providing for the phasing out of direct fossil fuel subsidies, including in the context of review of the State aid framework and revision of the Energy Taxation Directive;
- ensuring the revision of the State aid framework supports cost-effective decarbonisation of the economy.

To adapt the gas regulatory framework, the Commission will:

- reviews the legislative framework to design a competitive gas market, fit for renewable gases. It also plans to empower gas customers with enhanced information and rights.

To improve customer information, the Commission will:

- launches a consumer information campaign on energy customer rights;
- improve information to customers on the sustainability of industrial products. This will be part of a sustainable product policy initiative, and complementary legislative proposals.

A more integrated energy infrastructure[307]

Energy system integration will require more physical links between energy carriers. This calls for a new, holistic approach to both large-scale and local infrastructure planning, including resilience of critical infrastructure. Infrastructure planning will facilitate the integration of various energy carriers.

[306] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0299&from=EN

[307] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0299&from=EN

Various components of the energy network need to evolve. Modern low-temperature district heating systems should be promoted. These can connect local demand with renewable and waste energy sources that can help optimise supply and demand across energy carriers.
The Clean Energy Package will contribute to more efficient use of electricity grids. The existing gas network provides ample capacities across the EU to integrate renewable and low-carbon gases.
To enable the use of hydrogen, dedicated infrastructures for large-scale storage and transportation of pure hydrogen are required. Similarly, dedicated infrastructure for CO_2 storage and transportation is also essential. The Regulation on Trans-European Networks in Energy (TEN-E) provides a framework for the selection of infrastructure projects in common interest areas such as electricity, gas, and CO_2 networks. In this context, the Transmission System Operators (TSOs) develop 10-Year Network Development Plans (TYNDPs).
Finally, the Security Union Strategy[308] addresses both critical infrastructure and cybersecurity needs, as disruptions in one sector can have an immediate impact on operations in others due to increasing interdependencies.

Key Actions

The Commission will take the following measures:

- ensure the revisions of the TEN-E and TEN-T regulations support a more integrated energy system through greater synergies between the energy and transport infrastructure, in order to achieve a 15% electricity interconnection target for 2030;
- review the scope and governance of the TYNDPs for full consistency with the EU's decarbonisation objectives. It will also review cross-sectoral infrastructure planning as part of the revision of the TEN-E Regulation and other legislation;
- accelerates investments in smart, highly efficient, renewables-based district heating and cooling networks.

A digitalised energy system and a supportive innovation framework

Digitalisation supports energy system integration as it can aid dynamic and interlinked flows of energy carriers, support more diverse markets that are connected to each other, and provide the necessary data to match supply and demand on a real-time basis. A combination of data exchange infrastructures and data capacities that use Big Data, AI, 5G and distributed ledger technologies can enhance forecasting. Digitalisation is also key to realising the full potential of customers using energy consumption flexibly to contribute to efficient integration of renewables.
But digitalisation will result in an increased demand for ICT equipment, networks and services that need to be managed in the context of an integrated energy system. Digitalisation also faces challenges in terms of ethics, privacy, and cybersecurity.
A system-wide Digitalisation of Energy Action Plan, which was foreshadowed in the European Data Strategy could accelerate the implementation of digital solutions.
Lastly, research and innovation are key to creating new synergies in the energy system. Research should develop low maturity technologies to come to the market quickly, while more mature and innovative technologies could be scaled up through large scale demonstrations.

Key Actions

The Commission will take the following measures:

- adopt a Digitalisation of Energy Action plan to develop a competitive market for digital energy services. This will simultaneously ensure data privacy and support investment in digital energy infrastructure;
- develop a Network Code on cybersecurity in electricity with sector-specific rules;
- adopt the implementing acts on interoperability requirements and transparent procedures for access to data within the EU;
- publish a new impact-oriented clean energy research and innovation outlook to ensure these steps support energy system integration.

Conclusion

The transition to a more integrated energy system is important for Europe for many reasons. Firstly, for the post- COVID-19 recovery period: since the pandemic has affected the economy, this strategy proposes cost-effective and well-targeted investments in infrastructure and energy options which could lower bills for businesses and customers.
Secondly, it helps to achieve climate neutrality. It exploits energy efficiency potential, enables more integration of renewables, and the deployment of new decarbonised fuels.

[308] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1596452256370&uri=CELEX:52020DC0605

Finally, an integrated energy system is vital for shaping Europe's global leadership in clean energy technologies, by utilising Europe's existing strengths. These include an established leadership in renewables, a regional approach to system operation and infrastructure planning, liberalised energy markets, and excellence in energy innovation and digitalisation. While the Clean Energy Package adopted in 2018 lays the foundations of the integration, it needs to be fully implemented. New actions are also necessary to speed up the movement towards the energy system of the future.

Amending the Renewable Energy Directive

Description	*The first EU Renewable Energy Directive (RED) was adopted in 2001. In a 2009 revision, a goal was set of a minimum 20% share of renewable energy sources (RES) in final energy consumption by 2020. The Directive was revised in 2018 to achieve a minimum 32% share of RES in final energy consumption by 2030. However, since the EU has adopted more ambitious climate goals to reduce GHG emissions by 55% by 2030 and to have net zero GHG emissions by 2050, further changes are required. Consequently, as part of the "Fit for 55" package, a revision of the RED has been proposed to increase the binding EU minimum share of RES in final energy consumption to 40% by 2030.*[309]

Key Facts	
Year Launched	2021: proposal launched
Key Agency	European Commission
Responsibilities[310]	• The Commission will assess the 40% target of share of energy from renewable sources in the Union's gross final consumption of energy in 2030 and submit a proposal by 2023 to increase it where there are further substantial costs reductions in the production of renewable energy. • The Commission will establish a facilitative platform in order to support Member States that use cooperation mechanisms to contribute to the binding overall Union target. • The Commission will take specified steps to ensure the threat to biodiversity from biomass is minimised and that support schemes for biomass are necessary and not causing market distortions. • In 2032, the Commission will publish a report reviewing the application of the Directive. • The Commission will set up a Union database to enable the tracing of liquid and gaseous renewable fuels and recycled carbon fuels.
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Yes

Background[311]

Renewable energy is critical to delivering the European Green Geal and to achieveing climate neutrality by 2050, considering that the energy sector contributes over 75% of total greenhouse gas emissions in the Union. Renewable energy also contributes to tackling environment-related challenges such as biodiversity loss.

The Renewable Energy Directive (RED) sets a binding Union target to reach a share of at least 32% of energy from renewable sources in the Union's gross final consumption of energy by 2030. Under the Climate Target Plan, the share of renewable energy in gross final energy consumption needs to increase to 40% by 2030 in order to achieve the GHG emissions reduction target.

[309] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-the-renewable-energy-directive

[310] https://ec.europa.eu/info/sites/default/files/amendment-renewable-energy-directive-2030-climate-target-with-annexes_en.pdf

[311] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-the-renewable-energy-directive

Therefore, the aim of this proposal is to set a comprehensive framework for the deployment of RES across all sectors of the economy, with a particular focus on sectors where progress has been slow, such as in the transport, buildings and industry sectors. This proposal also aims to create a new credit mechanism aimed at boosting the use of renewable electricity in transport, and to remove barriers in permitting procedures for new RES installations. Moreover, the proposal includes new provisions to facilitate collective Power Purchase Agreements for renewable energy; introduce an EU labelling methodology for industrial products produced using renewable energy; and set up a cross-border pilot project to foster regional cooperation on renewables (e.g. offshore wind hub). Additionally, the proposal looks to further strengthen the sustainability of biofuels, in particular by prohibiting the use of all biomass[312] from primary and highly biodiverse forests, and the use of stumps and roots, and to oblige Member States to design RES support schemes in accordance with the biomass cascading principle. The revision applies more ambitious GHG reduction criteria to existing biomass-based installations and lowers the threshold for applying sustainability criteria for small-scale RES installations to 5 MW in comparison to the 20 MW level in the 2018 Directive.

Scope of the Regulation[313]

The Regulation sets a binding Union target for the overall share of energy from renewable sources in the Union's gross final consumption of energy in 2030. As such, Member States have to collectively ensure that the share of energy from renewable sources in the Union's gross final consumption of energy in 2030 is at least 40%. Member States also need to set national contributions to meet, collectively, the binding overall Union target as part of their integrated national energy and climate plans. Member States will take measures to ensure that energy from biomass is produced in a way that minimises undue distortive effects on the biomass raw material market and harmful impacts on biodiversity. To that end, they will take into account the waste hierarchy under Directive 2008/98/EC [314] and the cascading principle.

Programme Structure: Operational[315]

Support schemes

- Member States may apply support schemes to reach the Union target. Support schemes for electricity from renewable sources have to provide incentives for the integration of electricity from renewable sources in the electricity market in a market-based and market-responsive way. The schemes need to avoid unnecessary distortions of electricity markets and take into account possible system integration costs and grid stability. They also need to maximise the integration of electricity from renewable sources in the electricity market.
  - Support will be granted in the form of a market premium.
- Member States have the right to decide to which extent they support electricity from renewable sources which is produced in another Member State. Member States may open participation in support schemes for electricity from renewable sources to producers located in other Member States. In this case, Member States may provide that support for an indicative share of the newly supported capacity, or of the budget allocated to it.
  - If a Member State decides to open participation in support schemes to producers located in other Member States, the relevant Member States shall agree on the principles of such participation. The Commission, can upon request, provide assistance throughout the negotiation process.
  - Member States will, at least every five years, assess the effectiveness of their support schemes for electricity from renewable sources and their major distributive effects on different consumer groups, and on investments.
- Two or more Member States may also decide to join or partly coordinate their national support schemes. In this case, a certain amount of energy from renewable sources produced in the territory of one participating Member State may count towards the renewable energy share of another participating Member State, if the Member States:

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[312] *According to Directive 2018/2001 biomass refers to the biodegradable fraction of products, waste and residues from biological origin from agriculture, including vegetal and animal substances, from forestry and related industries, including fisheries and aquaculture, as well as the biodegradable fraction of waste, including industrial and municipal waste of biological origin.* https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02018L2001-20181221&from=EN

[313] https://ec.europa.eu/info/sites/default/files/amendment-renewable-energy-directive-2030-climate-target-with-annexes_en.pdf

[314] *According to Article 4 of Directive 2008/98/EC, the waste hierarchy will apply as a priority order in waste prevention and management legislation and policy: prevention; preparing for re-use; recycling; other recovery, e.g. energy recovery; and disposal.* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0098

[315] https://ec.europa.eu/info/sites/default/files/amendment-renewable-energy-directive-2030-climate-target-with-annexes_en.pdf

- make a statistical transfer of specified amounts of energy from renewable sources from one Member State to another Member State;
- set up a distribution rule agreed by participating Member States that allocates amounts of energy from renewable sources between the participating Member States.

- The Commission will disseminate guidelines and best practices, and upon request by the Member States, facilitate the establishment of joint support schemes between Member States.

Joint projects

- Two or more Member States may cooperate on all types of joint projects with regard to the production of electricity, heating or cooling from renewable sources. Such cooperation may involve private operators. By 31 December 2025, each Member State will agree to establish at least one joint project with one or more other Member States for the production of renewable energy. The duration of a joint project may extend beyond 2030.
  - Member States bordering a sea basin will cooperate to jointly define the amount of offshore renewable energy they plan to produce in that sea basin by 2050, with intermediate steps in 2030 and 2040. They will take into account the specificities and development in each region, the offshore renewable potential of the sea basin and the importance of ensuring the associated integrated grid planning.
- One or more Member States may cooperate with one or more third countries on all types of joint projects with regard to the production of electricity from renewable sources. Such cooperation may involve private operators and will take place in full respect of international law. The duration of a joint project may extend beyond 2030.
  - Electricity from renewable sources produced in a third country will be taken into account for the purposes of calculating the renewable energy shares of the Member States only where the following conditions are met:
    - the electricity is consumed in the Union;
    - the electricity is produced by an installation that became operational after 25 June 2009 or by the increased capacity of an installation that was refurbished after that date, under a joint project;
    - the amount of electricity produced and exported has not received support from a support scheme of a third country other than investment aid granted to the installation;
    - the electricity has been produced in accordance with international law, in a third country that is a signatory to the Council of Europe Convention for the Protection of Human Rights and Fundamental Freedoms, or other international conventions or treaties on human rights.
- The notifying Member State will notify:
  - the total amount of electricity produced from renewable sources during that year by the installation in place;
  - the amount of electricity produced from renewable sources during that year by that installation which is to count towards its renewable energy share;
  - evidence of compliance with the conditions above mentioned.

Monitoring

- The Commission will monitor the origin of biofuels, bioliquids and biomass fuels consumed in the Union and the impact of their production, including the impact as a result of displacement, on land use in the Union and in the main third countries of supply.
  - The monitoring will be based on Member States' integrated national energy and climate plans and corresponding progress reports, and those of relevant third countries, intergovernmental organisations, scientific studies and any other relevant pieces of information.
- The Commission will also monitor the commodity price changes associated with the use of biomass for energy and any associated positive and negative effects on food security.
- The Commission will maintain a dialogue and exchange information with third countries and biofuel, bioliquid and biomass fuel producers, consumer organisations and civil society regarding the general implementation of the measures in this Directive relating to biofuels, bioliquids and biomass fuels.
- In 2026, the Commission will submit a legislative proposal on the regulatory framework for the promotion of energy from renewable sources for the period after 2030.

Salient Features[316]

Provisions

Amendments to the RED

- Under the revision, Member States will have to establish a framework, which may include support schemes to facilitate the uptake of renewable power purchase agreements, enabling the deployment of renewable electricity to a level that is consistent with the Member State's national contribution. The framework will tackle remaining barriers, including those related to permitting procedures, to a high level of renewable electricity supply. When designing the framework, Member States will have to take into account the additional renewable electricity required to meet demand in the transport, industry, building, and heating and cooling sectors and for the production of renewable fuels of nonbiological origin.
- The gross final consumption of energy from renewable sources in each Member State will be calculated as the sum of:
  - gross final consumption of electricity from renewable sources;
  - gross final consumption of energy from renewable sources in the heating and cooling sector[317];
  - final consumption of energy from renewable sources in the transport sector.
- The share of energy from renewable sources will be calculated as the gross final consumption of energy from renewable sources divided by the gross final consumption of energy from all energy sources, expressed as a percentage.
- A new article has been added in the Revision (Article 15a) on mainstreaming renewable energy in buildings.
  - In order to promote the production and use of renewable energy in the building sector, Member States will set an indicative target for the share of renewables in final energy consumption in their buildings sector in 2030 that is consistent with an indicative target of at least a 49% share of energy from renewable sources in the buildings sector in the Union's final consumption of energy in 2030.
    - For existing buildings, the above-mentioned will apply to the armed forces only to the extent that its application does not cause any conflict with the nature and primary aim of the activities of the armed forces and with the exception of material used exclusively for military purposes.
  - Member States will introduce measures in their building regulations and codes and, where applicable, in their support schemes, to increase the share of electricity and heating and cooling from renewable sources in the building stock, including national measures relating to substantial increases in renewables self-consumption, renewable energy communities and local energy storage, in combination with energy efficiency improvements relating to cogeneration and passive, nearly zero-energy and zero-energy buildings.
  - Member States will ensure that public buildings at national, regional and local level, fulfil an exemplary role as regards the share of renewable energy used. Member States may, among others, allow that obligation to be fulfilled by providing for the roofs of public or mixed private-public buildings to be used by third parties for installations that produce energy from renewable sources.
  - Member States will promote the use of renewable heating and cooling systems and equipment. Member States will use all appropriate measures, tools and incentives, including:
    - energy labels developed under Regulation (EU) 2017/1369;
    - energy performance certificates under Directive 2010/31/EU;
    - or other appropriate certificates or standards developed at national or Union level.
- Member States will also ensure the provision of adequate information and advice on renewable, highly energy efficient alternatives as well as on financial instruments and incentives available to promote an increased replacement rate of old heating systems and an increased switch to solutions based on renewable energy.
- Member States will ensure that information on support measures is made available to all relevant actors such as consumers and suppliers. Information on the net benefits, cost and energy efficiency of equipment and systems for the use of heating, cooling and electricity from renewable sources will also be made available either by the

[316] https://ec.europa.eu/info/sites/default/files/amendment-renewable-energy-directive-2030-climate-target-with-annexes_en.pdf

[317] *Gross final consumption of energy from renewable sources in the heating and cooling sector will be calculated as the quantity of district heating and cooling produced in a Member State from renewable sources, plus the consumption of other energy from renewable sources in industry, households, services, agriculture, forestry and fisheries, for heating, cooling and processing purposes. Ambient and geothermal energy used for heating and cooling by means of heat pumps and district cooling systems need to be taken into account, provided that the final energy output significantly exceeds the primary energy input required to drive the heat pumps.*

supplier of the equipment/systems or by the competent authorities. Moreover, Member States also need to provide information to the public on the qualified and certified installers.

- Final customers are entitled to participate in a renewable energy community while maintaining their rights or obligations as final customers, and without being subject to unjustified or discriminatory conditions or procedures that would prevent their participation in a renewable energy community. Member States will provide an enabling framework to promote and facilitate the development of renewable energy communities. Energy communities are entitled to:
    - produce, consume, store and sell renewable energy, including through renewables power purchase agreements;
    - share, within the renewable energy community, renewable energy that is produced by the production units owned by that renewable energy community, and maintain the rights and obligations of the renewable energy community members as customers;
    - access all suitable energy markets both directly or through aggregation in a non-discriminatory manner.
- In order to promote the use of renewable energy in the heating and cooling sector, each Member State will increase the share of renewable energy in that sector by at least 1.1 percentage points as an annual average calculated for the periods 2021 to 2025 and 2026 to 2030, starting from the share of renewable energy in the heating and cooling sector in 2020, expressed in terms of national share of gross final energy consumption.
- To achieve the average annual increase, Member States may implement the following measures:
    - physical incorporation of renewable energy or waste heat and cold in the energy sources and fuels supplied for heating and cooling;
    - installation of highly efficient renewable heating and cooling systems in buildings, or use of renewable energy or waste heat and cold in industrial heating and cooling processes;
    - measures covered by tradable certificates through support to installation measures carried out by another economic operator such as an independent renewable technology installer or an energy service company providing renewable installation services;
    - capacity building for national and local authorities to plan and implement renewable projects and infrastructures;
    - creation of risk mitigation frameworks to reduce the cost of capital for renewable heat and cooling projects;
    - promotion of heat purchase agreements for corporate and collective small consumers;
    - planned replacement schemes of fossil heating systems or fossil phase-out schemes with milestones;
    - renewable heat planning, encompassing cooling, requirements at local and regional level;
    - other policy measures, with an equivalent effect, including fiscal measures, support schemes or other financial incentives.
- Member States will endeavour to increase the share of energy from renewable sources and from waste heat and cold in district heating and cooling by at least 2.1 percentage points as an annual average calculated for the period 2021 to 2025 and for the period 2026 to 2030, starting from the share of energy from renewable sources and from waste heat and cold in district heating and cooling in 2020.
- As an amendment to Article 29 regarding heating and cooling systems, the GHG emission savings from the use of biofuels, bioliquids and biomass fuels will be at least 70% for electricity, heating and cooling production from biomass fuels used in installations until 31 December 2025, and at least 80% from 1 January 2026.

Conclusion

The Revision of the Renewable Energy Directive (RED) aims to align with the Climate Target Plan and increase the share of renewable energy in gross final energy consumption from 32% to 40% by 2030 in order to achieve the GHG emissions reduction target. This Directive sets a binding Union target for the overall share of energy from renewable sources in the Union's gross final consumption of energy in 2030.

To achieve the target, the proposal sets a comprehensive framework for the deployment of RES across all sectors of the economy, with a particular focus on the transport, buildings and industry sectors.

European Green Deal Investment Plan

Description	*The European Green Deal Investment Plan, also called the Sustainable Europe Investment Plan, is the investment pillar of the European Green Deal. To reach the targeted 2030 climate and energy goals, an additional investment of EUR 260 billion per year till 2030 will be required. The Commission is intending to present an impact assessed plan to widen the EU's climate ambition for 2030. Additional investments will be required to achieve these broader environmental and social objectives. The plan aims to mobilise at least EUR 1 trillion in sustainable investments over the next decade to achieve the goals set by the European Green Deal ensuring a fair and just transition*[318]

Key Facts	
Year Launched	2020[319]
Key Agency	European Commission
Responsibilities	Setting a framework to mobilise at least EUR 1 trillion of private and public sustainable investments from 2020 to 2030 through the EU budget and associated instruments. The plan will also provide tailored support to public administrations and project promoters in executing sustainable projects.
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27[320]
Legally Binding	NA

Background

The European Green Deal is the European Union's response to climate and environmental-related challenges. This deal is a new growth strategy that aims to transform the EU into a modern, resource-efficient, and competitive economy with zero net emissions of greenhouse gases by 2050.

The Sustainable Europe Investment Plan is the investment pillar of the European Green Deal. On 14 January 2020, the European Commission presented this Plan to the Europe Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. To develop a sustainable Europe, significant investments are required across all sectors of the economy. The 2030 climate and energy targets will require additional investments at the rate of EUR 260 billion per year for the decade. The Commission also intends to further increase the EU's climate ambition for 2030 based on an impact assessed plan.

The Sustainable Europe Investment Plan will enable the transition to a green economy through the three dimensions.

- The Plan will mobilise at least EUR 1 trillion over the next decade from the EU budget. The Just Transition Mechanism will ensure a fair transformation by facilitating investments in regions most affected by the transition.
- The Plan will provide an enabling framework for private and public investors. This will ensure a cost-effective and fair transition. Investors require proper tools to identify sustainable investments
- The Plan will provide customised support to public administrations and project promoters to identify and execute sustainable projects.

[318] https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_24

[319] https://www.mondaq.com/economic-analysis/1015114/the-european-green-deal-investment-plan

[320] https://www.economist.com/the-economist-explains/2021/06/01/what-is-the-european-green-deal

Figure 9- Sustainable Europe Investment Plan

Source: figure adapted by Deloitte from Communication from the Commission on the Sustainable Europe Investment Plan[321]

[321] https://ec.europa.eu/commission/presscorner/api/files/attachment/860462/Commission Communication on the European Green Deal Investment Plan_EN.pdf.pdf

The annual investment requirements include energy-related investments, renovation of buildings, the transport sector, agriculture sector, and human capital investments. Digitalisation is also a key enabler in the Green Deal.
Analysis of the Commission's long-term strategic vision for a low carbon economy may require additional investments of up to 2% of GDP by 2040. This plan could support the financial requirements in the Fit for 55 package.

Programme Structure[322]

Finance Mechanism

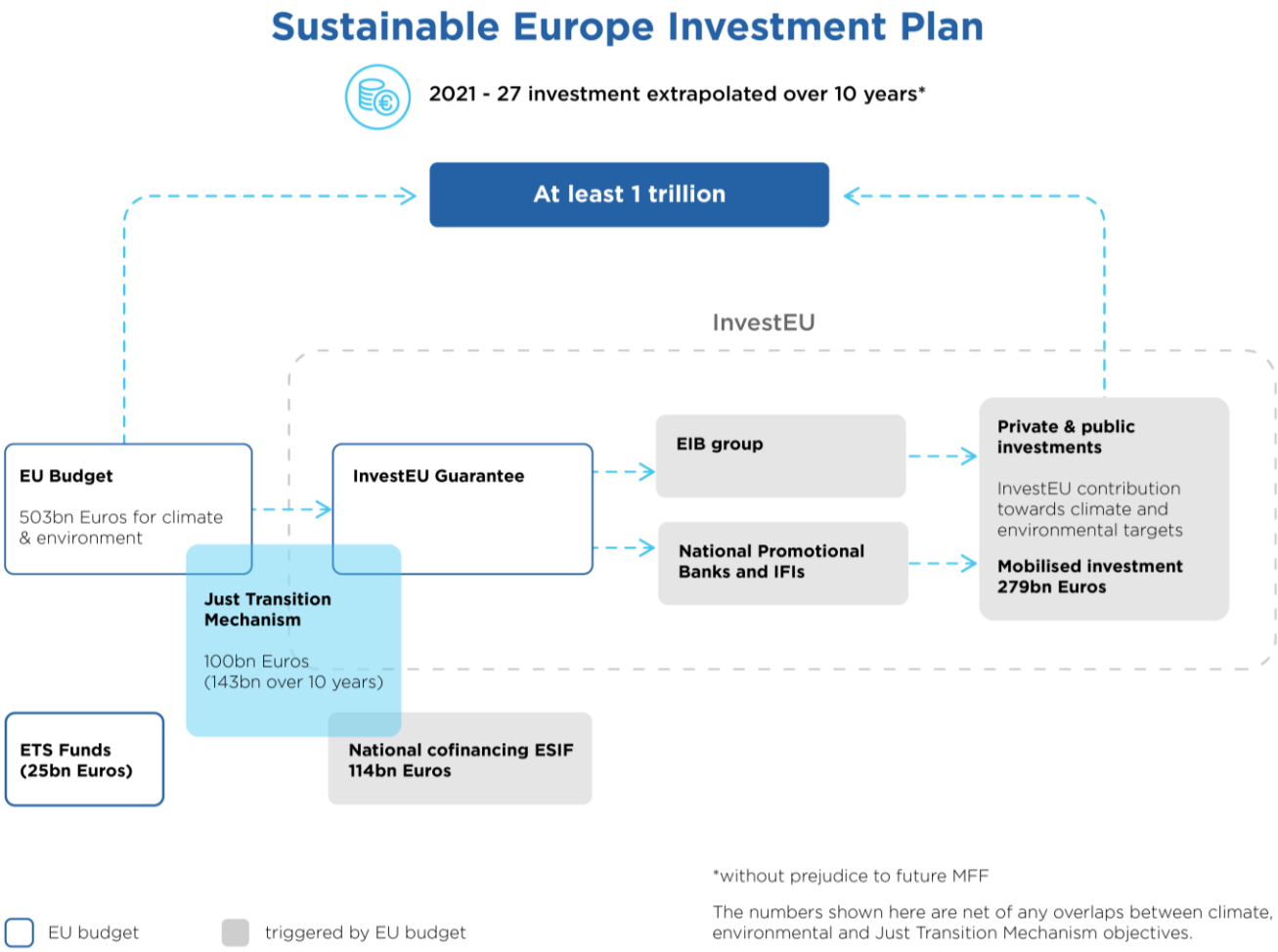
Financing for the green transition of the economy will be achieved through spending under the EU's long-term budget, 25% of which will go to climate-related purposes. According to the Commission, a combination of funds will achieve the ambition of mobilising at least EU 1 trillion during the next decade broken down broadly as follows.

1. EUR 503 billion from 2021 to 2030 for climate and environmental related investments from the EU budget.
2. EUR 279 billion of private and public funding by leveraging the EU's budget guarantee through the InvestEU Programme.
3. EUR 100 billion of investments from 2021-27, which extrapolated to 10 years will yield EUR 143 billion through the Just Transition Mechanism
4. At least EUR 25 billion for EU transition to climate neutrality through the Innovation and Modernisation Funds. Both these funds are financed outside the EU's long-term budget. The Innovation Fund aims to share innovation risk with project promoters to support highly innovative clean technology projects. The Modernisation Fund assists investments in modernising the power sector, boosting energy efficiency in 10 lower-income Member States.

The European Investment Bank will operate as the Union's climate bank. It has announced a gradual increase of its financing dedicated to climate action and environmental sustainability to reach 50% of its operations in 2025.

[322] *https://ec.europa.eu/commission/presscorner/api/files/attachment/860462/Commission%20Communication%20on%20the%20European%20Green%20Deal%20Investment%20Plan_EN.pdf.pdf*

Figure 10- Financing elements making up at least EUR 1 trillion over the next decade under the Sustainable Europe Investment Plan



Source: figure adapted by Deloitte from ***Communication from the Commission on the Sustainable Europe Investment Plan***[323]

Increased ambition of the EU budget and associated programmes

The Commission has increased the climate ambition to 25% in the 2021-2027 EU Multiannual Financial Framework of the EU budget and has enhanced tracking systems to monitor progress.

The different programmes, as proposed by the Commission for the next EU Multiannual Financial Framework, will include specific measures to strengthen the link between the implementation of the EU budget and the objective of a greener, carbon-free Europe, for example:

- the Cohesion Fund and the European Regional Development Fund will invest at least EUR 108 billion in climate and environment related projects, the Common Agriculture Policy will direct 40% of its total investments to support climate-related objectives, and Horizon Europe will spend at least 35% on climate objectives;
- the LIFE Programme will have its envelope increased by 72% as compared to 2014-2020 to EUR 5.4 billion, out of which more than 60% will pursue climate objectives;
- The Connecting Europe Facility Budget will direct at least 60% of its total budget to climate objectives.

[323] https://ec.europa.eu/commission/presscorner/api/files/attachment/860462/Commission_Communication_on_the_European_Green_Deal_Investment_Plan_EN.pdf.pdf

Crowding in private investments through InvestEU

- As some projects entail higher risk than the private sector can bear alone, public funds can be a way of de-risking projects and leveraging private financing. Through the InvestEU Programme, the EU budget will guarantee partial cover of the investment risk. It aims to mobilise at least EUR 195 billion of the climate investment from 2021-27, around EUR 28 billion per year.
- InvestEU will support sustainable investments in all sectors of the economy. The Commission will describe a climate tracking methodology to measure the contribution of specific financing and investment operations to the environmental objectives. Additionally, a sustainability proofing method will be established to assess the environmental, climate and social impact of large projects.

Overall, the Commission will enhance the sustainability proofing guidance for assessing projects and developing financial products to deploy under the InvestEU Programme.

The European Investment Bank's (EIB) contribution, and mobilising other financial institutions

- The EIB also plays a key role in mobilising funds to shift to a green economy. In 2020, the EIB provided EUR 24.2 billion to resist climate change, which totals 37% of the EIB financing[324]. Through the Sustainable European Investment Plan for the decade, the EIB is expected to finance outside the EU mandates around EUR 600 billion of climate investment across all Member States.
- The EIB will rise to become the EU climate bank, thereby increasing the financing for sustainable transition. The share of its financing dedicated to climate action and environmental sustainability will reach 50% in 2025 and beyond. By end-2020, the EIB Group planned to align all its financing activities with the principles of the Paris Agreement.
- Other international and National Financial Institutions will have a greater role in financing sustainable projects in line with EU policy objectives.

Overall, the Commission will ensure that EIB operations financed under EU mandates provide high additionality, in terms of sectors covered and the risk profile of projects financed. It will also engage with other International and National Financial Institutions to align activities with the European Green Deal objectives.

Implementation

Enable: Creating a framework for public and private investments to happen[325]

Within the broader context of the European Green Deal, the Sustainable Europe Investment Plan will enable the transition through targeted actions that directly affect the investment decisions of private investors and public entities.

Putting sustainable finance at the heart of the financial system

To address the significant investments required to reach the EU's climate and environmental objectives, the Commission proposed an Action Plan on financing sustainable growth in March 2018. Based on this Action Plan, frameworks conducive to mobilising finance for sustainable investments were established.

- The EU Taxonomy is a classification system establishing a list of environmentally sustainable economic activities. It will determine whether an economic activity is environmentally sustainable, based on certain performance criteria
- The Commission will seek to utilise the EU Taxonomy in the context of the implementation of the European Green Deal by the public sector, aside from InvestEU for private investors.
- Building on the 2018 Action Plan and bearing in mind the European Green Deal, the Commission presented a Strategy for Financing the Transition to a Sustainable Economy in July 2021[326], which aims to scale up sustainable finance. Publication was initially targeted for early 2021 but was while the taxonomy was agreed[327]. Companies will need to increase disclosures of climate and environmental data.

Overall, the Commission will prepare delegated acts on the climate change and environmental objectives of the EU Taxonomy, explore usage of the EU Taxonomy in the European Green Deal by the public sector, push a renewed sustainable finance strategy, and establish an EU Green Bond Standard[328] and other frameworks to increase public and private finance.

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[324] https://www.eib.org/en/about/priorities/climate-action/index.htm

[325] https://ec.europa.eu/commission/presscorner/api/files/attachment/860462/Commission%20Communication%20on%20the%20European%20Green%20Deal%20Investment%20Plan_EN.pdf.pdf

[326] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0390

[327] https://ec.europa.eu/info/publications/210712-sustainable-finance-platform-draft-reports_en

[328] https://ec.europa.eu/info/publications/210706-sustainable-finance-strategy_en

Providing the public sector with guidance and appropriate means for making sustainable investments

Public organisations are the key investors in certain sectors such as infrastructure and public services. In addition, in projects where the risk is high or private returns are less, public authorities may need to step in. The Commission also needs to coordinate in cases of projects which have spill-over effects across Member States.

- The European Semester provides a framework for the coordination of economic and employment policies across the EU[329]. It will facilitate the required investment for green transformation in the EU. The Semester aids the identification of investment priorities and blocks in each Member State.
- The Commission will coordinate with Member States to benchmark green budgeting practices. This will assess the extent to which annual budgets and fiscal plans consider environmental protection.
- The Commission will propose minimum requirements for green targets for public procurement in sectoral initiatives and EU funding. Such minimum criteria will set a common definition of green purchase, allowing collection of comparable data from public buyers. This will set the basis for assessing the impact of green public procurement.
- Energy efficiency should be applied to avoid wastage of resources associated with generation, transmission, distribution and use of energy

Overall, the Commission will include environmental sustainability as an integral part of reports under the European Semester, assist Member States in identifying their sustainable investment requirements, benchmark green budgeting practices, propose further guidance to green public procurement and guidance on energy efficient practices.

Enabling sustainable investments through a supportive State aid framework

Relevant State aid rules will be revised in 2021 to match the objectives of the European Green Deal. The aid rules will support a cost-effective and inclusive transition to climate neutrality by 2050. They will also facilitate the phasing out of fossil fuels to reduce pollution.

- Until revision, Member States can continue to utilise the flexibility provided under the existing rules to achieve their 2030 targets and the further decarbonisation of the electricity sector and the economy by 2050.
- For breakthrough innovations, Member States can collaborate on their funds to receive significant private investments in projects of common European interest.
- Even as Member States collaborate, the rules will maintain the integrity of internal markets, while respecting the objectives in the EU Treaty, which are at the heart of European integration. This would aid in reducing disparities between the development levels of various regions

More flexibility for State aid to transform to climate neutral production processes

The Commission will approve Member States' support to companies to decarbonise production processes. This will ensure that companies reduce their impact on the environment below benchmarks. But public support should be limited to levels required to minimise costs to the State.

Aid to improve energy efficiency of buildings

- Member States will have greater scope to invest in energy efficiency of buildings under the Guidelines for environmental protection. Member States will support financing arrangements such as Energy Performance Contracts, which are a form of creative financing for capital improvement[330]
- Member States will also have flexibility to support both energy-efficiency of buildings and invest in renewable energy generation

Aid for district heating

- When district heating networks are run the same way as other energy infrastructure through separation of third-party access and regulated tariffs, these can be considered to fall outside State aid control. They can also be considered as an infrastructure measure which does not affect competition and trade
- Member States can use a funding gap approach for district heating generation as an alternative to the maximum aid intensities set in the state aid environmental guidelines.
- Member States could also be allowed to grant State aid to district heating networks which are not part of energy efficient district heating systems where the investments that make the heat generation energy efficient start within three years of modernisation of the network.

[329] https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester_en

[330] https://ec.europa.eu/energy/content/energy-performance-contracting_en

Aid for closure of coal-fired power plants

- Member States are planning to accelerate the phase out of hard coal and lignite since they are one of the most polluting means of electricity generation.
- Member States need to ensure that power plants facing closure receive adequate compensation.

Aid for the circular economy

- Member States may support measures needed to shift from a linear economy to a circular economy by recycling waste, re-using waste heat, re-using CO_2, and separating the collection of waste streams.

Overall, the Commission will continue effective implementation of State aid rules for transition to a climate-neutral economy.

Execute: Creating a pipeline of sustainable projects[331]

Markets are currently highly liquid. What is challenging is to develop a robust pipeline of investment projects aligned with the European Green Deal. The availability of investment projects that are compatible with investors' goals does not yet match the availability of finance. Advisory support to project promoters has been effective in bridging the gap between a concept and an economically sound project.

Supporting administrations

The Structural Reform Support Programme and its successor, the Reform Support Programme, will provide technical support to Member States to aid design and implement reforms for the twin objective of climate and digital transitions. Limited administrative capacity, awareness, and sustainability expertise of public administration in Member States is a barrier holding back investment in sustainable infrastructure. The programme will also identify potential investment opportunities in clean energy.

Supporting project promoters

- The InvestEU Advisory Hub and other programmes developed under the InvestEU Programme with a total budget of EUR 500 million as proposed by the Commission, will support the identification, preparation, and implementation of investment projects.
- Public investors will profit from tailor-made support to implement their projects in practice. A Sustainable Procurement Screening instrument helps with making eco-friendly procurements and guaranteeing sustainability.

Ensuring coherence and visibility

- Capacity building and strategic planning activities by the Commission are yielding positive results that could be scaled up for the Green Deal.
- The InvestEU Portal will develop on the European Investment Project Portal and continue to offer a free, online user-friendly portal, offering EU project promoters visibility and networking opportunities.

Overall, the Commission will provide technical support to Member States through the Reform Support Programme, provide customised advisory services through the InvestEU Advisory Hub and propose a Sustainable Procurement Screening instrument to ensure sustainable public infrastructure projects.

Just Transition Mechanism[332]

The transition to a sustainable economy will require investments and strong policy implementation all over Europe. While all regions require funding for green transition, some territories will face additional challenges. Climate neutrality will require fundamental restructuring of their economies, structural changes in business models, and new skill requirements. These requirements must be addressed including all groups that are affected.

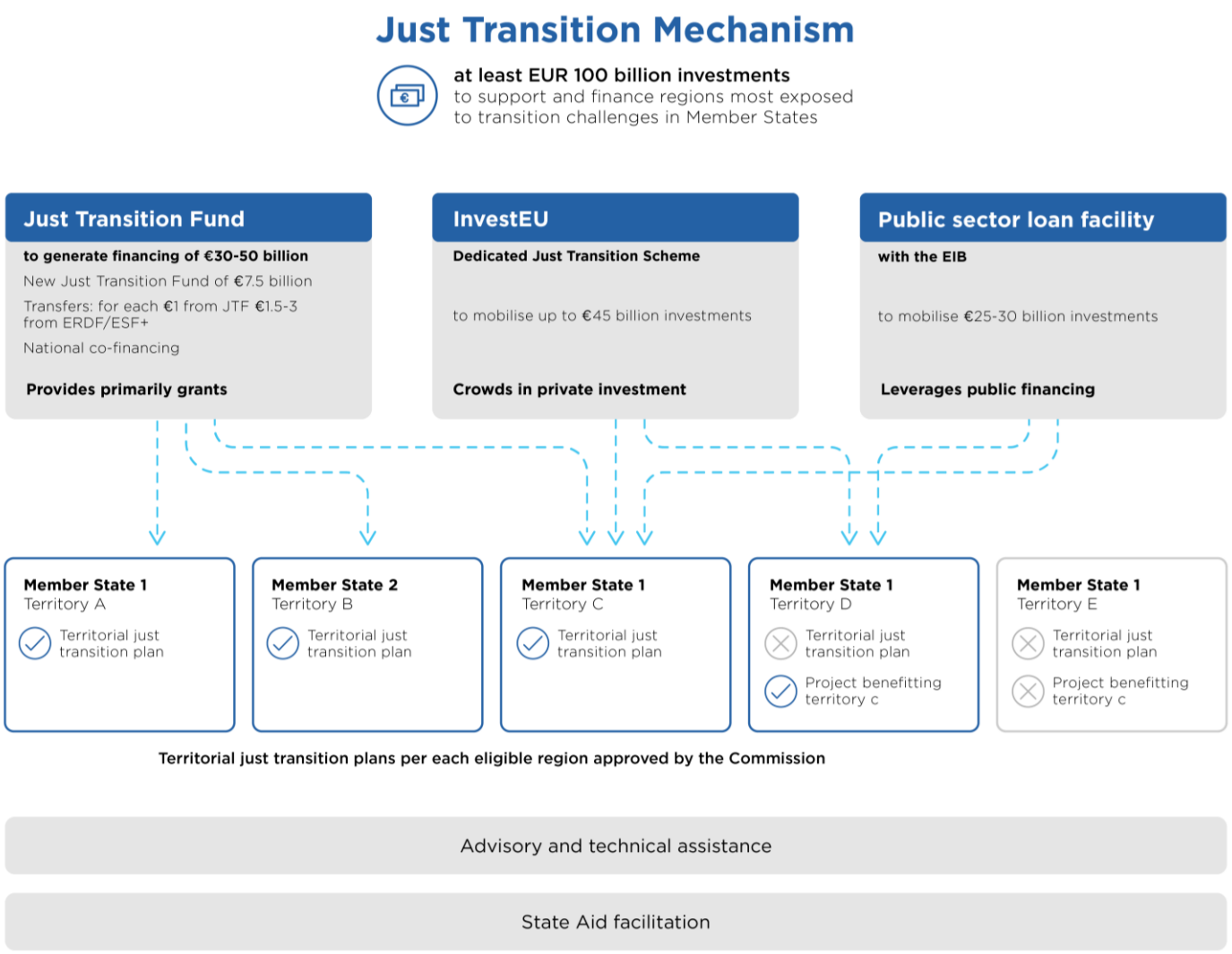
The Just Transition Mechanism consists of three pillars to generate the necessary investments.

- A Just Transition Fund,
- A dedicated Just Transition scheme under InvestEU,
- A new public sector loan facility for additional investments to be leveraged with the European Investment Bank.

[331] https://ec.europa.eu/commission/presscorner/api/files/attachment/860462/Commission%20Communication%20on%20the%20European%20Green%20Deal%20Investment%20Plan_EN.pdf

[332] https://ec.europa.eu/commission/presscorner/api/files/attachment/860462/Commission%20Communication%20on%20the%20European%20Green%20Deal%20Investment%20Plan_EN.pdf.pdf

Figure 11- Financing the Just Transition Mechanism



Source: figure adapted by Deloitte from ***Communication on the Green Deal*** [333]

[333] *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2019%3A640%3AFIN*

Considered together, the components of the Mechanism could mobilise investment of some EUR 100 billion over the period 2021-2027.

Pillar 1: The Just Transition Fund (JTF)

- The JTF will have EUR 17.5 billion available. Of this, EUR 7.5 billion will come from the EU budget and the remainder via the European Recovery Instrument in the period 2021-2023. The Fund aims to alleviate the social and economic costs of the transition to climate neutrality.
- The Just Transition Fund has been established by a Regulation establishing the Just Transition Fund[334], and amendments to the Common Provisions Regulation[335]. To receive EUR 1 from this Fund, each Member State will have to allocate a of minimum EUR 1.5 and a maximum of EUR 3 from the European Regional Development Fund and the European Social Fund Plus.
- The Just Transition Fund will aid territories with high employment in greenhouse gas-intensive industries, which would be severely impacted by the transition. The level of support will depend on the magnitude of challenges in these territories, in terms of economic diversification and reskilling of workers to take on new jobs.
- Through shared management and cooperation with national, regional, and local authorities, the Just Transition Fund will help reduce regional disparities and address structural changes in Europe's regions.
- Territorial just transition plans, the centrepiece of the Just Transition Mechanism, will identify eligible territories that are most affected by the transition.

Pillar 2: A dedicated scheme for Just Transition regions under the InvestEU Fund

- The Just Transition Mechanism will comprise a dedicated transition scheme under InvestEU. This will generate additional investment to aid the most affected regions.
- The InvestEU Fund is expected to raise EUR 650 billion of additional private and public investment to support EU policy objectives. An EU guarantee of EUR 38 billion in the MFF will mobilise this additional finance.
- Projects that are within regions approved by the transition plan under the Just Transition Fund Regulation, or projects that can benefit these regions, can benefit from the Mechanism, but only when the funding outside the just transition territories is essential for transition in those territories.
- Dedicated technical assistance will be provided to make projects investable through the InvestEU Advisory Hub

Pillar 3: A public sector loan facility with the European Investment Bank Group

- The European Investment Bank will provide a public sector loan facility to increase public sector investment in regions undergoing climate transition. It will offer concessional loans to the public sector. The EU support could also be in the form of an interest rate subsidy, or an investment grant coupled with EIB loans provided to municipal, regional, and other public authorities.
- The geographical coverage will be the same as the InvestEU Just Transition scheme. The support under the public loan facility will be complementary to the products under the InvestEU programme.
- The public sector loan facility aims to mobilise between EUR 25-30 billion in public investments over the period 2021-2027.

Technical assistance and advisory support

Technical and advisory support will be provided for the preparation of territorial transition plans through an expert network facilitating the information sharing between Member States, regions, agencies, and stakeholders.

Overall, the Commission will work with the EIB and other partners to implement the Just Transition scheme under InvestEU, propose a new legislative proposal for public sector loans, assist in the preparation of territorial transition plans and provide technical assistance and advisory support to generate a robust project pipeline.

Conclusion

The Sustainable Europe Investment Plan will play a key role in mobilising the investments necessary to reach the objectives of the European Green Deal. The plan includes a commitment to utilise relevant policy levers to provide private and public investors with a framework that provides maximum sustainable investments.

The Just Transition Mechanism included within the plan will ensure that the transition leaves no one behind. The success of the Sustainable Europe Investment Plan will depend on the engagement of all relevant stakeholders during implementation.

[334] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R1056

[335] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R1060

Every year the Commission will hold a Sustainable Investment Summit involving all relevant stakeholders. The Summit will provide an opportunity to assess the progress across different sectors within the Sustainable Europe Investment Plan and identify new avenues for action.

Amending the Energy Efficiency Directive

Description	*The Energy Efficiency Directive (EED) was adopted in 2012 to help the EU make energy efficiency improvements of at least 20% by 2020. This Directive places an upper limit on total EU energy consumption and includes a series of provisions to help Member States collectively meet the goal. The Directive was revised in 2018 to increase the EU objective to at least 32.5% energy efficiency improvements by 2030. Due to the EU's more ambitious climate goals of -55% GHG emissions by 2030, substantial changes to existing EU energy legislation are needed. As a result, under the "fit for 55" package, the Commission launched the revision of the EED to include higher targets for reducing EU primary (-39%) and final (-36%) energy consumption by 2030.*[336]

Key Facts	
Year Launched	2021: proposal launched
Key Agency	European Commission
Responsibilities[337]	• The Commission will assess whether the national measures are sufficient to achieve the Union's energy efficiency targets. In case these are insufficient, the Commission will propose measures and ensure the achievement of the Union's 2030 targets for energy efficiency. • The Commission will also assess by 31 December 2026 any methodological changes in the data reported on energy statistics, in the methodology for calculating energy balance and in energy models for European energy use, and if needed, propose technical calculation adjustments to the Union's 2030 targets. • The Commission will encourage the exchange and wide dissemination of information on good energy efficiency practices and methodologies to mitigate the split of incentives in Member States.
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Yes

Background[338]

Energy efficiency is a key area of action to achieve full decarbonisation of the Union economy. The Energy Efficiency Directive has led to the Union's current energy efficiency policy to capture the cost-effective energy saving opportunities. In December 2018, the Energy Efficiency Directive was amended as part of the "Clean Energy for All Europeans package", to include a new 2030 Union energy efficiency target of at least 32.5% (compared to projected energy use in 2030), and to extend and strengthen the energy savings obligation beyond 2020. However, the sum of national contributions communicated by Member States falls short of the Union's level of ambition of 32.5% in 2030, as it leads to a reduction of only 29.4% for final energy consumption and 29.7% for primary energy consumption. This translates into a collective ambition gap of 2.8 percentage points for primary energy consumption and 3.1 percentage points for final energy consumption at the EU level.

[336] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-the-energy-efficiency-directive#:~:text=The%20EED%20was%20revised%20in,savings%20obligations%20(%2B0.8%20%25).

[337] https://ec.europa.eu/info/sites/default/files/amendment-renewable-energy-directive-2030-climate-target-with-annexes_en.pdf

[338] https://eur-lex.europa.eu/resource.html?uri=cellar:a214c850-e574-11eb-a1a5-01aa75ed71a1.0001.02/DOC_1&format=PDF

The higher ambition level requires stronger promotion of energy efficiency, which is supported by the energy efficiency first principle. This principle has been recognised as a key element of the Strategy for Energy Sector Integration. In this context, the Energy Efficiency Directive is an important element to progress towards climate neutrality by 2050. The amendments will help reinforce the Directive to better address remaining market barriers and failures by considering broader objectives of the Green Deal. The proposal will strengthen the different provisions of the Directive to ensure that it contributes to the higher climate target of at least 55% GHG emissions reduction ambition for 2030.

Scope of the Regulation[339]

The Directive establishes minimum requirements to promote energy efficiency within the Union in order to ensure the Union's target on energy efficiency is met and enables further energy efficiency improvements. The Directive lays down rues designed to implement energy efficiency as a priority across all sectors, remove barriers in the energy market and overcome market failures. Member States may maintain or introduce more stringent measures, which need to be compatible with Union law.

Programme Structure: Operational[340]

Financing and technical support

- Member States will facilitate the establishment of financing facilities, or use of existing ones, for energy efficiency improvement measures to maximise the benefits of multiple streams of financing and the combination of grants, financial instruments and technical assistance.
- The Commission will assist, where appropriate, Member States in setting up financing facilities and project development assistance facilities at national, regional or local level with the aim of increasing investments in energy efficiency in different sectors, and protecting and empowering vulnerable customers.
- Member States will adopt measures that ensure that energy efficiency lending products, such as green mortgages and green loans, secured and unsecured, are offered widely and in a non-discriminatory manner by financial institutions and, are visible and accessible to consumers.
- In order to mobilise private financing for energy efficiency measures and energy renovation, the Commission will conduct a dialogue with both public and private financial institutions in order to map out possible actions it can take.
- Member States may set up an Energy Efficiency National Fund. The purpose of this fund will be to implement energy efficiency measures, as a priority among vulnerable customers, and to implement national energy efficiency initiatives measures to support Member States in meeting their national energy efficiency contributions and their indicative trajectories. The Energy Efficiency National Fund may be financed with revenues from the allowance auctions pursuant to the EU Emission Trading System on buildings and transport sectors.

Monitoring

- Member States will lay down the rules on penalties applicable in case of non-compliance with the national provisions adopted.
- In the context of the State of the Energy Union report, the Commission will report on the functioning of the carbon market.
- By 31 October 2025 and every four years thereafter, the Commission will evaluate the existing measures to achieve energy efficiency increase and decarbonisation in heating and cooling. The evaluation will take into account:
  - energy efficiency and greenhouse gases emissions trends in heating and cooling, including in district heating and cooling;
  - interlinkages between measures taken;
  - changes in energy efficiency and greenhouse gas emissions in the heating and cooling;
  - existing and planned energy efficiency policies and measures and greenhouse gas reduction policies and measures at national and EU level;
  - measures which Member States provided in their comprehensive assessments.

[339] https://eur-lex.europa.eu/resource.html?uri=cellar:a214c850-e574-11eb-a1a5-01aa75ed71a1.0001.02/DOC_1&format=PDF

[340] https://eur-lex.europa.eu/resource.html?uri=cellar:a214c850-e574-11eb-a1a5-01aa75ed71a1.0001.02/DOC_1&format=PDF

- By 28 February 2027, and every five years thereafter, the Commission will evaluate this Directive and submit a report to the European Parliament and to the Council. That evaluation will include:
  - an assessment of the general effectiveness of this Directive and the need to adjust further the Union's energy efficiency policy in accordance with the objectives of the 2015 Paris Agreement;
  - the Union's 2030 headline targets on energy efficiency in order to meet the Union's decarbonisation targets for 2040 or 2050, or its international commitments for decarbonisation;
  - if Member States will continue to achieve new annual savings for the ten-year periods after 2030;
  - if Member States will continue to ensure that at least 3% of the total floor area of heated and/or cooled buildings owned by public bodies is renovated each year;
  - if Member States will continue to achieve a share of energy savings among vulnerable customers for the ten-year periods after 2030;
  - if Member States will continue to achieve a reduction of final energy consumption.

Salient Features[341]

Provisions

Amendments to the EED

- A new article has been introduced in the Directive (Article 3), focused on the energy efficiency first principle. In conformity with this principle, Member States will ensure that energy efficiency solutions are taken into account in the planning, policy and major investment decisions related to the following sectors:
  - energy systems,
  - non-energy sectors, where those sectors have an impact on energy consumption and energy efficiency.
- Member States will also need to ensure that the application of the energy efficiency first principle is verified by the relevant entities where policy, planning and investment decisions are subject to approval and monitoring requirements.
  - In applying the energy efficiency first principle, Member States will:
    - promote and, where cost-benefit assessments are required, ensure the application of cost-benefit methodologies that allow proper assessment of wider benefits of energy efficiency solutions from the societal perspective;
    - identify an entity responsible for monitoring the application of the energy efficiency first principle and the impacts of planning, policy and investment decisions on energy consumption and energy efficiency;
    - report to the Commission, as part of the integrated national energy and climate progress reports on how the principle was taken into account in the national and regional planning, policy and major investment decisions related to the national and regional energy systems.
  - Regarding the energy efficiency targets, Member States will collectively ensure a reduction of energy consumption of at least 9% in 2030 compared to the projections of the 2020 Reference Scenario so that the Union's final energy consumption amounts to no more than 787 Mtoe and the Union's 2030 primary energy consumption amounts to no more than 1023 Mtoe in 2030.
    - Each Member State will set national energy efficiency contributions for final and primary energy consumption to meet the binding Union target. Member States will also provide the shared of energy consumption of energy end-use sectors, including industry, residential, services and transport, in their national energy efficiency contributions. Projections for energy consumption in information and communications technology (ICT) will also be indicated.
  - Another article introduced in the amendments is that on the public sector's role on leading the energy efficiency (Article 5). Under this, Member States will ensure that the total final energy consumption of all public bodies[342] combined is reduced by at least 1.7% each year, when compared to the year X-2 (with X as the year when this Directive enters into force). Member States will include in their national energy and climate plans, and updates thereof, a list of public bodies which will contribute to the fulfilment of the obligations previously mentioned, the amount of energy consumption reduction to be achieved by each of them and the measures they plan to achieve it.

[341] https://eur-lex.europa.eu/resource.html?uri=cellar:a214c850-e574-11eb-a1a5-01aa75ed71a1.0001.02/DOC_1&format=PDF

[342] *For the purposes of this Directive, "public bodies" means "contracting authorities" under Directive 2014/24/EU. "Contracting authorities" means the State, regional or local authorities, bodies governed by public law or associations formed by one or more such authorities or one or more such bodies governed by public law.* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0024

- Member States will ensure that regional and local authorities, establish specific energy efficiency measures in their decarbonisation plans after consulting stakeholders and the public, including the particular groups at risk of energy poverty or more susceptible to its effects.
- Member States will support public bodies in the uptake of energy efficiency improvement measures, including at regional and local levels, by providing guidelines, promoting competence building and training opportunities and encouraging cooperation amongst public bodies
- Member States will encourage public bodies to consider life cycle carbon emissions of their public bodies' investment and policy activities.

- Member States will ensure that at least 3% of the total floor area of heated and/or cooled buildings owned by public bodies is renovated each year to be transformed into nearly zero-energy buildings. Where public bodies occupy a building that they do not own, they will exercise their contractual rights to the extent possible and encourage the building owner to renovate the building to a nearly zero-energy building. When concluding a new contract for occupying a building they do not own, public bodies will aim for that building to fall into the top two energy efficiency classes on the energy performance certificate.
  - The rate of at least 3% will be calculated on the total floor area of buildings having a total useful floor area over 250 m^2 owned by public bodies of the Member State concerned and which on 1 January 2024, are not nearly zero-energy buildings. ï
  - Member States may count, in exceptional cases, towards the annual renovation rate of new buildings owned as replacements for specific public bodies' buildings demolished in any of the two previous years. The exception applies where they would be more cost effective and sustainable in terms of the energy and lifecycle CO_2 emissions achieved compared to the renovations of such buildings.
  - Member States need to make publicly available an inventory of heated and/or cooled public bodies' buildings with a total useful floor area of more than 250 m^2. The inventory needs to be updated at least annually.
- In terms of public procurement, Member States will ensure that contracting authorities and contracting entities, when concluding public contracts and concessions with a value equal to or greater than the thresholds laid down in Article 8 of Directive 2014/23/EU (EUR 5 186 000)[343]; Article 4 of Directive 2014/24/EU (EUR 5 186 000 for public works contracts; EUR 134 000 for public supply and service contracts awarded by central government authorities and design contests organised by such authorities; EUR 207 000 for public supply and service contracts awarded by sub-central contracting authorities and design contests organised by such authorities; EUR 750 000 for public service contracts for social and other specific services)[344]; and Article 15 of Directive 2014/25/EU (EUR 414 000 for supply and service contracts as well as for design contests; EUR 5 186 000 for works contracts; EUR 1 000 000 for service contracts for social and other specific services)[345], purchase only products, services, buildings and works with high energy-efficiency performance.
  - This obligation applies to the armed forces only to the extent that its application does not cause any conflict with the nature and primary aim of the activities of these. The obligation does not apply to contracts for the supply of military equipment.
  - To ensure transparency in the application of energy efficiency requirements in the procurement process, Member States will make publicly available information on the energy efficiency impact of contracts with a value equal to or greater than the thresholds above mentioned. Contracting authorities may decide to require that tenderers disclose information on the life cycle global warming potential of a new building and may make that information publicly available for the contracts, in particular for new buildings having a floor area larger than 2000 square meters.
  - Member States will support contracting authorities and contracting entities in the uptake of energy efficiency requirements, including at regional and local level, by providing clear rules and guidelines including methodologies on the assessment of lifecycle costs and environment impacts and costs, set up competence support centres, encouraging cooperation amongst contracting authorities including across borders and using aggregated procurement and digital procurement where possible.
  - Member States will establish legal and regulatory provisions, and administrative practices, regarding public purchasing and annual budgeting and accounting, necessary to ensure that individual contracting authorities

[343] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32014L0023
[344] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0024
[345] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0025

are not deterred from making investments in improving energy efficiency and from using energy performance contracting and third-party financing mechanisms on a long-term contractual basis.
    - Member States will remove any regulatory or non-regulatory barriers to energy efficiency, particularly regarding legal, regulatory and administrative provisions and practices.
- Member States need to achieve cumulative end-use energy savings at least equivalent to:
    - new savings each year from 1 January 2021 to 31 December 2023 of 0.8% of annual final energy consumption, averaged over the most recent three-year period prior to 1 January 2019;
    - new savings each year from 1 January 2024 to 31 December 2030 of 1.5% of annual final energy consumption, averaged over the three-year period prior to 1 January 2020.
- Member States will ensure that for natural gas, final customers are provided with competitively priced individual meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use. This meter will be provided when:
    - an existing meter is replaced, unless this is technically impossible or not cost-effective in relation to the estimated potential savings in the long term;
    - a new connection is made in a new building or a building undergoes major renovations.
- Member States will ensure that, for district heating, district cooling and domestic hot water, final customers are provided with competitively priced meters that accurately reflect their actual energy consumption. Where heating, cooling or domestic hot water is supplied to a building from a central source that services multiple buildings or from a district heating or district cooling system, a meter will be installed at the heat exchanger or point of delivery.
    - In multi-apartment and multi-purpose buildings with a central heating or central cooling source or supplied from a district heating or district cooling system, individual meters will be installed to measure the consumption of heating, cooling or domestic hot water for each building unit, where technically feasible and cost effective in terms of being proportionate in relation to the potential energy savings.
    - Where meters or heat cost allocators are installed, Member States will ensure that billing and consumption information is reliable, accurate and based on actual consumption or heat cost allocator readings.
- In order to enhance consumer information and empowerment, final customers will have the right to a contract with their supplies that specifies:
    - the identity and address of the supplier;
    - the services provided and the service quality levels offered;
    - the types of maintenance service offered;
    - the means by which up-to-date information on all applicable tariffs, maintenance charges and bundled products or services may be obtained;
    - the duration of the contract, the conditions for renewal and termination of the contract and services, including products or services that are bundled with those services, and whether terminating the contract without charge is permitted;
    - any compensation and the refund arrangements which apply if contracted service quality levels are not met, including inaccurate or delayed billing.
    - Suppliers will also offer final customers a wide choice of payment methods and fair and transparent general terms and conditions.
- Member States will take appropriate measures to promote and facilitate an efficient use of energy by final customers. These measures will include:
    - fiscal incentives;
    - access to finance, vouchers, grants or subsidies;
    - exemplary projects;
    - workplace activities;
    - training activities;
    - digital tools;
    - creation of one-stop shops or similar mechanisms for the provision of technical, administrative and financial advice and assistance on energy efficiency;
    - dissemination of information on energy efficiency measures and financing instruments;

- provision of single points of contact, to provide final customers and final users with all necessary information concerning their rights, the applicable law and dispute settlement mechanisms available to them in the event of a dispute.
- Member States will also take appropriate measures to support multilateral dialogue with the participation of relevant public and social partners.

- To increase primary energy efficiency and the share of renewable energy in heating and cooling supply, an efficient district heating and cooling system is a system which meets the following criteria:
  - until 31 December 2025, a system using at least 50% renewable energy, 50% waste heat, 75% cogenerated heat or 50% of a combination of such energy and heat;
  - from 1 January 2026, a system using at least 50% renewable energy, 50% waste heat, 80% of high-efficiency cogenerated heat or at least a combination of such thermal energy going into the network where the share of renewable energy is at least 5% and the total share of renewable energy, waste heat or high-efficiency cogenerated heat is at least 50%;
  - from 1 January 2035, a system using at least 50% renewable energy and waste heat, where the share of renewable energy is at least 20%;
  - from 1 January 2045, a system using at least 75% renewable energy and waste heat, where the share of renewable energy is at least 40%;
  - from 1 January 2050, a system using only renewable energy and waste heat, where the share of renewable energy is at least 60%.
- Member States will encourage public bodies to use energy performance contracting for renovations of large buildings. For renovations of large non-residential buildings with a useful floor area above 1000 m^2 , Member States will ensure that public bodies assess the feasibility of using energy performance contracting. Member States may encourage public bodies to combine energy performance contracting with expanded energy services including demand response and storage.
- Member States will support the public sector in taking up energy service offers by:
  - providing model contracts for energy performance contracting;
  - providing information on best practices for energy performance contracting;
  - making publicly available a database of implemented and ongoing energy performance contracting projects that includes the projected and achieved energy savings.

Conclusion

Energy efficiency is a very important element in achieving full decarbonisation of the Union economy. The higher ambition level requires a stronger promotion of energy efficiency, which is supported by the energy efficiency first principle. The energy efficiency first principle has been recognised as a key element of the Strategy for Energy Sector Integration. By promoting this principle through the Energy Efficiency Directive it will be possible to progress towards climate neutrality by 2050. The amendments to this Directive will reinforce the Directive to better address remaining market barriers and failures by considering broader objectives of the Green Deal and will strengthen the Directive to ensure that it contributes to the higher climate target of at least a 55% GHG emissions reduction ambition for 2030.

Sustainable and Smart Mobility Strategy

Description	*As part of the European Green Deal, the European Commission published its Sustainable and Smart Mobility Strategy with an Action Plan, including 82 initiatives to guide transport policies in Europe for 2021-2024[346]. The Strategy also includes transport industry transition targets for 2030, 2035, and 2050. The document serves as a basis for improving the EU transport system to a greener and more digital system.[347] It is a comprehensive strategy to ensure the EU transport sector is fit for a clean, digital and modern economy for increasing the uptake of zero-emission vehicles, making sustainable alternative solutions available to the public and businesses, supporting digitalisation, and improving connectivity.[348]*

Key Facts	
Year Launched	2020[349]
Key Agency	European Commission
Responsibilities	• To make the transport system more sustainable: strategies include increasing the number of zero-emission vehicles, renewable and low-carbon fuels, creating zero-emission airports and ports, making interurban and urban mobility sustainable, and developing green freight transport. • To make the transport system smart: strategies include making connected and automated multimodal mobility a reality and boosting innovation and the use of data and AI for smarter mobility. • To make the transport system resilient: strategies include reinforcing the Single Market, making mobility fair for all by making the transport system affordable and accessible in all regions, and stepping up transport safety and security across all modes, including bringing the death toll close to zero by 2050. [350]
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	NA

Background

Amongst the multiple targets in the European Green Deal is reduction of transport-related greenhouse gas (GHG) emissions by 90% by 2050. The Commission intends to adopt a comprehensive strategy to meet the target and ensure the EU transport sector is clean for the future economy. Some objectives include increasing the uptake of zero-emission vehicles, making sustainable alternative solutions available, supporting digitalisation and automation, and improving connectivity.[351]

The strategy sets out visions for the transport sector in line with the European Green Deal.

[346] https://www.changing-transport.org/wp-content/uploads/EU-Mobility-Strategy.pdf

[347] https://www.electrive.com/2020/12/10/eu-reveals-sustainable-and-smart-mobility-strategy/

[348] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12438-Sustainable-and-Smart-Mobility-Strategy_en

[349] https://civitas.eu/news/european-commission-presents-landmark-sustainable-and-smart-mobility-strategy

[350] https://ec.europa.eu/transport/themes/mobilitystrategy_en

[351] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12438-Sustainable-and-Smart-Mobility-Strategy_en

- Mobility and transport should be accessible to everyone to cater for traveling for work, tourism, supply chains, etc. As the second-largest area of expenditure for European households, the transport sector makes up 5% of European GDP and provides 10 million direct jobs.
- Mobility and transport impose costs on society, although they are essential. Some of these include GHG emissions, pollution, accidents, and congestion. Transport sector GHG emissions have increased over time and represent almost a quarter of the EU's total emissions.
- The most serious challenge to the transport sector includes reducing its emissions and becoming sustainable. The success of the revised European Green deal objectives depends on increasing the sector's sustainability through reduction of the reliance on fossil fuels.
- A coordinated European approach for a connected transport sector is essential to ensure required movements are maintained in times of crisis such as during a pandemic.
- The transport system should be made resilient against future crises.
- The transport sector should focus on sustainability through interconnected multimodal transport systems, abundant recharging points for electric vehicles, and low-carbon fuels to reduce emissions.
- Digitalisation and automation will support an increase in the levels of safety and security, thereby maintaining the EU's leadership in transport equipment manufacturing and improving logistics chain efficiency.
- Transportation should be made affordable and available to all, leaving none behind. The European Pillar of Social Rights requires making the green and digital transitions socially fair.

Various milestones are set out to direct the European transport system's path towards achieving the objectives for sustainable mobility. These are:

By 2030:

- at least 30 million zero-emission vehicles in operation on European roads,
- 100 climate-neutral European cities,
- doubling of high-speed rail traffic,
- carbon-neutral scheduled collective travel within the EU of under 500 km,
- large-scale deployment of automated mobility,
- market-ready zero-emission vessels.

By 2035:

- sale-ready zero-emission large aircraft.

By 2050:

- nearly all cars, vans, buses will be zero-emission,
- doubling of rail freight traffic,
- tripling of high-speed rail traffic,
- full operation of the multimodal Trans-European Transport Network (TEN-T) equipped for sustainable and smart transport with high-speed connectivity across the whole network.

Programme Structure[352]

The European Green Deal requires a 90% reduction in GHG emissions in transport for the EU to become climate-neutral by 2050. To achieve this target, three pillars have been established for future actions.

1. Make all transport modes sustainable through measures to reduce current dependence on fossil fuels.
2. Make sustainable alternatives widely available in a multimodal transport system.
3. Establish the right incentives to drive the transition.

The Sustainable and Smart Mobility Strategy has set out an action plan of concrete policy measures, structured around 10 key areas for action areas called flagships. These will guide the Commission's work in the years to come. Of the 10 flagship areas, eight are relevant to the EBCG. These are highlighted in the list below and discussed subsequently in more detail.

Flagship 1 - Boosting the uptake of zero-emission vehicles, renewable and low-carbon fuels, and related infrastructure

Flagship 2 - Creating zero-emission airports and ports

Flagship 3 - Making interurban and urban mobility more sustainable and healthier

Flagship 4 - Greening freight transport

[352] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12438-Sustainable-and-Smart-Mobility-Strategy_en

Flagship 5 - Pricing carbon and providing better incentives for users
Flagship 6 - Making connected and automated multimodal mobility a reality
Flagship 7 - Innovation, data, and AI for smarter mobility
Flagship 8 - Reinforcing the single market
Flagship 9 - Making mobility fair and just for all
Flagship 10 - Enhancing transport safety and security

Details of the Flagship Areas relevant to the EBCG

Table 39- Flagship 1: Boosting the uptake of zero-emission vehicles, renewable and low-carbon fuels, and related infrastructure

Issues	Measures
Proportion of low and zero-emission vehicles in transportation is far too low today	• CO_2 and air pollutant emissions standards, and public procurement rules such as in the Clean Vehicles Directive adopted by the Council in June 2019 with a transposition deadline for Member States of August 2021
Reduce emissions of air pollutants from motor vehicles	• Significant efforts undertaken during the past five years to reduce emissions • More stringent air pollutant emissions standards for combustion engine vehicles to ensure that only future-proof low-emission vehicles come to market
Stimulate demand for zero emission vehicles	• Measures such as carbon pricing, taxation, road charging, and the revision of rules on the weights and dimensions of heavy-duty vehicles • New regulation on batteries will ensure batteries placed on the EU market are sustainable and safe
A single faulty vehicle can pollute the environment	• Roadworthiness legislative framework requires adjustment to ensure the lifetime compliance of vehicles with emission and safety standards
Pollution caused by tyres such as noise and microplastics	• High performing tyres should be promoted to reduce energy consumption and emissions while maintaining vehicle safety
Fuel suppliers and operators supplying low grade fuel	• The sector should be provided with a clear signal that transport fuels must be carbon-neutral and that such fuel must be deployed on a large scale
Air and waterborne transport face lack of ready zero-emission technologies, long development times for aircraft and vessels, refuelling equipment, and infrastructure	• These modes must have priority access to additional renewable and low-carbon liquid and gasoline fuels • The ReFuelEU Aviation and FuelEU Maritime initiatives will boost the uptake of sustainable fuels in these sectors • The Commission will establish a Renewable and Low-Carbon Fuels Value Chain Alliance to boost supply of these fuels
Reduction of emissions from aircraft and vessels	• Ambitious standards for vessel design and operations must be promoted • The EU must work closely with all international organisations such as the International Civil Aviation Organisation (ICAO) and the International Maritime Organisation (IMO)

Issues	Measures
Lack of interoperable recharging/refuelling services across Europe for all modes	• The Commission will consider options for more binding targets on the roll-out of infrastructure, and further measures to ensure full interoperability of infrastructure and infrastructure use services for all alternatively fuelled vehicles

Table 40- Flagship 2: Creating zero-emission airports and ports

Issues	Measures
Emissions at airports and seaports	• Ports and airports should be multimodal mobility and transport hubs, linking all relevant modes • Inland and seaports can become efficient through integrated electricity systems, hydrogen and other low-carbon fuels, and testbeds for waste reuse
Measures required to make airports and ports clean	• Incentivise the deployment of renewable and low-carbon fuels instead of fossil energy, development of quieter aircraft and vessels, and greening ground movements at airports
Requirements for more sustainable multimodal access and fleet renewals in aviation and waterborne transport	• Public and private investment offered, which could utilise sustainable taxonomy criteria • The revised lending policy to be decided by the European Investment Bank could be helpful
Reduce the broader environmental footprint in the marine sector	• Delivering on the establishment of wide-ranging Emission Control Areas in all EU waters, ultimately aiming for zero pollution in water from shipping should be a priority • EU legislation on ship recycling will be reviewed for sustainable ship recycling practices • The Commission has spearheaded efforts covering the Mediterranean Sea and it aims to begin similar work in the Black Sea
Increase the uptake of sustainable alternatives that are safe, competitive, and affordable	• People are willing to switch to more sustainable modes, with the main condition for switching being the cost, availability, and speed
Consumers have changed demands largely facilitated by digital solutions	• Teleworking, videoconferencing, electronic commerce, collaborative mobility services all contribute to the ongoing transformation of mobility

Table 41- Flagship 3: Making interurban and urban mobility more sustainable and healthier

Issues	Measures
Action required to transform the transport sector into a multimodal system of sustainable and smart mobility services	• Europe should invest in a high-quality transport network with high-speed rail services for short distances and with clean aviation services for long distances • The Commission will work to create carbon-neutral choices for scheduled collective travel below 500 km within the EU by 2030

Issues	Measures
Boost the rail sector for cross-European connections	• The European Year of Rail 2021 provides an opportunity for Member States to increase cross-European connections in the rail sector • With the implementation of the Fourth Railway Package and opening the rail markets to competition, railway operators will improve the quality of services and cost-effectiveness • Completing the TEN-T, including the high-speed lines, will provide better connections along the main corridors • In 2021, the Commission will propose an action plan to boost long-distance and cross-border passenger rail services. For this purpose, at least 15 pilots are aimed for by 2030
Seamless multimodality enabled by digital solutions is vital in urban and sub-urban areas	• Increasing pressure on passenger transport systems has boosted demand for new and innovative solutions, with various transport services being integrated into a service accessible on demand, following the Mobility as a Service concept

Table 42- Flagship 4: Greening freight transport

Issues	Measures
Large part of freight transport occurs through road transport	• The European Green Deal calls for 75% of inland freight carried by road to shift to rail and inland waterways • Short-sea shipping and efficient zero-emission vehicles can contribute to greening freight transport
Cargo operations in Europe require urgent greening	• The existing framework for intermodal transport needs a substantial revamp and must be turned to an effective tool • Options to revise the regulatory framework such as the Combined Transport Directive for both operations and infrastructure should be considered
The growth of e-commerce has significantly changed consumption patterns, costing millions in deliveries including empty and unnecessary runs	• Multimodal logistics must be part of the transformation of the economy • Accelerate the deployment of zero-emission solutions including cargo bikes, automated deliveries and drones, and better usage of inland waterways into cities
Scarcity of transhipment infrastructure and of inland multimodal terminals is pronounced in certain parts of Europe	• The EU needs the multimodal exchange of data, plus smart traffic management systems in all modes
Domestic rules and technical barriers hinder rail freight operations	• Rail freight can be boosted through increased capacity, strengthened cross-border coordination and cooperation between rail infrastructure managers, and the deployment of new technologies such as digital coupling and automation • Integrating multiple corridors such as Rail Freight Corridors and TEN-T core network corridors for quick wins such as railway length, loading gauge, and improved operational rules

Issues	Measures
Inland waterways transport requires actions to seize the untapped potential in a sustainable way	• The Commission will put forward the NAIADES III programme to exploit the potential by tackling the key challenges such as the need to renew barge fleets and to improve access to financing

Table 43- Flagship 5: Pricing carbon and providing better incentives for users

Issues	Measures
The "polluter pays" and "user pays" principles need to be implemented without delay in all transport modes	• Environment-related external costs amount to EUR 388 billion each year. By internalising these external costs, those who use the transport will bear the full costs, triggering them to have more sustainable transport modes • Emissions trading, infrastructure charges, energy and vehicle taxes must be mutually compatible
Absence of the EU Emissions Trading System (ETS) in aviation and maritime transport	• The Commission will propose extending the EU ETS to the maritime transport sector • For the aviation sector, a proposal will be made to revise the EU ETS Directive
Presence of fossil-fuel subsidies	• When revising the Energy Taxation Directive, the Commission will aim to align taxation of energy products and electricity with EU energy and climate policies • The Commission will aim to close any loopholes existing in tax exemptions in 2021, including for aviation and maritime fuels
Shippers/logistics operators organising a delivery do not consider their environmental footprint	• They are not given the right information, including the available alternatives • The Commission will establish a European framework for measurement of transport and logistics GHG emissions

Table 44- Flagship 6: Making connected and automated multimodal mobility a reality

Issues	Measures
Improve the functioning of the whole transport system through connected and automated systems	• The EU needs to take full advantage of smart digital solutions and intelligent transport systems (ITS)
Purchasing tickets for multimodal journeys is cumbersome, as there is no conducive framework for EU-wide, multimodal information, ticketing, and payment services	• Address the insufficient availability and accessibility of data, sub-optimal cooperation between suppliers and vendors, the absence of digital tickets in certain cases, inadequate payment system interoperability, and the existence of different licensing systems • The EU requires a legal framework to look at the rights and obligations of online intermediaries and multimodal digital service providers selling tickets and mobility services

Issues	Measures
Digitalisation of information exchange is particularly relevant for land transport	• Future mobility should offer paperless options in all modes for professionals and individual drivers alike • Electronic certificates for drivers and freight transport information would facilitate digital enforcement, while real-time tracking of goods would complete the Digital Single Market
Requirement for capacity allocation and traffic management	• The introduction of the European Rail Traffic Management System (ERTMS) and the Single European Sky (SES) remains a priority for the Commission and NextGenerationEU
Rail automation and traffic management	• The Commission will propose updated technical specifications for interoperability to include new technologies like 5G and satellite data, and provide an upgradeable and common system architecture
Air Traffic Management (ATM) efficiency improvement has a large potential for modernisation and sustainability	• Completing and effectively implementing the SES will ease the travelling experience. A modernised regulatory framework and digital ATM infrastructure will help reduce bottlenecks

Table 45- Flagship 7: Innovation, data, and AI for smarter mobility

Issues	Measures
Requirement of favourable conditions for the development of new technologies and services	• The EU will put in place all the necessary legislative tools for the validation of new technologies • New technologies will include drones (unmanned aircraft) for commercial applications, autonomous vehicles, hyperloops, hydrogen aircraft, electric waterborne transport, and clean urban logistics • The Commission will facilitate testing and trials for the regulatory environment fit for innovation
Deployment of innovative and new technologies	• The Commission will drive the research and deployment of innovative and sustainable technologies in transport • Instruments such as the Connecting Europe Facility, the Cohesion Fund and the European Regional Development Fund will provide support through EU research programmes
Key digital enablers need to be in place to ensure digital transformation	• The key digital enablers include electronic components for mobility, network infrastructure, cloud-to-edge resources, data technologies and AI • The industrial capacities related to digital supply chain need to be strengthened • This includes design and production of components, software platforms and IoT technology • The EU also requires the highest level and performance of digital infrastructure through 5G • The Commission will support testing and experimentation facilities on AI under the Digital Europe Programme

Issues	Measures
Unclear regulatory conditions, lack of an EU market for data provision, the absence of an obligation to collect data, incompatible systems for data collection and sharing, and data sovereignty concerns	• The digital transformation of the transport sector requires efforts related to data availability, access, and exchange • The Commission will also propose further actions to build a European Common Mobility Data Space

Table 46- Flagship 10: Enhancing transport safety and security

Issues	Measures
Accidents occurring in EU in road, rail, and water transportation	• The Commission remains committed to implementing the EU road safety strategy of 2018 to decrease accidents • The Commission will prioritise protecting vulnerable road users and will assess the added value of in-depth crash investigation • Infrastructure investments will prioritise upgrading of existing high-risk infrastructure • In the maritime sector, the Commission will initiate a major review of existing legislation on flag state responsibilities, port state control and accident investigation • The EU will update and improve existing security frameworks, including against cyberattacks

Conclusion

The decarbonisation and modernisation of the entire transport and mobility system requires accelerating during the recovery from the COVID-19 pandemic. The green and digital transitions should reshape the sector, increase connectivity, and boost the economy. The Commission emphasises the need for a socially fair and just transition to a sustainable transport sector although this will not be easy. Stepping up research and innovation to introduce new technologies in the sector is also required. The Commission has set out a list of measures to put the EU on the path to creating a sustainable, smart, and resilient mobility system of the future.

Amending the Regulation setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles

Description	*In July 2021, as part of the 'Fit for 55 package', the Commission presented a legislative proposal for the revision of the Regulation setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles[353]. The proposal sets more ambitious targets to reduce CO_2 emissions of new cars and vans. The emissions registered would have to be 55% lower for new passenger cars and 50% lower for new vans than the levels currently required (i.e. in 2021). By 2035 emissions from all new passenger cars and vans would have to be zero.[354]*
Key Facts	
Year Launched	2021: proposal launched
Key Agency	European Commission
Responsibilities	• The Commission is responsible for monitoring and assessing the real-world representativeness of the CO_2 emissions and fuel or energy consumption values. It is required regularly to collect data on the real-world CO_2 emissions and fuel or energy consumption of passenger cars and light commercial vehicles using on-board fuel and/or energy consumption monitoring devices, starting with new passenger cars and new light commercial vehicles registered in 2021. • In 2028, the Commission is required to review the effectiveness and impact of the Regulation and if needed, submit a proposal for further amending it.
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Yes

Background

In the context of the European Union's commitment to reduce the Union's economy-wide net greenhouse gas emissions by at least 55% by 2030 below 1990 levels, all sectors of the economy are expected to contribute to achieving those emission reductions, including the road transport sector. In order to achieve these targets, it is necessary to strengthen the reduction requirements set out in the existing Regulation setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles.[355] Ambitious action on greenhouse gas emission reductions in road transport will complement other sectors, including those where decarbonisation is more challenging. Additionally, the aim of strengthening CO_2 emission reduction requirements is also to incentivise an increasing share of zero-emission vehicles being deployed on the Union market while providing benefits to society such as air quality, energy savings and innovations in the automotive value chain. Zero-emission vehicles currently include battery electric vehicles, fuel-cell and other hydrogen powered vehicles. Zero and low-emission vehicles will play an important role in the transition pathway.

[353] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0556

[354] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-co2-emission-standards-for-cars-and-vans-post-euro6vi-emission-standards#:~:text=On%2014%20July%202021%2C%20as,cars%20and%20light%20commercial%20vehicles.&text=For%20new%20vans%2C%20the%20reduction,CO2%2Fkm%20in%202021).

[355] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02019R0631-20210301

Against this background, new emission reduction targets are set for both new passenger cars and new light commercial vehicles for the period 2030 onwards. These targets aim to accelerate the uptake of zero-emission vehicles on the Union market and to stimulate innovation in zero-emission technologies in a cost-efficient way.

Scope of the Regulation[356]

The Regulation applies to the following motor vehicles:

- Category M1[357], which are defined as "passenger cars" and are registered in the Union for the first time and which have not previously been registered outside the Union ("new passenger cars");
- Category N1[358], as defined in Regulation (EU) 2018/858[359] and falling within the scope of Regulation (EC) No 715/2007 ("light commercial vehicles"), which are registered in the Union for the first time and which have not previously been registered outside the Union '"new light commercial vehicles"); in the case of zero-emission vehicles of category N with a reference mass exceeding 2 610 kg or 2 840 kg, as the case may be, they will, from 1 January 2025, be counted as light commercial vehicles falling within the scope of this Regulation if the excess reference mass is due only to the mass of the energy storage system.
- This Regulation does not apply to special purposes vehicles, such as motor caravans, armoured vehicles, ambulances, hearses, wheelchair accessible vehicles, trailer caravans, mobile cranes, special group vehicles[360], converter dollies, exceptional load transport trailers, exceptional load transport motor vehicles, and multi-equipment carriers.

Programme Structure: Operational[361]

Monitoring

- Every calendar year, Member States will record information for each new passenger car and each new light commercial vehicle registered in its territory, which will be made available to the manufacturers and their designated importers or representatives in each Member State. Member States will designate a competent authority for the collection and communication of the monitoring data in accordance with this Regulation and will inform the Commission of the competent authority designated.
- The Commission will keep a central register of the data, which will be made publicly available, reported by Member States and will provisionally calculate the following information for each manufacturer:
  - the average specific emissions of CO_2 in the preceding calendar year;
  - the specific emissions target in the preceding calendar year;
  - the difference between the manufacturer's average specific emissions of CO_2 in the preceding calendar year and its specific emissions target for that year.
- The Commission will evaluate, no later than 2023, the possibility of developing a common Union methodology for the assessment and the consistent data reporting of the full life-cycle CO_2 emissions of passenger cars and light commercial vehicles that are placed on the Union market.
- Member States are also required to collect and report data on registrations of vehicles in categories M2 and N2, with a reference mass not exceeding 2610 kg.[362]
- Each calendar year, the Commission will impose an excess emissions premium on a manufacturer or pool manager, where a manufacturer's average specific emissions of CO_2 exceed its specific emissions target.

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[356] https://eur-lex.europa.eu/resource.html?uri=cellar:870b365e-eecc-11eb-a71c-01aa75ed71a1.0001.01/DOC_1&format=PDF

[357] *According to Regulation 2018/858 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, 'Category M1' consists of motor vehicles designed and constructed primarily for the carriage of passengers and their luggage with not more than eight seating positions in addition to the driver's seating position and without space for standing passengers, regardless of whether the number of seating positions is restricted to the driver's seating position.* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018R0858

[358] *According to Regulation 2018/858 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, 'Category N1' consists of motor vehicles designed and constructed primarily for the carriage of goods with a maximum mass not exceeding 3,5 tonnes.* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018R0858

[359] *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018R0858*

[360] *Special purpose vehicle that does not enter in any of the definitions mentioned in this point. For further information consult Annex I to Regulation (EU) 2018/858.* https://eur-lex.europa.eu/resource.html?uri=cellar:870b365e-eecc-11eb-a71c-01aa75ed71a1.0001.01/DOC_1&format=PDF

[361] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0631&from=EN

[362] *Category M2: Used for the carriage of passengers, having a maximum mass not exceeding 5 tonnes; category N2: Used for the carriage of goods, having a maximum mass exceeding 3.5 tonnes but not exceeding 12 tonnes*

- The excess emissions[363] premium is calculated using the following formula:
- (Excess emissions × EUR 95) × number of newly registered vehicles.
- The Commission will publish, by 31 October of each year, a list indicating:
  - for each manufacturer, its specific emissions target for the preceding calendar year;
  - for each manufacturer, its average specific emissions of CO2 in the preceding calendar year;
  - the difference between the manufacturer's average specific emissions of CO2 in the preceding calendar year and its specific emissions target in that year;
  - the average specific emissions of CO2 for all new passenger cars and new light commercial vehicles registered in the Union in the previous calendar year;
  - the average mass in running order for all new passenger cars and new light commercial vehicles registered in the Union in the preceding calendar year until 31 December 2020;
  - the average test mass of all new passenger cars and new light commercial vehicles registered in the Union in the preceding calendar year.
- The Commission is required to monitor and assess the real-world representativeness of the CO_2 emissions and fuel or energy consumption values. It is required to regularly collect data on the real-world CO_2 emissions and fuel or energy consumption of passenger cars and light commercial vehicles using on-board fuel and/or energy consumption monitoring devices, starting with new passenger cars and new light commercial vehicles registered in 2021.
- The Commission will ensure that the following parameters relating to real-world CO_2 emissions and fuel or energy consumption of passenger cars and light commercial vehicles are made available at regular intervals to it, from manufacturers, national authorities or through direct data transfer from vehicles:
  - vehicle identification number;
  - fuel and/or electric energy consumed;
  - total distance travelled;
  - for externally chargeable (plug-in) hybrid electric vehicles, the fuel and electric energy consumed and the distance travelled distributed over the different driving modes;
  - other parameters necessary to ensure that the obligations of monitoring and assessing the real-world representativeness of the CO_2 emissions and fuel or energy consumption values can be met.
- To prevent the real-world emissions gap from growing, the Commission will, no later than 1 June 2023, assess how fuel and energy consumption data may be used to ensure that the vehicle CO_2 emissions and fuel or energy consumption values determined remain representative of real-world emissions over time for each manufacturer.
  - The Commission will monitor and report annually on how the gap evolves over the period 2021 to 2026, and will assess in 2028 the feasibility of a mechanism to adjust the manufacturer's average specific emissions of CO_2 as of 2030.

Salient Features[364]

Provisions

Amendments to the Regulation

- From 1 January 2030, the following EU fleet-wide targets will apply:
  - for the average emissions of the new passenger car fleet, an EU fleet-wide target equal to a 55% reduction of the target in 2021;
  - for the average emissions of the new light commercial vehicles fleet, an EU fleet-wide target equal to a 50% reduction of the target in 2021.
- From 1 January 2035, the following EU fleet-wide targets will apply:
  - for the average emissions of the new passenger car fleet, an EU fleet-wide target equal to a 100% reduction of the target in 2021;
  - for the average emissions of the new light commercial vehicles fleet, an EU fleet-wide target equal to a 100% reduction of the target in 2021.
- By 31 December 2025, and every two years after this, the Commission will report on the progress towards zero-emission road mobility. This report will monitor and assess the need for possible additional measures to facilitate

[363] *'Excess emissions' means the positive number of grams per kilometre by which a manufacturer's average specific emissions of CO2, taking into account CO2 emissions reductions due to innovative technologies approved in accordance with Article 11, exceeded its specific emissions target in the calendar year or part thereof to which the obligation under Article 4 applies, rounded to the nearest three decimal places.*

[364] *https://eur-lex.europa.eu/resource.html?uri=cellar:870b365e-eecc-11eb-a71c-01aa75ed71a1.0001.01/DOC_1&format=PDF*

the transition, including through financial means. In the reporting, the Commission will consider all the factors contributing to cost-efficient progress towards climate neutrality by 2050. This includes:

- the deployment of zero- and low-emission vehicles, progress in achieving the targets for the roll-out of recharging and refuelling infrastructure as required under the Alternative Fuels Infrastructure Regulation[365];
- the potential contribution of innovation technologies and sustainable alternative fuels to reach climate-neutral mobility;
- impact on consumers;
- progress in social dialogue as well as aspects to further facilitate an economically viable and socially fair transition towards zero-emission road mobility.

Conclusion

By amending this Regulation, the Commission aims to set more ambitious targets for reducing the CO_2 emissions of new cars and vans. The overall objective is zero emissions from all new passenger cars and vans by 2035. The aim is to reduce the emissions of new passenger cars by 55% and of new vans by 50%by 2030. While the existing Regulation is being amended to ensure it is more ambitious, the Commission will have to review the new Regulation in 2028, in order to assess its effectiveness and impact in terms of moving towards achieving the zero-emission road mobility targets. It may then propose further strengthening.

[365] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32014L0094

New European Bauhaus Initiative

Description	*The New European Bauhaus is a cultural, environmental, and economic initiative of the European Commission that intends to bring people together to create a more sustainable, aesthetic, and inclusive future. The initiative serves as a link between the worlds of science and technology, art, and culture, mobilising professionals from both fields to re-imagine sustainable living in Europe and beyond. The initiative aims to facilitate a profound, collaborative, and multidisciplinary societal transformation along three dimensions* • *Quality of experience including style/aesthetics, healthy and safe living environments* • *Sustainability, including circularity* • *Inclusion, including accessibility and affordability.* [366]

Key Facts	
Year Launched	2020
Key Agency	European Commission
Responsibilities	• Facilitate dialogues among stakeholders about ways to make future living spaces more affordable and accessible • Bring together creative minds from across the sectors to reimagine sustainable life in Europe and beyond • Enhance the quality of living environment by focusing on simplicity and functionality • Provide financial assistance to help with development of new products and ideas
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	NA

Background

Inspired by the German Bauhaus movement, the New European Bauhaus initiative was launched in September 2020 by the President of the European Commission, Ursula Von der Leyen, with the goal of shaping future ways of living in Europe. It aims to serves as a link between science and technology, art, culture, and social inclusion to solve everyday problems. With sustainability, aesthetics, and inclusivity as the core principles, the initiative seeks to bring European creative minds together to generate new ideas and solutions to transform Europe's environmental, economic, and cultural goals.
Closely aligned with the Europe Union's Renovation Wave Strategy and Europe's vision of becoming a climate neutral continent by 2050, using creativity, innovation, and imagination, the New European Bauhaus initiative will support the construction of climate-friendly structures without sacrificing culture or aesthetics. The initiative involves citizens, experts and businesses, as well as policy-making institutions in reinventing a sustainable way of life.

The New European Bauhaus initiative unfolds in three phases: [367]

1. **Co-design** (From October 2020 to Summer 2021): Explore ideas and examples
2. **Delivery and Dissemination** (September 2021 onwards): Setup and implement New European Bauhaus pilots
3. **Dissemination** (January 2023 onward): Amplify the ideas and reach out beyond Europe's borders

[366] https://europa.eu/new-european-bauhaus/frequently-asked-questions_en
[367] https://europa.eu/new-european-bauhaus/about/about-initiative_en

Programme Structure

Design phase (October 2020 to Summer 2021)

This is a discovery phase for finding and linking all present examples of New European Bauhaus concepts, as well as how the initiative may help expedite, concretise, and materialise new ideas. It also includes a series of semi-structured interviews with distinguished thinkers and practitioners, which will act as a sounding board for ideas. The result of these actions will be a support framework, which will include a call for pilot projects in various EU Member States to bring the new Bauhaus concept to life.

The European Commission introduced the inaugural edition of the New European Bauhaus prize in the spring of 2021 as part of the design phase, garnering over 2,000 applications. The prize ceremony will take place in mid-September. Awards will be given to outstanding contemporary examples that are already combining sustainability, quality of experience, and inclusion in their own unique way.

The design phase is structured in the following manner.

1. **Defining the concept and the engagement structure (2 months)**: This phase includes determining how to incorporate diverse groups and cultures to enable broader participation, identify delivery options, ecosystems to build on, and appropriate instruments already in place.

2. **Engage & Harvest (3 months)**: This phase includes determining how high quality, sustainable, inclusive, affordable projects translate in communities and identifying possible gaps, themes, and intervention points.

3. **Ideate (4 months):** This phase entails identifying challenges and needs that may generate calls for proposals, as well as determining ways to monitor change and empower the most effective.

Delivery Phase (From September 2021 onward)

This phase begins with the establishment and execution of at least five New European Bauhaus pilots. These pilots will be closely monitored in a community of practice to ensure that all partners in this project get something useful to learn. The initiative will be further structured and extended through digital networks and participation platforms due to the flanking efforts and new policy instruments identified during the design phase.

Dissemination Phase (From January 2023 onwards)

The distribution phase will be primarily focused on amplifying the ideas and actions with a broader audience, not just in Europe but beyond. To ensure all frontrunners replicate their experiences in cities, rural areas and localities, extensive networking and knowledge sharing on the best available approaches, solutions and prototypes will be carried out between participants and practitioners.

Salient Features

Sustainability, Aesthetics, and Inclusiveness

The initiative seeks to bring together experts, corporations, and institutions to enable discussions about making future living places more affordable and accessible, as well as reimagining sustainable living in Europe and beyond. In terms of sustainability, the emphasis is on building a more resilient, greener, and digitalised society by leveraging art and culture through the lenses of energy efficiency and environmental sustainability. In terms of inclusiveness, the initiative would focus on affordable housing and improving the quality of living by focusing on simplicity and practicality without sacrificing the need for comfort and beauty in our everyday lives.

Creative and interdisciplinary movement

The New European Bauhaus is a crossroads project, which brings together innovation, creativity and culture, and adopts innovative and aesthetic approaches to realise the Green Deal in people's lives. Through this approach, it aims to build a community of creative minded people that can together build a sustainable and inclusive future that is beautiful for our eyes, minds, and souls.

Bridge between the world of science and technology and the world of art and culture

The initiative brings together artists, designers, engineers, scientists, entrepreneurs, architects, students and all other interested people with creative minds to contribute and jointly design a future that is sustainable, inclusive, and

affordable. It also encourages experimentation and the development of relationships and collaborations between thinkers and doers.

Sustainability through the intersection of art and culture

With an aim of creating "the world of tomorrow for a tomorrow that is greener, more beautiful, and humane,"[368] the New European Bauhaus initiative is leveraging culture and arts to promote a more sustainable way of living. Culture is necessary for the study and evaluation of complicated issues, as well as the assessment of our relationship with and reliance on the environment. Hence, the initiative intends to focus on construction materials, energy efficiency, and future-oriented mobility without sacrificing art and culture.

Conclusion

The New European Bauhaus initiative aspires to put sustainability, inclusivity and beauty at the centre of Europe's future by leveraging culture, art and technology. It may be viewed as an intersectional effort that aims to alters Europe's environmental, economic, and cultural objectives.

The initiative urges Europe's creative minds to offer diverse perspectives and solutions to address environmental and digital challenges, perceiving them as opportunities to enhance Europeans' lives. In line with its core values of Sustainability, Aesthetics, and Inclusivity, the initiative provides a plethora of opportunities for creative players to create, discuss, and implement innovative ideas.

Thus, the New European Bauhaus may be viewed as a systemic change aiming to influence thought, behaviour, and markets in relation to new forms of living and construction. It aspires to bring the European Green Deal closer to people's minds and homes by breaking down barriers between science and technology, art, culture and social inclusion.

[368] https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_20_1902

Amending the EU MRV Regulation

Description	*The revision of the EU MRV Regulation was taken up to streamline certain aspects of the EU and IMO monitoring, reporting, and verification systems, which will reduce the administrative burden and associated costs for ships having to report under both systems.* *The proposal aims to facilitate the smooth implementation of the two systems while maintaining the objectives of the current EU legislation and aims to keep the collection of robust and verified CO2 emissions data at individual ship level to stimulate the uptake of energy efficiency solutions and inform future policymaking decisions.*[369]

Key Facts	
Year Launched	2020[370]
Key Agency	European Commission
Responsibilities	• To conduct an Impact Assessment and amend the EU MRV to take appropriate account of the IMO global data collection system for fuel oil consumption of ships • To publish annually reported aggregated data on a "per ship" basis to ensure transparency • To assess the maritime transport sector's overall impact on the global climate every two years
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Yes

Background

Based on a 2011 EU White Paper on transport, the European Commission adopted a strategy in 2013 to gradually integrate maritime emissions into the EU's policy for reducing greenhouse gas emissions.

In 2015, the European Parliament and the Council adopted Regulation (EU) 2015/757 on the monitoring, reporting, and verification of carbon dioxide emissions from maritime transport (the 'EU MRV Regulation'), which was supported by two Delegated Regulations and two Implementing Regulations in 2016. The EU MRV Regulation focuses on collecting data on shipping emissions for policymaking and incentivising emission reductions by providing information on ships' efficiency to relevant markets. It mandates companies to monitor, report, and verify the fuel consumption, CO2 emissions, and energy efficiency of their ships on voyages to and from European Economic Area (EEA) ports annually from 2018. This also applies to CO2 emissions within EEA ports.

Under the 2015 Paris Agreement, the EU and its Member States have carried out an economy-wide reduction target exercise. The International Maritime Organisation (IMO) is working to limit international maritime emissions and has adopted a data collection system for fuel oil consumption of ships ('the global IMO DCS') in October 2016.

Article 22 of the EU MRV Regulation states that should an international agreement on global monitoring, reporting and verification system have been developed, the Commission will review the EU MRV Regulation and propose amendments

[369] https://ec.europa.eu/clima/news/commission-adopts-proposal-revise-eu-system-monitor-report-and-verify-co2-emissions-ships_zh

[370] https://www.europarl.europa.eu/legislative-train/theme-resilient-energy-union-with-a-climate-change-policy/file-revision-of-the-eu-system-to-monitor-report-and-verify-co2-emissions-from-ships

in line with the international agreement. In accordance with this Article, the Commission examined ways of aligning the two systems to reduce the administrative burden on ships while following the objectives of the EU MRV Regulation.[371]
The impact assessment that followed suggested a partial alignment of the two monitoring, reporting and verification systems, which should be limited to definitions and monitoring parameters, plans, and templates. However, there was to be no modification to the governance, scope, verification, transparency, or CO2 reporting requirements of the EU MRV Regulation as this would change its objectives and affect its capacity to help in policy-making decisions.
The objective of Regulation (EU) 2015/757 is to monitor, report and verify CO2 emissions from ships calling at EEA ports as the first step to reducing greenhouse gas emissions. Considering its scale and effects, it was felt this could be better achieved at the EU level than by the Member States. Thus any future revision should consider the global IMO DCS and ensure the continued comparability and reliability of collected data based on a single set of requirements. It was decided that the Regulation (EU) 2015/757 should be amended. A proposal for Regulation of the European Parliament and of the Council amending Regulation (EU) 2015/757 was submitted in February 2019.

Programme Structure: Operational

Monitoring

The Impact Assessment carried out for the Proposal for the 2015 EU MRV Regulation suggested five indicators to monitor and evaluate the progress made towards the reduction of GHG emissions from maritime transport.
The indicators relevant in the context of the amendment are:

- annual CO2 emissions from maritime transport within the EU scope (on a per ship and fuel consumption basis);
- annual CO2 emissions from maritime transport compared to the annual maritime transport activity of the EU (in tonnes-nautical miles);
- annual turnover of European shipbuilders, equipment manufacturers, and service providers to the shipping sector;
- number and percentage of ships that are monitoring and reporting their emissions in line with the Regulation compared to the number of ships calling into EEA ports.

These indicators would be calculated on an annual basis based on data from relevant European Agencies provided by the concerned authorities. The functioning of measures for monitoring and reporting of emissions would be reviewed periodically.
The Commission would also assess the maritime transport sector's overall impact on the global climate, including through non-CO2-related emissions or effects every two years.

Salient Features

Provisions

Amendments to the EU MRV Regulation

Ships performing maritime transport activities are covered by both the EU MRV Regulation and the global IMO DCS (data collection system). To reduce the administrative burden and maintain the objectives of the EU action in this area, the following amendments were put forward.

- Amended definitions of “company” and “reporting period” and the responsibility of monitoring and reporting obligations in case of "changes of company" were needed to consider the global IMO DCS parallel provisions. This would ensure that the same legal entities monitor and report according to similar reporting periods on their ships performing EEA-related maritime transport activities under both systems;
- The Regulation also had to account for the global IMO DCS provisions on data to be monitored and reported annually to ensure streamlining of data collected for ships' activities falling under both systems:
  - “Deadweight tonnage” was defined and reported as a compulsory parameter while “cargo carried” was a voluntary monitoring parameter for those companies willing to provide a calculation of their ships' average energy efficiency based on cargo carried;
    - Deadweight tonnage is the maximum deadweight of the ship and measures the ship's carrying capacity. It accounts for the weight of the cargo on board, fuel, ballast water, freshwater, crew, provisions for the crew, excluding the weight of the ship in the calculation
  - The EU parameter “time at sea” would be replaced by the global IMO DCS definition of “hours underway”.
  - Calculation of “distance travelled” would be based on the options retained under relevant IMO DCS guidelines.

[371] https://eur-lex.europa.eu/resource.html?uri=cellar:0920c07e-2865-11e9-8d04-01aa75ed71a1.0006.02/DOC_1&format=PDF

- The minimum content of monitoring plans should be streamlined taking into consideration the IMO "Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)" except for the provisions that are required to ensure that only EU-related data are monitored and reported under the EU MRV Regulation.[372]

In July 2020, it was suggested by the Committee on Environment, Public Health and Food Safety (ENVI) of the European Parliament that the amendments also introduce environmental performance labelling of ships and provide for inclusion of methane and other greenhouse gases in addition to CO2, and better supply of shoreside electricity in ports. The European Commission would be required to review the Regulation in the light of future IMO measures. The ENVI committee also called for inclusion of maritime shipping under the EU Emissions Trading System (ETS) Directive in the report from 2022.[373] [374] The EU ETS is the world's first and biggest carbon market and the foundation of the EU's policy to fight against climate change.[375]

The ENVI Committee proposed an 'Ocean Fund' for the 2022-2030 period backed by revenues from auctioning EU ETS allowances to:

- make the ships more energy-efficient;
- support investment in innovative technologies and infrastructure for decarbonising maritime transport;
- protect marine ecosystems impacted by climate change.[376]

Retaining key features of the EU MRV Regulation

While the European Commission has proposed amendments to the EU MRV Regulation, certain relevant features needed to be continued.

- Maintaining the scope in terms of ships and activities covered under the EU MRV Regulation: This includes most ships above 5 000 GT calling at EU ports for maritime transport purposes. Ship activities such as dredging, laying pipelines, and supporting offshore installation activities are not considered maritime transport and are not bound by monitoring and reporting requirements.
- Separate monitoring and reporting of ships' CO2 emissions within EU ports to incentivise the use of available measures for reduction of CO2 emissions within these ports and increase awareness of shipping emissions:
  - data on voyages internal to any EU Member State are also to be monitored and reported on to provide the Member States' authorities with recent and comparable data on their national shipping emissions;
  - current MRV provisions on verification of data by accredited third parties to preserve the EU objective of providing comparable data over time and robust information for further decision making at the EU or the global level.
- EU MRV Regulation provisions on publication of individual ships' data of CO2 emissions and energy efficiency to help remove market barriers hampering the acceptance of more energy-efficient technologies and behaviours in the sector.[377]

Conclusion

Amending Regulation (EU) 2015/757 is an effort to streamline the EU MRV Regulation and the global IMO DCS and reduce the administrative effort or cost involved. The amendment tries to bring changes to the EU MRV that align it with the global IMO DCS while keeping certain key elements of the Regulation related to its scope and monitoring and reporting process.

[372] https://eur-lex.europa.eu/resource.html?uri=cellar:0920c07e-2865-11e9-8d04-01aa75ed71a1.0006.02/DOC_1&format=PDF

[373] https://www.europarl.europa.eu/RegData/etudes/ATAG/2020/652054/EPRS_ATA(2020)652054_EN.pdf

[374] https://www.europarl.europa.eu/legislative-train/theme-resilient-energy-union-with-a-climate-change-policy/file-revision-of-the-eu-system-to-monitor-report-and-verify-co2-emissions-from-ships

[375] https://ec.europa.eu/clima/policies/ets_en

[376] https://www.europarl.europa.eu/legislative-train/theme-resilient-energy-union-with-a-climate-change-policy/file-revision-of-the-eu-system-to-monitor-report-and-verify-co2-emissions-from-ships

[377] https://eur-lex.europa.eu/resource.html?uri=cellar:0920c07e-2865-11e9-8d04-01aa75ed71a1.0006.02/DOC_1&format=PDF

FuelEU Maritime

Description	*The FuelEU Maritime initiative was launched in February 2021. It is an EU-wide initiative that aims to reduce emissions by increasing the uptake of sustainable alternative fuels. The initiative is also designed to increase the share of zero-carbon alternative fuels in the fuel mix of international maritime transport. The initiative aims to increase the use of sustainable alternative fuels in European shipping and ports by addressing market barriers that hamper their use and uncertainty about which technical options are market-ready.*[378]

Key Facts	
Year Launched	2021: proposal launched
Key Agency	European Commission
Responsibilities	• The Commission is to measure progress towards achieving the specific objectives of the proposal, in particular through the data collected annually as part of the EU Monitoring, Reporting and Evaluation (MRV) system. Accredited verifiers will ensure the accuracy and completeness of the monitoring and reporting by companies and compliance with the Regulation. • The Commission will report by 1 January 2030, on the functioning of this Regulation and the evolution of the sustainable alternative fuel technologies and on the need for amendments.
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Yes

Background

In September 2020, the Commission adopted a proposal to cut greenhouse gas emissions by at least 55% by 2030. To achieve climate neutrality, there is a need to reduce transport emissions by 90% by 2050 and all transport modes, including maritime transport, are to be included in the reduction efforts. Achieving significant CO_2 emission reductions in international maritime transport implies increasing energy efficiency and using cleaner types of energy, by using renewable and low-carbon fuels. The FuelEU Maritime initiative aims to increase the production and uptake of sustainable alternative fuels for this sector. Technology development and deployment are also important and need to happen by 2030 in order to see rapid improvements. Currently, the fuel mix in the maritime sector relies entirely on fossil fuels. This is due to insufficient incentives for operators to cut emissions, market failures, and the lack of mature, affordable and globally utilisable technological alternatives to fossil fuels in the sector.[379]

Moreover, maritime tranport has an important role in terms of the connectivity of island and peripheral maritime regions and in external and internal trade. A level playing field for ship operators and shipping companies is critical to a well-functioning EU market for maritime transport. To ensure this, the FuelEU Maritime initiative proposes a common EU regulatory framework to increase the share of renewable and low-carbon fuels in the fuel mix of international maritime transport without affecting the single market. Fuel costs can range from 35% of the freight rate of a small tanker to around 53% for container/bulk vessels, which means variations in marine fuel prices have a significant impact on the

[378] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12312-CO2-emissions-from-shipping-encouraging-the-use-of-low-carbon-fuels_en

[379] https://ec.europa.eu/info/sites/default/files/fueleu_maritime_-_green_european_maritime_space.pdf

economic performance of ship operators. As the price differential between conventional marine fuels of fossil origin and renewable low-carbon fuels remains high, maintaining competitiveness while promoting a fuel transition means clear and uniform obligations on ships' use of renewable low-carbon fuels are necessary.[380]

Scope of the Regulation

This Regulation applies to all ships above a gross tonnage of 5000, regardless of their flag in respect of:

- the energy used during their stay within a port of call under the jurisdiction of a Member State;
- the entirety of the energy used on voyages from a port of call under the jurisdiction of a Member State to a port of call under the jurisdiction of a Member State;
- half the energy used on voyages departing from or arriving to a port of call under the jurisdiction of a Member State, where the last or the next port of call is under the jurisdiction of a third country.

This Regulation does not apply to warships, naval auxiliaries, fish-catching or fish-processing ships, wooden ships of a primitive build, ships not propelled by mechanical means, or government ships used for non-commercial purposes.

Salient Features[381]

Article 1: Objective and purpose

The Regulation lays down uniform rules imposing:

- the limit on the greenhouse gas intensity of energy used on-board by a ship arriving, staying, departing from ports under the jurisdiction on a Member State;
- the obligation to use on-shore power supply or zero-emission technology in ports that are under the jurisdiction of a Member State.

This is in order to increase the use of renewable and low-carbon fuels and substitute sources of energy across the Union, while avoiding distortions in the internal market and ensuring the smooth operation of maritime traffic.

Article 2 : Scope

This Regulation applies to all ships above a gross tonnage of 5000, excluding warships, naval auxiliaries, fish-catching or fish-processing ships, wooden ships of a primitive build, ships not propelled by mechanical means, or government ships used for non-commercial purposes.

Article 3 : Definitions

- Provides definitions of main elements of the Regulation.
- A relevant definition provided in this article is that of the FuelEU certificate of compliance, which is a certificate specific to a ship, issued to a company by a verifier, which confirms that a ship has complied with the Regulation for a specific period.

Article 4 : Greenhouse gas intensity limit of energy used on-board by a ship

- The yearly average greenhouse gas intensity of the energy used on-board by a ship during a reporting period shall not exceed the limit, which is calculated by reducing the reference value of [X grams of CO2 equivalent per MJ] by the following percentage:
  - -2% from 1 January 2025;
  - -6% from 1 January 2030;
  - -13% from 1 January 2035;
  - -26% from 1 January 2040;
  - -59% from 1 January 2045;
  - -75% from 1 January 2050.
- The greenhouse gas intensity of the energy used on-board by a ship shall be calculated as the amount of greenhouse gas emissions per unit of energy.

Article 5: Additional zero-emission requirements of energy used at berth

- From 1 January 2030, a ship at berth in a port under the jurisdiction of a Member State is required to connect to on-shore power supply and use it for all energy needs while at berth. This applies to container ships and passenger ships. This does not apply to ships that:
  - are at berth for less than two hours, calculated on the basis of hour of departure and arrival;

[380] https://ec.europa.eu/info/sites/default/files/fueleu_maritime_-_green_european_maritime_space.pdf

[381] *All information is retrieved from: https://ec.europa.eu/info/sites/default/files/fueleu_maritime_-_green_european_maritime_space.pdf. For the purposes of this document, only the articles that are further detailed are considered more relevant for the EBCG community and Frontex. For this reason, some articles do not have further explanations.*

- use zero-emission technologies;
- have to make an unscheduled port call for reasons of safety or saving life at sea;
- are unable to connect to on-shore power supply due to unavailable connection points in a port;
- are unable to connect to on-shore power supply because the shore installation at the port is not compatible with the on-board on-shore power equipment;
- which, for a limited period of time, require the use of on-board energy generation, under emergency situations representing immediate risk to life, the ship, the environment or for other reasons of *force majeure*.

Article 6: Common principles for monitoring and reporting

- Companies will have to monitor and report on the relevant data during a reporting period for each of their ships. Monitoring and reporting will cover the energy used on-board by ships, while the ships are at sea as well as at berth.
- Monitoring and reporting has to be consistent and comparable over time. To do this, the same methodologies and data sets have to be used.

Article 7: Monitoring plan

- The monitoring plan is required to contain the following elements:
  - the identification and type of the ship, including its name, its IMO identification number, its port of registry or home port, and the name of the ship-owner;
  - the name of the company and the address, telephone and e-mail details of a contact person;
  - a description of the energy conversion systems installed on-board, and the related power capacity expressed in megawatt;
  - a description that the ship has installed and certified equipment to allow connection to onshore power supply, at a specified voltage and frequency, including the gear specified in IEC/IEEE 80005-1 (High Voltage) and IEC/IEEE 80005-3 (Low Voltage) or is equipped with substitute sources of energy or a zero-emission technology;
  - a description of the intended source(s) of energy to be used on-board while in navigation and at berth;
  - a description of the procedures for monitoring the fuel consumption of the ship as well as the energy provided by substitute sources of energy or a zero-emission technology;
  - well-to-wake[382] emission factors;
  - a description of the procedures used to monitor the completeness of the list of voyages;
  - a description of the procedures used for determining activity data per voyage, including the procedures, responsibilities, formulae and data sources for determining and recording the time spent at sea between the port of departure and the port of arrival and the time spent at berth;
  - a description of the procedures, systems and responsibilities used to update any of the data contained in the monitoring plan over the reporting period;
  - a description of the method to be used to determine surrogate data for closing data gaps;
  - a revision record sheet to record all the details of the revision history.

Article 8: Modifications to the monitoring plan

- Companies must check regularly, and at least annually whether a ship's monitoring plan reflects the nature and functioning of the ship and whether any of the data it contains can be improved.
- Companies must modify the monitoring plan if:
  - a change of company occurs;
  - new energy conversion systems, new types of energy, including substitute sources of energy or a zero-emission technology are in use;
  - a change in availability of data, due to the use of new types of measuring equipment, new sampling methods or analysis methods, or for other reasons, may affect the accuracy of the data collected;
  - data resulting from the monitoring method applied has been found to be incorrect;
  - any part of the monitoring plan is identified as not being in conformity with the requirements of this Regulation.

Article 9: Certification of biofuels, biogas, renewable liquid and gaseous transport fuels of non-biological origin and recycled carbon fuels

- Lays down rules for biofuels, biogas, renewable fuels of non-biological origin and recycled carbon fuels, that companies need to comply with through the provision of data.

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[382] *"Well-to-wake" is a method for calculating emissions that takes into account the greenhouse gas impact of energy production, transport, distribution and use onboard, including during combustion.*

Article 10: Verification activities

Article 11: General obligations and principles for the verifiers

Article 12: Verification procedures

Article 13: Accreditation of verifiers

Article 14: Monitoring and recording

- Based on the monitoring plan, companies must record, for each ship arriving in or departing from, and for each voyage to or from a port of call under the jurisdiction of a Member State, the following information:
  - port of departure and port of arrival including the date and hour of departure and arrival and time spent at berth;
  - whether the ship (if applicable) has connection to and use of on-shore power or the existence of any of the exceptions listed in Article 5;
  - the amount of each type of fuel consumed at berth and at sea;
  - the well-to-wake emission factors for each type of fuel consumed at berth and at sea, broken down by well-to-tank, tank-to-wake and fugitive emissions, covering all relevant greenhouse gases;
  - the amount of each type of substitute source of energy consumed at berth and at sea.
- Companies must record the information and data listed on an annual basis in a transparent manner.

Article 15: Verification and calculation

- On the basis of the information verified, the verifier shall:
  - calculate the yearly average greenhouse intensity of the energy used on-board by the ship concerned;
  - calculate the ship's compliance balance;
  - calculate the number of non-compliant port calls in the previous reporting period including the time spent at berth for each non-compliant port call;
  - calculate the amount of the penalties referred to in Article 20.

Article 16: Compliance database and reporting

- The Commission will develop, ensure functioning of and update an electronic compliance database for the monitoring of compliance. The compliance database is to be used to keep a record of the ships' compliance balance. It must be accessible to the companies, the verifiers, the competent authorities and the Commission.

Article 17: Banking and borrowing of compliance surplus between reporting periods

- Where the ship has a compliance surplus for the reporting period, the company may bank it to the same ship's compliance balance for the following reporting period.
- Where the ship has a compliance deficit for the reporting period, the company may borrow an advance compliance surplus of the corresponding amount from the following reporting period.

Article 18: Pooling of compliance

- The compliance balances of two or more ships, which are verified by the same verifier, may be pooled for the purposes of fulfilling the requirements of Article 4.
- In case of pooled compliance, the company may decide how to allocate the total compliance balance of the pool to each individual ship, provided that the total pool compliance balance is respected.

Article 19: FuelEU certificate of compliance

- By 30 June of the year following the reporting period, the verifier shall issue a FuelEU certificate of compliance for the ship concerned, provided that the ship does not have a compliance deficit and does not have non-compliant port calls. The FuelEU certificate of compliance will be valid for the period of 18 months after the end of the reporting period.
- The FuelEU certificate of compliance is to include the following information:
  - identity of the ship (name, IMO identification number and port of registry or home port);
  - name, address and principal place of business of the ship-owner;
  - identity of the verifier;
  - date of issue of this certificate, its period of validity and the reporting period it refers to.

Article 20: Penalties

- The company will pay a penalty for each non-compliant port call. The verifier calculates the amount of the penalty by multiplying the amount of EUR 250 by megawatts of power installed on-board and by the number of completed hours spent at berth.

Article 21: Allocation of penalties to support renewable and low-carbon fuels in the maritime sector

- The penalties will be allocated to support common projects aimed at the rapid deployment of renewable and low carbon fuels in the maritime sector. Projects financed by the funds collected from the penalties will stimulate the production of greater quantities of renewable and low carbon fuels for the maritime sector, facilitate the construction of appropriate bunkering facilities or electric connection ports in ports, and support the development, testing and deployment of the most innovative European technologies in the fleet to achieve significant emission reductions.

Article 22: Obligation to carry a valid FuelEU certificate of compliance on-board

- The ships calling at a port under the jurisdiction of a Member State will be required to carry on-board a valid FuelEU certificate of compliance.

Article 23: Enforcement

Article 24: Right to review

Article 25: Competent authorities

Article 26: Exercise of delegation

Article 27: Committee procedure

Article 28: Report and review

Article 29: Amendments to Directive 2009/16/EC

Article 30: Entry into force

Conclusion

FuelEU Maritime is part of the sustainable and smart mobility policy objective of the European Green Deal and one of the European Commission measures that aims to decarbonise the maritime sector by encouraging the use of alternative fuels which are sustainable and increasing the production and the uptake of sustainable alternative fuels for this sector. The legislation will facilitate investments, including in the production and deployment of these fuels in the sector. The Commission acts as the implementing agency, looking to speed up the market acceptability of alternative sustainable fuels. Increasing their share in the fuel mix of international maritime transport and reducing emissions in ports by improving the use of alternatives such as on-shore power supply at berth are some of the measures that are taken in the legislation. FuelEU Maritime is a concerted effort to change patterns of fuel consumption in the maritime sector and contribute to significant reductions in CO_2 emissions in this sector.

ReFuelEU Aviation

Description	*ReFuelEU Aviation is an initiative of the European Union (EU) to boost the production, deployment, and supply of affordable, high-quality sustainable aviation fuels in Europe, in line with the goals of the Paris Agreement and the EU's aim of achieving climate neutrality by 2050. This initiative is part of the sustainable and smart mobility strategy and is an effort to accelerate the Strategy on Smart Sector Integration, i.e. the Strategy for Energy Sector Integration.*[383]

Key Facts	
Year Launched	2020: proposal launched
Key Agency	European Commission
Responsibilities	The proposed Regulation includes monitoring, reporting and verification systems that allow the Commission to ensure that it is implemented correctly. In particular, aircraft operators and fuel suppliers will be required to report on a yearly basis. Such reports will be verified by independent bodies and assessment of compliance of aircraft operators and fuel suppliers will be undertaken to determine whether they have fulfilled their respective obligations. Further, on a yearly basis, the European Union Aviation Safety Agency (EASA) will report to the Commission, notably on the compliance of economic operators and on the status of the aviation and sustainable aviation fuels markets.
Geographical scope	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Yes

Background

The European aviation sector has shown continuous growth since the early 1990s, with an associated doubling of its greenhouse gas (GHG) emissions from 1990 to 2017. According to the European Commission, direct emissions from the air transport sector account for 3% of the EU's total GHG emissions and more than 2% of global emissions.[384] In line with the goals of the Paris Agreement and the EU's ambitious vision of achieving climate neutrality by 2050, the Commission's Communication on the European Green Deal[385] sets out the need to reduce transport emissions by 90% by 2050 (compared to 1990), and to increase the production and deployment of sustainable, alternative transport fuels.

In this context, the European Commission's 2020 work programme included the ReFuelEU Aviation initiative that aims to boost the production and supply of Sustainable Aviation Fuels (SAF)[386]. In order to decrease significantly the emissions of the aviation sector, the exclusive reliance on fossil jet fuel needs to be reduced and the transition to innovative and sustainable types of fuels and technologies needs to be accelerated. Since air transport needs to address its carbon footprint on all flight ranges by 2030, the role of sustainable aviation liquid fuels is essential. This requires measures to increase the supply and use of sustainable aviation fuels at Union airports. While several sustainable aviation fuel pathways are certified for use in aviation, the use of these is currently negligible due to lack of production at an affordable cost. Therefore, the production capacity needs to scale up with lower production costs over time so that sustainable aviation fuels account for at least 5% of aviation fuels by 2030 and 63% by 2050. The proposal for a ReFuelEU Aviation

[383] https://ec.europa.eu/info/sites/default/files/refueleu_aviation_-_sustainable_aviation_fuels.pdf

[384] https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/659361/EPRS_BRI(2020)659361_EN.pdf

[385] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

[386] For the purposes of this initiative, sustainable aviation fuels means liquid drop-in fuels sustainable to conventional aviation fuel. https://ec.europa.eu/info/sites/default/files/refueleu_aviation_-_sustainable_aviation_fuels.pdf

Regulation looks at pushing the introduction to the market of synthetic aviation fuels since these have the potential to achieve emission savings as high as 85% or more compared to fossil aviation fuel and could contribute to at least 28% of the aviation fuel mix by 2050.[387] [388]

The Regulation also aims to prevent practices such as "fuel tankering"[389], which leads to higher fuel burn than necessary and undermines fair competition in the Union air transport market. Therefore, through the ReFuelEU Aviation proposal, a requirement is being placed on aircraft operators to limit this practice so that the amount of fuel uplifted prior to departures from a given Union airport is commensurate with the amount of fuel necessary to operate the flights departing from that airport, taking into account the necessary compliance with fuel safety rules. In this way equal conditions for operations in the Union are ensured and the environment is safeguarded.

Scope of the Regulation

This Regulation applies to aircraft operators, Union airports, and aviation fuel suppliers. The definitions of these are further detailed below under salient features, particularly in Article 3.

Salient Features[390]

Article 1: Subject matter

- Lays down harmonised rules on the uptake and supply of sustainable aviation rules.

Article 2: Scope

- Applies to aircraft operators, Union airports, and aviation fuel suppliers.

Article 3: Definitions

- Provides definitions of the main elements of the Regulation.
- To understand the scope of the Regulation, the following definitions are included in this article:
  - "Union airport", which means an airport where passenger traffic was higher than 1 million passengers or where the freight traffic was higher than 100 000 tons in the reporting period and is not situated in an outermost region;
  - "aircraft operator' means a person that operated at least 729 commercial air transport flights departing from Union airports in the reporting period or, where that person may not be identified, the owner of the aircraft;
  - "aviation fuel supplier" means a fuel supplier supplying aviation fuel at a Union airport.

Article 4: Share of sustainable aviation fuel available at Union airports

- Aviation fuel suppliers need to ensure that all aviation fuel made available to aircraft operators at each Union airport contains a minimum share of sustainable aviation fuel, including a minimum share of synthetic aviation fuel.

Article 5: Refuelling obligation for aircraft operators

- The annual quantity of aviation fuel uplifted by a given aircraft operator at a given Union airport is to be at least 90% of the annual aviation fuel required.

Article 6: Obligations of Union airports to provide the infrastructure

- Union airports need to take the necessary measures to facilitate aircraft operators' access to aviation fuels containing shares of sustainable aviation fuels. They also need to provide the infrastructure needed for the delivery, storage and uplifting of such fuels.
- If aircraft operators report difficulties in accessing sustainable aviation fuels at a Union airport due to lack of adequate infrastructure, the European Union Aviation Safety Agency can request the airport to provide the information necessary to prove compliance, which the airport needs to provide without undue delay.
- It is the responsibility of Union airports to take the necessary measures to identify and address the lack of adequate airport infrastructure in 5 years after the entry into force of the Regulation.

Article 7: Reporting Obligations for Aircraft Operators

- Aircraft operators must report annually the following information:
  - the total amount of aviation fuel uplifted at each Union airport (in tonnes);
  - the annual aviation fuel required per Union airport (in tonnes);

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[387] https://ec.europa.eu/info/sites/default/files/refueleu_aviation_-_sustainable_aviation_fuels.pdf

[388] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0561

[389] *"Fuel tankering" refers to the practice of uplifting more aviation fuel than necessary at a given airport to avoid refuelling partially or fully at a destination airport where aviation fuel is more expensive.*

[390] https://ec.europa.eu/info/sites/default/files/refueleu_aviation_-_sustainable_aviation_fuels.pdf

- the annual non-tanked quantity per Union airport;
- the total amount of sustainable aviation fuel purchased from aviation fuel suppliers, for the purpose of operating their flights departing form Union airports (in tonnes);
- for each purchase of sustainable aviation fuel, the name of the aviation fuel supplier, the amount purchased expressed in tonnes, the conversion technology, the characteristic and origin of the feedstock used for productions, and the lifecycle emissions of the sustainable aviation fuel. If a purchase has different sustainable aviation fuels, the reports should provide the information of each type of sustainable aviation fuel.

Article 8: Aircraft operator claiming of use of sustainable aviation fuels

- Aircraft operators need to provide the following (in addition to the information required in Article 7):
  - a declaration of greenhouse gas schemes the operators participate in and in which the use of sustainable aviation fuels may be reported;
  - a declaration that the operator has not reported identical batches of sustainable aviation fuels under more than one scheme.

Article 9: Reporting obligations for fuel suppliers

- Aviation fuel suppliers need to report annually the following information:
  - volume of aviation fuel supplied at each Union airport
  - volume of sustainable aviation fuel supplied at each Union airport, and for each type of sustainable aviation fuel the lifecycle emissions, origin of feedstock and conversion process of each sustainable aviation fuel type supplied at Union airports.

Article 10: Competent Authority

- Member States are responsible for designating the competent authority, who will enforce the application of the Regulation.

Article 11: Enforcement

- Member States are responsible for laying down the rules on penalties applicable to infringement of the provisions.

Article 12 : Data collection and publication

- The European Union Aviation Safety Agency will publish annually a report containing information on:
  - the amount of sustainable aviation fuel purchased by aircraft operators at Union level;
  - the amount of sustainable aviation fuel and of synthetic aviation fuel supplied at Union level;
  - the state of the market, including price information, and trends in sustainable aviation fuel production and use in the Union;
  - the status of compliance of airports regarding obligations;
  - the compliance status of each aircraft operator and aviation fuel supplier;
  - the origin and the characteristics of all sustainable aviation fuels purchased by aircraft operators for use on flights departing from Union airports.

Article 13: Transitional period

Article 14: Reports and Review

Article 15: Entry into force

- The Regulation will enter into force on the 20th day following publication in the Official Journal of the European Union.
- The Regulation applies from 1st January 2023.

Conclusion

ReFuelEU Aviation is an initiative to bolster the production, supply, and uptake of sustainable aviation fuels in the aviation industry, to reduce emissions and achieve carbon neutrality in aviation. By promoting the use of sustainable aviation fuels, it is expected that the production of these will scale up and the production costs will no longer be a barrier for aircraft operators and suppliers. The Regulation also aims to reduce the practice of “fuel tankering”, which affects fair competition in the internal market and leads to higher fuel burn than necessary because aircraft operators take more fuel on board than is needed at airports where it is cheaper in order to save on the cost of refuelling at intermediary or turnaround stops. This is climate-unfriendly because it adds to the weight of the plane and therefore to their emissions.

Renovation Wave

Description	*Renovation Wave is a key initiative of the European Green Deal which aims to drive energy efficiency in the sector and deliver on Europe climate-neutral (net-zero emissions) by 2050 and other climate objectives. The Renovation Wave is focused on greening buildings, creating jobs, and improving lives, as per its official tagline.*[391] *The initiative aims to ensure full decarbonisation of the EU building stock in line with EU climate goals*[392].

Key Facts	
Year Launched	2020[393]
Key Agency	European Commission
Responsibilities	Lead to an increase in the annual deep renovation rate from 0.2% to 3% annually to achieve the target of 60% GHG emissions reduction in buildings required to achieve the EU 2030 climate targets; double the annual renovation rate by 2030, foster deep energy renovation, and mobilise forces at all levels towards these goals.
Geographic Boundaries: Global/ Regional	Regional (EU)
Number of Participating Countries	European Union Member States (27)
Legally Binding	Not yet, but the possibility of legally binding minimum energy performance standards is being envisaged as also highlighted in the stakeholder consultation[394]

Background

In October 2020, the European Commission published its Renovation Wave Communication, a strategic document accompanied by an Action Plan, aiming at "greening our buildings, creating jobs, improving lives"[395]. The Renovation Wave is part of the Green Deal, which sets the objective of climate-neutrality by 2050 at the EU level.

The Renovation Wave covers all factors important to building renovation, outlining a wide range of policies, measures, and tools to overcome barriers and mobilise all actors.

Roadmap[396]

- The EC welcomed feedback between 11 May 2020 and 08 June 2020 from business organisations, NGOs, public authorities, etc.
- Between 11 June 2020 and 9 July 2020, the EC welcomed feedback in consultation from the public.
- Post these two feedbacks periods, the EC adopted the Renovation Wave on 14 October 2020.
- On 18 January 2021, the EC launched the design phase of the New European Bauhaus as part of the Renovation Wave.
- On 11 June 2021 the Council of energy ministers approved conclusions that endorsed the EU renovation wave strategy.

[391] https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

[392] https://energypost.eu/european-commission-should-intensify-political-action-in-2021-to-align-renovation-wave-with-eu-climate-targets-bpie-says/

[393] https://www.bpie.eu/wp-content/uploads/2021/04/BPIE_Renovation-Wave-Analysis_052021_Final.pdf

[394] https://ec.europa.eu/energy/sites/default/files/stakeholder_consultation_on_the_renovation_wave_initiative.pdf

[395] https://ec.europa.eu/energy/sites/ener/files/eu_renovation_wave_strategy.pdf

[396] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12376-Energy-efficiency-in-buildings-consultation-on-%E2%80%98renovation-wave%E2%80%99-initiative_en

In the dissemination phase, the NEB will focus on diffusing good ideas and concepts to a broader audience in Europe and beyond. via networking and sharing knowledge between practitioners on the best available methods, solutions, and prototypes.

Principles

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

- Treating **energy efficiency** as a horizontal guiding principle outlined in the European Green Deal and the EU Strategy on Energy System Integration, to make sure we only produce the energy we really need.
- **Affordability of** energy-performing and sustainable buildings, to be widely available for medium and lower-income households and vulnerable people and areas.
- **Decarbonisation** and integration of renewables: Building renovation should speed up the integration of locally sourced renewables and promote broader use of waste heat. It should integrate energy systems at local and regional levels, helping to decarbonise transport as well as heating and cooling.
- **Lifecycle thinking and circularity:** Minimising the footprint of buildings requires resource efficiency and circularity combined with turning parts of the construction sector into a carbon sink.
- **Promotion of green infrastructure:** Use of organic building materials that can store carbon, such as sustainably sourced wood.
- High **environmental standards**: high air quality, good water management, disaster prevention and protection against climate-related hazards, removal of and protection against harmful substances such as asbestos and radon, fire, and seismic safety. Furthermore, accessibility should be ensured to achieve equal access for Europe's population.
- Twin challenges of the **green and digital transitions** together: Smart buildings can enable efficient production and use of renewables at the house, district, or city level.
- **Smart energy distribution** systems: they will enable highly efficient and zero-emission buildings
- Respect for aesthetics and **architectural quality:** Renovation must respect design, craftsmanship, heritage, and public space conservation principles.

Intervention Areas[397]

Based on its analysis and public consultation, the Commission has identified the following areas of intervention and lead actions critical to enabling changes in the depth and scale of renovations.

1. Strengthening information, legal certainty, and incentives for renovation

The European Commission aims to incentivise both owners (public and private) and tenants to undertake renovations. It aims to:

- revise the Energy Efficiency Directive (EED) and the Energy Performance of Buildings Directives (EPBD) in 2021 with stronger obligations to have Energy Performance Certificates (EPC);
- implement a phased introduction of mandatory minimum energy performance standards for existing buildings;
- consider extending energy audit requirements to larger and more complex non-residential buildings such as hospitals, schools, or offices, to also maximise complementarity with EPCs;
- extend the requirements for building renovation to all levels of public administration. The impact assessments accompanying these revisions will consider the level, scope, and timing of these requirements.
- introduce Digital Building Logbooks that will integrate all building-related data provided by the upcoming Building Renovation Passports, Smart Readiness Indicators, Level(s), and EPCs;
- increase the annual renovation rate;
- consider making the European Building Stock Observatory a central European repository for reliable data on the building stock, its energy performance, and support with designing incentives.

Such measures will facilitate the linking of specific national, regional, and local incentives and support compliance with these minimum standards.

Energy performance certificates (EPC)

EPCs are an integral tool for the implementation of the Renovation Wave. EPCs and their availability in accessible databases can improve transparency at all levels.

- At the building level, EPCs may provide information about the share of renewables and energy costs.
- At the district, regional, national, or Union level, they are crucial for identifying the worst-performing buildings in urgent need of renovation.
- They can help connect financing with quality renovation.

Challenges

Currently, the coverage of EPCs is limited with a coverage rate below 10% in several Member States. Their quality and fair pricing remain an issue, eroding the trust in this tool. In its updates, the Commission will consider emerging energy performance metering technologies, including:

- using a uniform EU machine-readable data format for the certificates;
- more stringent provisions on the availability and accessibility of databases;
- federated digital repositories for EPCs.

2. Reinforced, accessible, and well-targeted funding

The European Commission estimates that to achieve the proposed 55% climate target by 2030, around EUR 275 billion of additional investments are needed per year in building renovation

EU and national public funds can be more effectively targeted and better channelled to the end-users by making it easier to blend various sources of financing, strengthen financial, technical, or project development assistance, and promote synergies with market-based mechanisms. It is envisaged that this would happen in the following ways.

- EU co-funded programmes can be complemented through additional support schemes, e.g. use funding from the European Agricultural Fund for Rural Development (EAFRD) for energy efficiency enhancement and renewable energy production in rural areas.
- InvestEU will act as a single EU-level investment support programme to provide technical assistance and financing backed by an EU budget guarantee to unlock private investments:
  - dedicated financial products for energy renovation of buildings will be used as part of InvestEU and will target the residential sector and focus on social and affordable housing, public buildings, schools, hospitals, SMEs, etc. It will also enable the linking of financial products with technical assistance;
  - Member States will be able to transfer part of the funding available under cohesion policy to the Member State compartment of InvestEU;
  - The simplified rules also make it possible to combine loans with grants and reward best-performing projects with a higher grant rate.
- As part of the European Initiative for Building Renovation, the European Investment Bank (EIB) will support the aggregation of building renovation project portfolios and the provision of tailored financial support in the form of long-term loans, guarantees, equity, or receivables financing:
  - The EC will work with the Member States, the EIB, and market participants to facilitate the implementation of rules on combining EU programmes and instruments, national funds, and private funds for renovation projects.
- State aid rules will be made clearer and easier-to-apply to building renovation in the residential and social sectors and the scope of State aid for renewable energy installations for self-consumption will be clarified:
  - As a first step, the Commission is revising State aid rules to facilitate co-financing of InvestEU guarantees by the Member States.
- Advise Member States on using revenues from the EU Emissions Trading System (ETS) and funding opportunities under the ETS Modernisation Fund to fund renovation in lower-income households.

EU funding driving investment for renovation

The 2021-2027 Multiannual Financial Framework and the recovery instrument NextGenerationEU provide an unprecedented opportunity to set off the Renovation Wave.

- The Recovery and Resilience Facility will have EUR 672.5 billion, 37% of which would be targeted to climate-related expenditure, so that this can support renovation investment and energy efficiency-related reforms across the Member States.

- In the Annual Sustainable Growth Strategy 2021, the Commission proposed the European flagship areas, Renovate and Power Up, for coordinated intervention by all Member States, based on projects included in their national Recovery and Resilience Plans.
- The Commission plans to complement the Guidance to the Member States on the preparation of Recovery and Resiliency Plans with tailor-made guidance to each Member State in the context of the individual assessment of National Energy and Climate Plans (NECPs) and Long-term Renovation Strategies.
- The existing Concerted Actions will be strengthened to help Member States exchange good practices and monitor implementation over time.
- Cohesion policy will remain the main source of public funding for renovation-related investments between 2021-2027. Member States need to ensure that their co-funded energy and resource efficiency programmes deliver high energy performance monitored via a robust indicator system.
- Member States are required to have submitted long-term Renovation Strategies to access Cohesion Funds from 2021 onwards.

Attracting private investment and stimulating green loan financing

- The EC considers private finance offered jointly with innovative renovation services to be an attractive business proposition:
  - actors like ESCOs, utilities, or banks can offer property owners support in terms of ideas and financing in all phases of a renovation process;
  - these can promote the aggregation of small projects, offer favourable conditions for complex projects with long payback times and unite the various stakeholders involved.
- Member States can reduce risk perception and scale up market incentives such as energy-saving tariffs, pay-per-performance public support schemes, and energy-saving tenders to attract private intermediaries and aggregators.
- Member States should explore innovative financing solutions through on-tax and on-bill schemes or property-linked finance and taxation tools to generate economic incentives to finance building renovation.
- Existing energy efficiency obligation schemes under the Energy Efficiency Directive can be used to engage new intermediaries like utilities, deliver technical expertise and offer aggregated services to reduce transaction and administrative costs.
- Involving ESCOs through public-private partnerships is a possibility to attract investment, pool small-scale and scattered investments, reduce upfront costs and reward energy savings. Coupling energy performance contracts with resilience contracting by insurers can help the market manage investment risk.
- Encourage the standardisation of contracts and financial instruments by using existing forums to help replicate best practices and innovative approaches. Activating private-sector investments through the Energy Efficiency Financial Institutions Group (EEFIG) and the Sustainable Energy Investment (SEI) Forums.

Green Loan Financing

The Renovation Wave can also be an opportunity to spur the development of green loans and mortgage financing.

- An upgraded system of EPCs demonstrating efficiency gains will allow banks and other financial institutions to offer credit and mortgage financing to green their portfolios and to pool buildings as collateral for the issuance of covered bonds:
  - several market-led initiatives are already piloting innovative schemes for energy efficiency loan and mortgage financing;
  - in the next step, whole life-cycle carbon can be included in this assessment and linked to financing for circular solutions.
- The EC is looking into additional standards and labels for sustainable financial products, such as green mortgages, green loans, and green bonds. These will help make sure energy and resource efficiency lending products are offered more widely and are more visible to consumers.
- The reviews of the Mortgage Credit Directive and the Consumer Credit Directive provide opportunities to consider lowering the credit risk of sustainable financial products.
- The European Banking Authority will analyse the feasibility of unique bank regulation for financial products associated with building renovations.
- The Commission is considering measures to incorporate environmental, social, and governance risks into prudential regulation in its reviews of the rules for banks (the Capital Requirements Regulation and Directive) and insurers (the Solvency II Directive).

- The EIB will consider supporting new ways of attracting private finance, such as unlocking new markets in energy-efficiency mortgage-based lending or securitisation.
- The Commission has developed the EU Taxonomy to direct private capital towards sustainable investments in energy renovation. This would include technical screening criteria for buildings and rely on Energy Performance Certificates and nearly zero-energy building standards.
- As part of the EPBD revision, the Commission will consider introducing a "deep renovation" standard for specific measurable "green" investments.

3. Increasing capacity and technical assistance

Technical assistance plays a key role in higher rates and quality of renovation.

- Based on lessons learnt from the EU's ELENA facility, Private Financing for Energy Efficiency (PF4EE), cohesion policy, the JASPERS programme, and the Horizon 2020 Project Development Assistance (PDA) facility, the Commission will simplify and reinforce technical assistance in order to reach more beneficiaries including those of a smaller size.
  - Strengthened financing has been proposed for the ELENA (European Local Energy Assistance) facility, to come from the InvestEU advisory hub and possibly from other European programmes.
  - The EU and the EIB will help Member States design national or local programmes replicating the ELENA model and reward fast implementation and high energy performance using three financing streams: cohesion policy funds (as stand-alone support or as part of a financial instrument operation), the Member State compartment of InvestEU, or the Recovery and Resilience Facility.
- The EC and EIB will set up standardised one-stop shops to deliver tailored advice and financing solutions for homeowners or SMEs. Other local stakeholders can also build on this and create unique competence centres related to sustainable renovation topics.
- Capacity support will be offered by the Technical Support Instrument of the Recovery Plan, the EU City Facility and the Project Development Assistance Facility under LIFE, and through the administrative capacity building and technical assistance support under the post-2020 cohesion policy funds.
- There is provision in cohesion policy for a European Urban Initiative to strengthen an integrated and participatory approach to sustainable urban development. The European Smart Cities Marketplace also offers a blueprint to guide public authorities in building renovation.

4. Creating green jobs, upskilling workers, and attracting new talent

The EC aims to increase the capacity to prepare and implement building renovation projects. It plans to scale up technical assistance through the Resilience and Recovery Fund and strengthen ELENA.

The potential for job retention and creation in this sector has been and remains large. Energy efficiency in buildings is the largest generator of jobs per million euros invested. Some measures that can accelerate the process of job creation in the sector are listed below.

- **Transforming existing jobs** to include green and circular skills: creation of new job profiles such as specialists in deep building renovation, installers for advanced technological solutions, or Building Information Modelling managers.
- **Provide training to professionals** to improve accessibility to renovation: the Commission has launched the Pact for Skills bringing together private and public stakeholders with the shared objective of reskilling Europe's workforce. The Commission encourages Member States to make use of the NextGenerationEU funds, the European Social Fund+ and the Just Transition Fund:
  - SMEs can be given better access to training and apprenticeship programmes. Social partners have solid expertise in upskilling workers, attracting new talent, and promoting an inclusive working environment and should be involved in the design and implementation of measures to achieve these goals;
  - The Commission's Youth Employment Support package of 1 July 2020 announced a renewed European Alliance for Apprenticeships;
  - The Build Up Skills initiative under the LIFE programme can help undertake gap analysis and build National Roadmaps for training;
  - The EC is expected to develop training material on the use of Level(s) in 2021.
- **Policies can shape demand for jobs** that cater to innovative and sustainable solutions. For example, the bioeconomy can provide new low-carbon materials for deep renovation, increasing new specialist job opportunities.

- **Increasing the presence and role of women** in the construction sector can help improve the availability of skills and qualified professionals. Revising vocational and educational training strategies by involving industry, creating an inclusive and accessible working environment, and overcoming prejudices is key.
- Complying with **legal requirements** for worker protection, especially with regards to renovating old buildings from exposure to asbestos.

5. Sustainable built environment

Delivering the depth and volume of the Renovation Wave in Europe requires a strong and competitive construction sector with innovation and sustainability at the forefront. Only this can increase quality and reduce costs. The EC plans on building the sector up in the following ways:

- uptake of industrialised technological solutions to limit the cost and duration of works, spur digitalisation, and full integration of circularity principles across the value chain: sourcing safe, sustainable, and secondary raw materials, reuse and recycling, and waste management;
- triggering higher demand for deeper renovation and falling costs for smarter and more sustainable products;
- promoting sustainable building solutions and materials such as wood and bio-based materials, nature-based solutions, and recycled materials based on a comprehensive life-cycle assessment approach;
- addressing the project sustainability basis, the revised Construction Products Regulation and by 2023, developing a roadmap to 2050 for reducing whole life-cycle carbon emissions in buildings:
  - accelerate work with standardisation organisations on climate resilience standards for buildings;
  - review the material recovery targets set in EU legislation for construction and demolition waste by the end of 2024;
  - put in place measures to increase reuse and recycling platforms and support a well-functioning internal market for secondary raw materials;
- supporting digitalisation in the construction sector through Horizon Europe, Digital Innovation Hubs, and Testing and Experimentation Facilities;
- using digital tools to help record the progression, track materials, and increase productivity. For example, a digital twin of a building, enabled by 3D mapping data, provides information on how the building is performing in real-time and prevents serious accidents by helping predict potential failures in building systems;
- setting up a governance framework to develop allocated energy, manufacturing, and construction data spaces;
- promoting Building Information Modelling (BIM) in public procurement for construction and providing a methodology to public clients to conduct a cost-benefit analysis for the use of BIM in public tenders;
- In addition, the Clean Energy Transition sub-programme under the LIFE programme will address behavioural and non-technological barriers to renovation.

6. Adopting an integrated, participatory, and neighbourhood-based approach

Fully reaping the Renovation Wave potential in terms of co-benefits requires an integrated approach that has already been successfully piloted. The steps the EC plans to take include:

- creation of “smart” homes, which lead to integration of renewable and surplus energy in buildings;
  - for example, in some pilot projects, apartment buildings were equipped with photovoltaic solar panels on the roofs, thermal storage and heat pumps;
  - each building was connected to a local grid, which fed charging points for electric cars;
  - the application of smart meters helped match power supply and demand in the most efficient way;
  - this renovation example combined energy storage and demand-side flexibility with renewability, IoT, recharging points for e-mobility etc.;
- deploy over 1 million public charging stations by 2025 and charging points for e-mobility through full implementation of the EPBD measures;
- implement the EU Smart Readiness Indicator;
- remove regulatory and administrative barriers faced by renewable products in the market and facilitate mutual recognition of national certification and insurance schemes for renovation and energy efficiency specialists;
- promote the synergies for renovation that become evident when scaled up to approaches. Aggregating projects at district and community level so that they lead to zero-energy or positive energy districts. These offer system efficiencies and affordability;
- implement the Electricity Market Directive and the Renewable Energy Directive across the Member States;

- finance investments in a local context as part of the territorial instruments within the European Regional Development Fund (ERDF) and the European Agricultural Fund for Rural Development (EAFRD): Integrated Territorial Investments (ITI's), Community-Led Local Development (CLLD), and LEADER;
- city commitments to building renovation pledges could feed into Long-Term Renovation Strategies and result in aggregated green procurement to which mayors commit under the Covenant. The Big Buyers for Climate and Environment[398] project further fosters collaboration between big public buyers towards the piloting of new clean technologies;
- engage stakeholders through the Climate Pact and the High-Level Forum on Construction with supportive actions.

7. Tackling energy poverty and worst-performing buildings

The EC intends to use renovation as a lever to address energy poverty and access to healthy housing for households. Each year, 800 000 social homes need renovation, requiring an estimated EUR 57 billion of additional funding per year. Additionally, Member States are required to identify dwellings of people at risk of energy poverty and develop effective strategies for renovating these as a matter of priority, in accordance with the Clean Energy for all Europeans Package[399]. The EC intends to tackle energy poverty in the following ways:

- launch an Affordable Housing Initiative for 100 lighthouse projects;
- examine whether and how the EU budget resources alongside EU Emissions Trading System (EU ETS) revenues could be used to fund national energy efficiency and savings schemes targeting lower-income population;
- with nearly 34 million Europeans unable to afford to keep their home warm enough, tackling energy poverty is an urgent task for the EU and its Member States;
- expand the use of ESCOs and energy performance contracts through the upcoming revision of the EED to make renovation affordable for all households, including low-income ones.

The EU Building Stock Observatory, the EU Energy Poverty Observatory, the Horizon Europe Mission on Climate-neutral and Smart Cities, and the EU Covenant of Mayors Office can further assist Member States in taking stock and identifying segments in need, and in linking renovation strategies to social indicators and policies to address energy poverty. The potential of efficiency purchase agreements based on actual savings achieved can also be piloted.

Financing solutions for low-income households

The EC aims to assist the Member States in developing targeted financial solutions for lower-income households, together with easier access to essential services, energy audits, and energy performance certificates. The specific provisions to enable financing options are:

- use of grant-subsidised renovation measures, or the use of energy savings for repayment (limiting upfront investment to available grants);
- micro-credits backed by a guarantee fund to promote fair cost-sharing between owners and tenants, on-bill financing schemes, and on-tax financing schemes;
- offering blended loans and guarantees from public and private sources through one-stop shops.

Further, Member States are expected to shield vulnerable households from rent increases that may follow renovations.

8. Public buildings and social infrastructure showing the way

Public and privately-owned social infrastructure, public administrative buildings, social housing, cultural institutions, schools, hospitals, and healthcare facilities can spearhead the Renovation Wave, serving as a role model and reference point for the industrialisation of construction and the co-benefits that become immediately visible to the public. The Commission will:

- Issue guidance on the Energy Efficiency First principle in 2021 to enable a cost-benefit analysis of investments that can be applied in public procurement;
- propose extension of the scope of the renovation requirements to all levels of public administration and increase the annual renovation obligation (as part of the EED) by June 2021;
- propose extension of the scope of the renovation requirements in conjunction with the phased introduction of minimum energy performance standards in the context of the revision of the EPBD by the end of 2021;
- develop comprehensive guidance on sustainable public investments through procurement;

[398] *Big Buyers for Climate and Environment*

[399] https://ec.europa.eu/energy/topics/energy-strategy/clean-energy-all-europeans_en

- develop green public procurement criteria for public buildings such as office buildings and schools related to lifecycle and climate resilience and based on Level(s);
- Issue indicative milestones for the renovation of public and private service buildings for 2030 and 2040 with a view to decarbonising the building stock by 2050.

9. Decarbonising heating and cooling

Promoting the decarbonisation of heating and cooling, which is responsible for 80% of the energy consumed in residential buildings, in the following ways:

- through the June 2021 revision, the Renewable Energy Directive will consider strengthening the existing renewable heating and cooling target and introducing a requirement to use minimum levels of renewables in buildings;
- revision of the EU ETS, and the application and further development of eco-design and labelling measures, as well as support to district approaches. The revisions include:
    - measures to promote advanced heating and cooling, including highly efficient low-temperature renewable and waste heat and cold technologies;
    - development of local and regional heating and cooling plans;
    - provisions to address the barrier of high upfront capital investment;
    - provisions to promote the use of decarbonised gases to create local synergies with municipal and agricultural waste recycling and industrial sectors.
- revision of the Eco-design Framework Directive and the product-specific eco-design and energy labelling acts to promote and increase awareness of efficient products as well as steer financial incentives towards the highest performing.

Partnerships[400]

To achieve the objectives of the Renovation Wave, the EC is fostering a number of partnerships.

1. Horizon Europe
    - support for research and innovation on energy technologies, circularity of materials, and systems for construction;
    - initiation of a Public-Private Partnership on People-centric Sustainable Built Environment (Built4People);
    - a dedicated Mission on Climate-Neutral and Smart Cities;
    - delivering innovation to the buildings and construction industry and showcasing 100 European cities in their systemic transformation towards climate neutrality by 2030;
    - inclusion of an area dedicated to “Energy and resource-efficient buildings” in the European Green Deal Call, part of Horizon 2020.
2. The Clean Energy Transition Co-Funded Partnership can contribute to developing climate-neutral solutions for heating and cooling systems in buildings.
3. The Clean Energy Transition sub-programme under LIFE will support the Renovation Wave by addressing behavioural and non-technological barriers to renovation.
4. Regional programmes and the new LIFE programme.

Apart from these, social enterprises too are important partners in tackling energy poverty through socially innovative solutions, including through awareness campaigns, retraining of unemployed people, and they should be fully involved in the Renovation Wave.

Recommendations of the BPIE (Buildings Performance Institute Europe)[401]

The Buildings Performance Institute Europe is an independent think tank based in Europe, which specialises in the energy performance of buildings.

According to an analysis of the Renovation Wave by the BPIE (Buildings Performance Institute Europe) released in May 2021, the current provisions are not in line with the bloc’s objective of reaching climate neutrality by 2050[402]. It highlights the need to correct its design during the implementation phase, to align measures with the EU climate-neutrality ambition, ensure their coherence and adjust the sequencing.

It urges the EC to:

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[400] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1603122220757&uri=CELEX:52020DC0662

[401] https://www.bpie.eu/wp-content/uploads/2021/04/BPIE_Renovation-Wave-Analysis_052021_Final.pdf

[402] https://www.euractiv.com/section/energy-environment/news/eus-building-renovation-wave-hits-administrative-snag/

- intensify political coordination and coherence in the implementation phase of the Renovation Wave strategy;
- ensure that the Renovation Wave's ambition leads to an annual deep renovation rate rising from **0.2% to 3%** to achieve the **60% GHG emissions reductions** of buildings. This represents a fifteen-fold effort compared to current levels;
- clarify in the implementation phase of the Renovation Wave what is meant by resilience and adaptation in the buildings sector and better coordinate with climate adaptation strategy;
- aim at a comprehensive EPBD revision, outlining how it will address possible interactions and interdependencies between different policy measures, and between different strategic planning tools;
- outline in greater detail when certain actions will begin to take effect and the importance of their impact;
- revisit the incremental and disaggregated approach adopted for the legislative developments in some policy areas.

Conclusion

As per industry leaders and think tanks, the Renovation Wave is a welcome announcement[403] for legally binding minimum energy performance standards in 2021.

Initially, the Renovation Wave strategy had been much anticipated by social and environmental groups, offering a potential 'win-win-win' opportunity to tackle climate change, poverty rates and to pioneer sustainable jobs for economic recovery. However, under current plans, the Renovation Wave will not be able to achieve the desired progress in reducing energy poverty. It might also not be fast enough in making all Europe's buildings zero carbon in line with the Paris agreement.

However, the success of the Renovation Wave will be dependent on how the Commission addresses the loopholes and comments by organisations and stakeholders within the field and fortifies the action plan to ensure maximum participation and achievement of all the climate goals which have been committed to.

[403] *https://friendsoftheearth.eu/press-release/eu-renovation-wave-right-direction-wrong-speed-for-emissions-and-energy-poverty/*

Annex C - Abbreviations

Abbreviations	Full forms
10YFP	10-Year Framework of Programmes on Sustainable Consumption and Production Patterns
AC	Award Criteria
AF	Adaptation Fund
AI	Artificial Intelligence
AMI	Advanced Metering Initiative
AMR	Antimicrobial Resistance
ATM	Air Traffic Management
BAT	Best Available Technologies
BIM	Building Information Modelling
BPIE	Buildings Performance Institute Europe
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
BS	British Standard
CAP	Common Agricultural Policy
CBIT	Capacity-building Initiative for Transparency
CDP	Carbon Disclosure Project
CF SEDSS	Consultation Forum for Sustainable Energy in the Defence and Security Sector
ChM	Change Management
CLLD	Community-Led Local Development
CO^2	Carbon Dioxide
COP	Conference of the Parties to the UNFCCC
CPC	Contract Performance Clauses
CPI	City Prosperity Initiative
CSE	Collaborative and Sharing Economy
CSO	Chief Sustainability Officer
CSR	Corporate Social Responsibility
CSRD	Corporate Sustainability Reporting Directive
CTCN	Climate Technology Centre and Network
D&E	Dissemination and Exploitation
DCS	Data Collection System
DE	Diesel Engine
DFI	Development Finance Institution
DG	Directorate-General
DG CLIMA	Directorate-General for Climate Action (European Commission)
DG ENV	Directorate-General for Environment (European Commission)
DGNB	German Sustainable Building Council
DHS	Department of Homeland Security
DRR	Disaster Risk Reduction
DSDG	Division for Sustainable Development Goals
DTU	Danish Technical University
E-DCAS	Energy Defence Data Collection, Analysis & Sharing

Abbreviations	Full forms
EAFRD	European Agricultural Fund for Rural Development
EAP	Environmental Action Programme
EBCG	European Border and Coast Guard Agency
EC	European Commission
ECB	European Central Bank
ECEEE	European Council for an Energy Efficient Economy
ECHA	European Chemicals Agency
EDA	European Defence Agency
EDF	Environmental Defense Fund
EDMS	Energy Data Management System
EEA	European Economic Area
EEA	European Environment Agency
EED	Energy Efficiency Directive
EEFIG	Energy Efficiency Financial Institutions Group
EFSD+	European Fund for Sustainable Development Plus
EGR	Exhaust Gas Recirculation
EIB	European Investment Bank
EIC	European Innovation Council
eID	Electronic Identification
EIE	European Innovation Ecosystems
EIOPA	European Insurance and Occupational Pensions Authority
EIP-SCC	European Innovation Partnership on Smart Cities and Communities
EIT	European Institute of Innovation and Technology
ELENA	European Local Energy Assistance
EMAS	Eco-Management and Audit Scheme
EMODNet	European Marine Observation and Data Network
EMS	Environmental Management System
ENE	Energy and Environment Programme
ENVI	Committee on Environment, Public Health and Food Safety
EOSC	European Open Science Cloud
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Contracting
EPC	Energy Performance Certificate
ERA	European Research Area
ERC	European Research Council
ERDF	European Regional Development Fund
ERTMS	European Rail Traffic Management System
ESCO	Energy Service Companies
ESF+/ESIF+	European Social Fund Plus
ESG	Environmental, Social, Governance
ETF	Enhanced Transparency Framework
ETS	EU Emissions Trading System
EU	European Union

Abbreviations	Full forms
EUEB	European Union Ecolabelling Board
EUI	European Urban Initiative
EUR	Euro
EUROSUR	European Border Surveillance System
EV	Electric Vehicle
FLO	Fairtrade Labelling Organisation International
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEI	Global Energy Interconnection
GEN	Global Ecolabelling Network
GHG	Greenhouse Gas
GNI	Gross National Income
GPP	Green Public Procurement
GRI	Global Reporting Initiative
GST	Global Stocktake
GT	Gross Tonnage
GWP	Global Warming Potential
GWT	Global Water Tool
HR	Human Resources
HSAM	Homeland Security Acquisition Manual
HVAC	Heating, Ventilation and Air Conditioning
HVO100	100% Hydrotreated Vegetable Oil Biodiesel
IAEG-SDGs	Inter-Agency and Expert Group on SDG Indicators
ICC	Intelligent Cities Challenge
ICT	Information and Computer Technology
IEA	International Energy Agency
IFI	International Financial Institution
IFTF	Institute for the Future
IMF	International Monetary Fund
IMO	International Maritime Organization
INDC	Intended Nationally Determined Contributions
INEGI	Instituto Nacional de Estadistica, Geografia e Informática
INESC TEC	Institute for Systems and Computer Engineering, Technology and Science
IoT	Internet of Things
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IPIECA	International Petroleum Industry Environmental Conservation Association
ISAE 3000	International Standard on Assurance Engagements 3000
ISO	International Organisation for Standardization
IT	Information Technology
ITI	Integrated Territorial Investments
IUCN	International Union for Conservation of Nature

Abbreviations	Full forms
JRC	Joint Research Centre
JTF	Just Transition Fund
JTM	Just Transition Mechanism
KETs	Key Enabling Technologies
KPI	Key Performance Indicator
KSO	Key Strategic Orientation
KW	Kilowatt
KWh	Kilowatt-Hour
LCA	Life Cycle Assessment
LCC	Life Cycle Costing
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LED	Light Emitting Diode
LIFE	L'Instrument Financier pour l'Environnement
LNG	Liquefied Natural Gas
LT-LEDS	Low greenhouse gas emission development strategies
LWT	Local Water Tool
MAPS	Methodology for Assessing Procurement Systems
MDB	Multilateral Development Bank
MDGs	Millennium Development Goal
MFF	Multiannual Financial Framework
MGO	Marine Gas Oil
MoI	Ministry of Interior
MPTF Office	Multi-Partner Trust Fund Office
MRV	Monitoring, Reporting and Verification
MSCA	Marie Skłodowska-Curie Actions
NDC	Nationally Determined Contribution
NEB	New European Bauhaus
NECP	National Energy and Climate Plan
NGEU	Next Generation Europe
NGO	Non-Governmental Organisation
NOx	Nitrogen oxides
NPF	National Policy Framework
OECD	Organisation for Economic Co-operation and Development
OPS	On-shore Power Supply
ODA	Official Development Assistance
PCCB	Paris Committee on Capacity-building
PEF	Product Environmental Footprint
PEF	Primary Energy Factor
PEFC	Programme for the Endorsement of Forest Certification
PESETA	Projection of Economic impact of climate change in Sectors of the European Union based on bottom-up Analysis
PVC	Polyvinyl Chloride

Abbreviations	Full forms
PET	Polyethylene Terephthalate
Q&A	Questions and Answers
R&D	Research and Development
R&I	Research and Innovation
RA	Rainforest Alliance
REACT-EU	Recovery Assistance for Cohesion and the Territories of Europe
RRF	Recovery and Resilience Facility
SAF	Sustainable Aviation Fuels
SBTi	Science-Based Targets Initiative
SC	Selection Criteria
SCCF	Special Climate Change Fund
SCG	Swedish Coast Guard
SCP	Sustainable Consumption and Production
SCR	Selective Catalytic Reduction
SCS	Supply Chain Sustainability
SDGs	Sustainable Development Goals
SDS	Sustainable Development Strategy
SEE	Shore-side Electricity
SEI	Sustainable Energy Investment
SEP	Sustainability and Environmental Programs
SES	Single European Sky
SIDS	Small Island Developing States
SMART	Specific, Measurable, Achievable, Realistic, Time-bound
SME	Small and Medium-Sized Enterprise
SOP	Standard Operating Procedure
SOx	Sulphur Oxides
SRD	Sectoral Reference Document
SRI	Smart Readiness Indicator
SSRI	Strengthened Security Research and Innovation
SUV	Sports Utility Vehicle
TAP	Technology Action Plan
TCFD	Task Force on Climate-related Financial Disclosures
TEC	Technology Executive Committee
TFEU	Treaty on the Functioning of the European Union
TEN-E	Trans-European Networks for Energy
TEN-T	Trans-European Transport Network
TNA	Technology Needs Assessment
TS	Technical Specifications
TSO	Transmission System Operators
TYNDP	10-Year Network Development Plans
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNCT	UN Country Team

Abbreviations	Full forms
UNDESA	United Nations Department of Economic and Social Affairs
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
UWE	University of the West of England
VOC	Volatile Organic Compounds
VUCA	Volatility, Uncertainty, Complexity, and Ambiguity
WBCSD	World Business Council for Sustainable Development
WFO	World Fairtrade Organisation
World GBC	World Green Building Council
WRI	World Resources Institute
WWF	World Wildlife Fund

Annex D - References

Regulatory Framework

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