



CrossEU

D4.1 - Effectiveness of the existing mitigation and adaptation policies

(Version 1)

WP4 - Task 4.1
March 2025



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Authors:

Alice Ludvig, Katharina de Melo (BOKU); Aleš Urban (CZU); Shreya Some, Kirsten Halnæs (DTU); Charlotte Burnod (LGI); Andrea Declich, Federico L. Marta, Gabriele Quinti (K&I); Vladut Falcescu (MeteoRo); Nico Caltabiano, Jon Cox (WMO)



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Contributing Partner(s)/Authors	BOKU: Alice Ludvig, Katharina De Melo CZU: Aleš Urban DTU: Shreya Some, Kirsten Halnæs LGI: Charlotte Burnod K&I: Andrea Declich, Federico L. Marta, Gabriele Quinti MeteoRo: Vladut Falcescu WMO: Jon Cox, Nico Caltabiano, Latifa Yousef
Reviewed by	Angela Cristina Plescan, Dana Micu and Laurentiu Ciuhu (MeteoRo); Olivier Bothe (HEREON); Fabio Feudo (K&I)
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Executive Summary

The “D4.1 - Effectiveness of the existing mitigation and adaptation policies (Version 1)” is submitted in the framework of WP4 and reports on the work done in the framework of Task 4.1 (T4.1) “Analysing mitigation and adaptation measures in relevant EU and national policies”. It includes the first results of the work carried out in this task and will be complemented with the work to be implemented in the next months which will be contained in the Deliverable D4.2. T4.1 of WP4 entailed so far, an analysis of the policy and institutional frameworks and instruments related to Mitigation and Adaptation (M&A) to Climate Change at the International, EU, and national levels. Specifically, the analysis focused on the stated goals, timeframes, cross-sectoral and scale interlinkages, and synergies and contradictions between sectoral-driven policies.

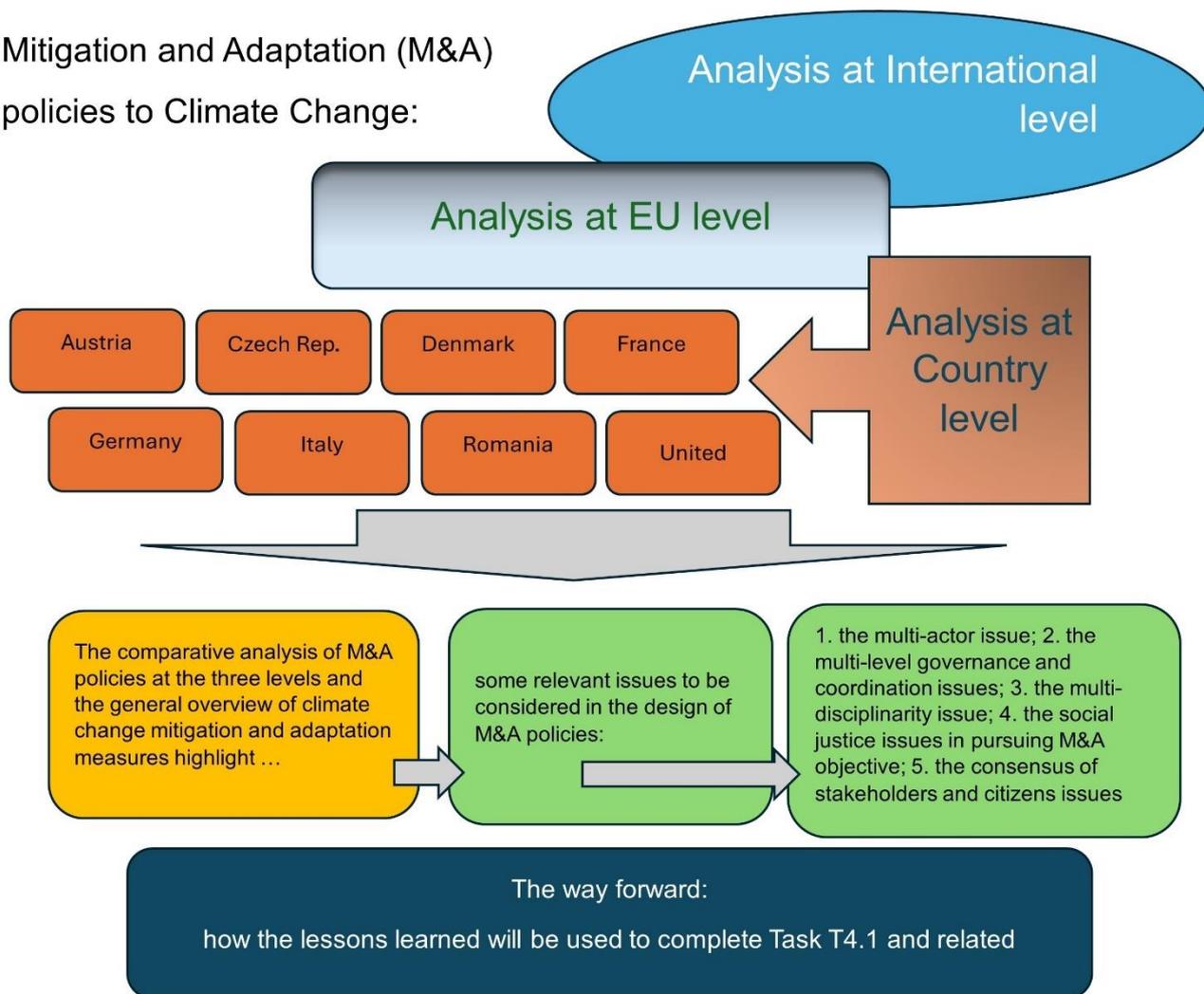
D4.1. is divided into three parts. The first part contains an Introduction - the first chapter - dedicated to the basic information about the CROSSEU project, the WP4, and T4.1. Then, it is followed by other three chapters (from 2 to 4), which present respectively the thematic, theoretical, and methodological frameworks of the analysis carried out so far.

The second part is dedicated to the substantive analysis of M&A policies at the international and EU levels and in eight European countries relevant to CROSSEU (i.e. where the project’s partners come from). They are Austria, Czech Republic, Denmark, France, Germany, Italy, Romania, and the United Kingdom.

The third part of D4.1 is devoted to a comparative and cumulative analysis of the findings of the previous part (chapter 15) followed (in chapter 16). by a presentation of the way forward (i.e., how the implementation of the task is progressing toward its final results). Chapter 15 contains a comparative analysis of the various M&A policies of the selected countries and provides a general overview of what is being done to mitigate and adapt to climate change. The focus is on the main pillars of the two broad domains (Mitigation and Adaptation) of Climate change policies in the eight countries, mainly considering the relevant sectors, through a general description of the related goals, actions and measures. In this overall analysis, an aspect that has received some attention is the overlapping, and sometimes conflicting, between mitigation and adaptation policies. The overall analysis made it possible to provide some suggestions for a further reflection on M&A policies. In particular, the following insights were acquired: the “Diffuse character” of M&A policies (they are implemented by a wide array of actors and their main result is the behavioural change of a large number of actors whose decisions are decentralized, e.g., families that change some consumption routines); the issue of Multilevel governance and coordination (the involvement of policy actors belonging to various government levels – national, regional, local and the need of coordination among them); Multidisciplinary (These policies require interventions whose components are very diverse); Social impacts of M&A policies (putting social justice in M&A policies raises the issue of how handling appropriately the social dimension of transition); Public awareness and exchange with the public (consensus of stakeholders and citizens is crucial and is based on the awareness of climate change challenges), Scientific approach to M&A (M&A policies are crucially connected to the

advancement of scientific knowledge, which is relevant also in the implementation), Improved timeframe and coordination (temporal dimension is a crucial aspect of M&A policies because of the delay of the impacts on climate; this is an aspect of the complexity of these policies that requires a strong coordination among the involved actors). The last chapter, “the way forward”, presents how the insights gained through the analysis of the M&A policies will be used for the finalization of the activities foreseen in the T4.1 and of the related deliverable 4.2.

Mitigation and Adaptation (M&A) policies to Climate Change:



Keywords

Mitigation; Adaptation; Governance framework; Policy assessment; Climate policies; Climate change.

Abbreviations and acronyms

Acronym	Description
AAP	Adaptation Action Plan
AOPK	Nature Conservation and Landscape Protection of Czechia
AST	Adaptation Support Tool
BEK 2030	Berlin Energy and Climate Protection Program 2030
BMK	Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation, and Technology
CAM	Minimum Environmental Criteria (Italy)
CBD	Conference on Biological Diversity
CC	Climate Change
CCA	Climate Change Adaptation
CCA	Climate Change Act (UK)
CCC	Citizen's Convention for Climate (France)
CCC	Committee on Climate Change (UK)
CCHs	Climate Change Hotspots
CCP	Climate Change policy (UK)
CCRA	UK Climate Change Risk Assessment
CCS	Carbon Capture and Storage
CENIA	Czech Environmental Information Agency
CHMI	Czech Hydrometeorological Institute
CITE	Interministerial Committee for Ecological Transition (Italy)
CoP	Conference of Parties
CoR	European Committee of the Regions
CPP	Climate Protection Policy
CRA	Climate Risk Assessment
CROSSEU	Cross-sectoral Framework for Socio-Economic Resilience to Climate Change and Extreme Events in Europe
CSOs	Civil Society Organisations
CZECHGLOBE	Global Change Research Institute (Czechia)
C40	Covenant of Mayors
DAS	Germany's strategic approach to adapting to climate change
DEFRA	Department for Environment and Rural Affairs (UK)
DESNZ	Department for Energy Security and Net Zero (UK)
DG	Directorate General
DKK	Danish crowns
DRR	Disaster Risk Reduction
DRS	Deposit Return System
DSD	Department for Sustainable Development (Romania)
DSS	Decision Support System
EC	European Commission
ECB	European Central Bank
ECMWF	European Centre for Medium-Range Weather Forecasts
EEA	European Environment Agency

Acronym	Description
EED	Energy Efficiency Directive
EESC	European Economic and Social Committee
EFA	Environmental Fund Administration (Romania)
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EIOPA	European Insurance and Occupational Pensions Authority
EGD	European Green Deal
EMODnet	European Marine Observation and Data Network
EPG	Energy Policy Group
ESA	European Space Agency
ESF+	European Social Fund Plus
ESG	Environmental, Social, and Governance
ETS	Emissions Trading Scheme
EU	European Union
EU ETS	European Union Emissions Trading System
EVs	electric vehicles
FAO	Food and Agriculture Organisation of the United Nations
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GSG	General Secretariat of the Government (Romania)
G3W	Global Greenhouse Gas Watch
HCC	High Council for Climate
ICCC	Interministerial Committee on Climate Change (Romania)
IFAD	International Fund for Agricultural Development
IKI	International Climate Initiative
IMAA	Interministerial Working Group on Adaptation to Climate Change (Germany)
INTRA	Directorate General for International Partnership
IPCC	Intergovernmental Panel on Climate Change
ISPRA	Higher Institute for Environmental Protection and Research (Italy)
ISTAT	National Statistical Institute (Italy)
ITU	International Telecommunications Union
KAnG	Climate Adaptation Law (Germany)
KLAR!	Climate Change Adaptation Model Regions (Austria)
KMGBF	Kunming-Montreal Global Biodiversity Framework
KWAN	Network of Innovative Climate Change Adaptation for Practitioners at Regional Level (Austria)
LANUV	State Agency for Nature, Environment and Consumer Protection (Germany)
LDCs	Least Developed Countries
LDN	Land Degradation Neutrality
LTS	Long-Term Strategy
LULUCF	Land use, land-use change, and forestry
M&A	Mitigation & Adaptation
MASE	Ministry of the Environment and Energy Security (Italy)

Acronym	Description
MEWF	Ministry of Environment, Waters, and Forests (Romania)
MPO	Ministry of Industry and Trade (Czechia)
MZP	Ministry of the Environment (Czechia)
NAEK	National report on The Energy and Climate Plan (Austria)
NAPs	National Adaptation Plans
NAS	National Adaptation Strategy
NASA	National Aeronautics and Space Administration (United States)
NBSAP	National Biodiversity Strategies and Action Plan
NbS	Nature-based Solution
NDCs	Nationally Determined Contributions
NECPs	National Energy and Climate Plans
NEP	National Energy Policy
NICCAP	Northern Ireland Climate Change Adaptation Programme
NKU	Supreme Audit Office (Czechia)
NGOs	Non-Governmental Organizations
NLTS	Italian Long-Term Strategy
NRRP	National Recovery and Resilience Plan (Romania)
NRW	North Rhine-Westphalia
NSACC	National Climate Change Adaptation Strategy 2030, with a perspective towards 2050 (Romania)
NSSD	National Strategy for Sustainable Development (Romania)
NUTS	Nomenclature of Territorial Units for Statistics
NZEB	Nearly Zero-Energy Building
OECD	Organisation for Economic Co-operation and Development
ONERC	National Observatory on the Effects of Climate Change (France)
OPE	Operational Programme Environment (Czechia)
PCAET	Territorial Climate-Air-Energy Plans (France)
PNACC	National Climate Change Adaptation Plans (France, Italy)
PNCIA	National Air Pollution Control Program (Italy)
PNIEC	National Integrated Energy and Climate Plan (France, Italy)
PNRR	National Recovery and Resilience Plan (Italy)
PPE	Multiannual Energy Program (France)
PTE	Ecological Transition Plan (Italy)
RED	Renewable Energy Directive
RJTP	Regional Just Transition Plan
RO-ADAPT	National Adaptation Platform (Romania)
SAF	Sustainable Aviation Fuel Bill (UK)
SEP 2030	State Environmental Policy (Czechia)
SFZP	State Environmental Fund (Czechia)
SIDS	Small Island Developing States
SNBC	National Low-Carbon Strategy (France)
SNEC	National Strategy for Circular Economy (Romania)
STL	Storylines



Acronym	Description
SDGs	Sustainable Development goals
SRCAE	Regional Climate-Air-Energy Schemes (France)
TEC	total energy consumption
TFCRFD	Task Force on Climate-Related Financial Disclosures
UFZ	Leipzig Environmental Research Centre
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCCD	United Nations Convention to Combat Desertification
UNCOP	United Nations Conference of Parties
UNDDR	United Nations Office for Disaster Risk Reduction
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
UNFCCC	United Nations Framework Convention on Climate Change
UNOPS	United Nations Office for Project Services
WFP	World Food Program
WMO	World Meteorological Organisation
WP	Work Package
WWF	Worldwide Fund for Nature



PART One – Introductory frameworks

This first section of the document includes the ‘coordinates’ within which it was developed: the CROSSEU project; the background, including the historical context within which climate policies (adaptation and mitigation) came onto the agenda; the theoretical framework and its methodological tools.

1. INSTITUTIONAL FRAMEWORK

The objective of the CROSSEU project is to equip stakeholders with the necessary tools and insights to assess risks arising from climate hazards and make well-informed decisions in order to adapt to those risks and reduce their impacts on different socio-economic sectors. Deliverable D1.1 on the CROSSEU methodology developed the requirements and expertise from multiple sectors converging to present the socio-economic risks of climate change, giving an overview of the co-design and development process as illustrated in Figure 1.

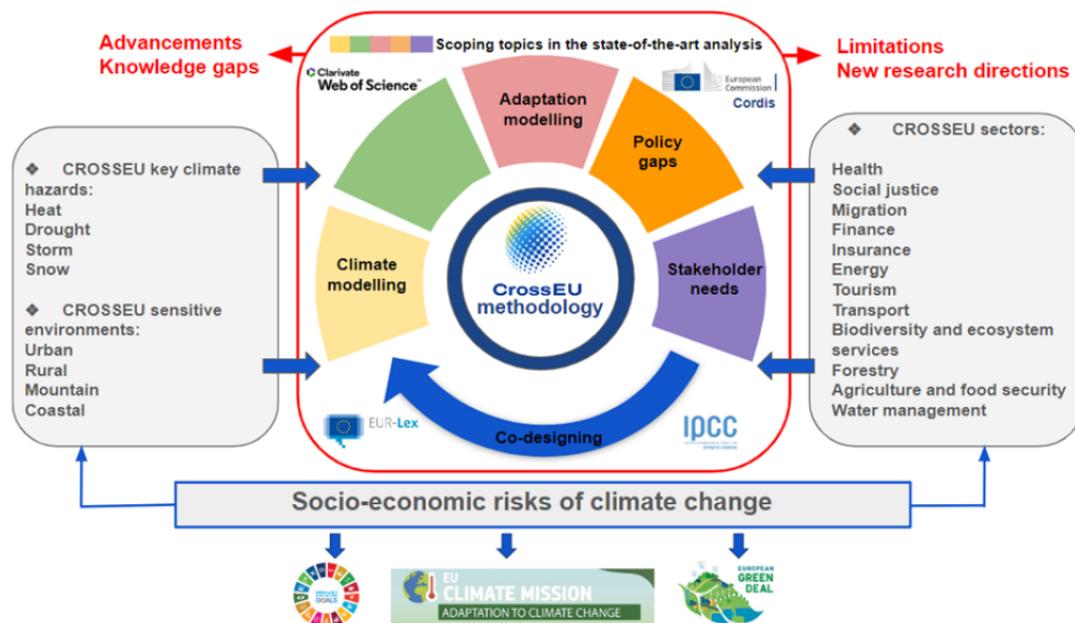


Figure 1 – Scoping analysis for the co-design and development of the CROSSEU methodology

Within CROSSEU, researchers need to collaborate and share data, knowledge and expertise. In this framework, Work Package 4 (WP4) is intended to facilitate climate policy responses, including M&A, and to enhance the integration of CC risks in decision-making and investments both in public and private sectors. WP4 includes five tasks aimed, respectively, at:

- (i) Conducting a systematic and comprehensive analysis of the mitigation and adaptation measures in EU and national policy framework (T4.1)
- (ii) Analysing climate change impacts and sectoral policy responses relevant for the STLs and CCHs addressed in regional and local in-depth case studies (T4.2)
- (iii) Analysing social aspects and consequences of M&A measures in relevant EU, national and sectoral policies (T4.3)
- (iv) Analysing climate change related economic and finance policies to mitigate the analysed risk storylines (T4.4), and
- (v) Deriving knowledge-based recommendations for ambitious climate policy response in support of M&A (T4.5).

The present Deliverable (D4.1) is the first one submitted in WP4 and is referring to T4.1 “Analysing mitigation and adaptation measures in relevant EU and national policies”. It includes the first results of the work carried out in this task and will be complemented with the work to be implemented in the next months which will be contained in the Deliverable D4.2 (planned for M24).

T4.1 already entailed a systematic and as far as possible, comprehensive analysis of the policy and institutional framework and instruments related to Mitigation and Adaptation (M&A) to Climate Change at EU and national levels (considering also the international level, as a reference framework). The analysis focused on the stated goals, timeframes, cross-sectoral and scale interlinkages, and synergies and contradictions between sectoral driven policies.

Based on available policy documents at different levels, a first assessment of the effectiveness of these policies has been undertaken, focusing on two aspects: first, how operational they are (e.g., bottlenecks and barriers in decision, implementation and monitoring process); and second, the results achieved. We started to assess their role for climate change adaptation, environmental conservation, circular economy and sustainability; having also in mind actual and possible trade-offs between sustainable development, mitigation and adaptation. This assessment will be completed in the next months, thanks to interviews with relevant key-informants at the EU and the national level. An overall assessment will be included in D4.2.

Globally, T4.1 (through D4.1 and D4.2) represents a basis for the co-production of actionable knowledge for policy options. Both deliverables will inform the Decision Support System (DSS) development in WP3 and the policy recommendations in T4.5, fed by the further analysis implemented in T4.2, T4.3, and T4.4.

This deliverable is organized as follows.

After the brief institutional Introduction, the problematic and historical context in which the policies for mitigation of climate change and adaptation to climate change are located is drafted, followed by the theoretical framework (main concepts and theoretical approaches); and the methodological framework adopted (how the work has been carried out including type of documents reviewed, the sources used and the documentation search procedures).

This first section is followed by the second one, which includes the main results achieved. Such findings are distributed in sub-sections, each dedicated to the various levels of our analysis:

- International level
- European level
- Country level.

Countries represent Case Study Areas of the CROSSEU project. In each country, the climate policies were assessed based on the following criteria:

- The strategies/policies of Mitigation and Adaptation being carried out
- The related governance framework

- The main dynamic aspects of these strategies/policies, i.e., their evolution, the implementation period, the monitoring systems adopted, etc.
- A first assessment of the effectiveness of the strategies/policies.

The third and final section is devoted to a comparative and cumulative analysis of the findings of the previous section, followed by a detailed presentation of the way forward (i.e., how the implementation of the task is progressing towards its final results). This section also includes some preliminary conclusions and recommendations.

All URLs in the text, as hyperlinks or in footnotes, were accessed by 3 March 2025.

2. THEMATIC FRAMEWORK

The overarching framework of this deliverable comes from a vision of climate change mitigation operationalized in a 2°C target conceived by the Paris Agreement approved at the UN-COP in 2015 (which legally required countries to reduce their carbon emissions to limit global warming to 1.5°C compared to pre-industrial levels). While it may be seen as simplistic, unrealistic, or insufficient, it has become a mobilising factor: simple to communicate and easy to relate to. The second key feature of the Paris Agreement is the institutional diversity, which is enabled through the system of pledges that allows the contracting parties to activate a variety of stakeholders across sectors. Stakeholder engagement not only improves the legitimacy of the policy decisions but also enhances the policy process with local perspectives, which is potentially crucial for policy success in a given context. In fact, the Energy Policy Group (EPG) scholarship demonstrates [essential links between institutional diversity, stakeholder engagement, social learning and trust](#).

Launched in 2019, the European Green Deal (EDG) sets out to make Europe the first climate-neutral continent by 2050, promoting economic growth, human health and quality of life, conserving nature and ensuring a fair transition for all. The EDG seeks to simultaneously address [environmental, social and economic issues](#) and currently represents, coupled with the UN Paris Agreement, the general framework within which the climate policies. Notably those functional to the mitigation of climate change and adaptation to climate change are promoted at European level and in individual countries they are articulated.

However, the history of climate change policies started well before the launch of the EDG and the 2015 Paris Agreement itself. Climate change emerged as a political issue in the 1970s¹, when activist and formal efforts sought to address [environmental crises on a global scale](#). International policy regarding climate change has focused on cooperation and the establishment of international guidelines to address global warming.

¹ Before the 70s, it still deserves to be mentioned the UN Scientific Conference on the conservation and utilization of resources (New York, 17 August to 6 September 1949), which was the first UN body to address the depletion of those resources and their use

Held in Stockholm, from 5 to 16 June 1972, the UN Scientific Conference, also known as the First Earth Summit, adopted a declaration that set out principles for the preservation and enhancement of the human environment, and an action plan containing recommendations for international environmental action. In a section on the identification and control of pollutants of broad international significance, the Declaration raised the issue of climate change for the first time, warning Governments to be mindful of activities that could lead to climate change and evaluate the likelihood and magnitude of climatic effects. The UN Scientific Conference also proposed the establishment of stations to monitor long-term trends in the atmospheric constituents and properties, which might cause meteorological properties, including climatic changes. The Conference also called for the convening of a second meeting on the environment and established the Governing Council of the United Nations Environment Program (UNEP). UNEP, with the World Meteorological Organization (WMO; which finds its roots in the International Meteorological Organization, born in 1873) are the two UN agencies that assumed the leadership of the Intergovernmental Panel on Climate Change (IPCC) established in 1988.

The year before, in 1987, the UN General Assembly gave real impetus to environmental issues, when it adopted the Environmental Perspective to the Year 2000 and Beyond, a framework to guide national action and international cooperation on policies and programs aimed at achieving environmentally sound development. The Perspective underlined the relationship between environment and development and for the first time introduced the notion of sustainable development. Two years later, the Montreal Protocol on Substances that Deplete the Ozone Layer of September 1987 was adopted.

Efforts to raise awareness of the effects of climate changes were further advanced at the second World Climate Conference, held in 1990. In its Ministerial Declaration, the Conference stated that climate change was a global problem of unique character for which a global response was required.

The main milestone in the '90s has been the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro in 1992. This Conference set a new framework for seeking international agreements to protect the integrity of the global environment (Rio Declaration and Agenda 21), establishing the link between science, sustainable development, energy development and consumption, transportation, industrial development, stratospheric ozone depletion and transboundary atmospheric pollution. This Conference entailed the signature of the United Nations Framework Convention on Climate Change (UNFCCC). UNFCCC entered into force on 21 March 1994, and has been ratified by 197 countries.

UNFCCC started a UN process for negotiating an agreement to limit dangerous climate change. The cornerstone of the climate change action was the adoption of the Kyoto Protocol to the UNFCCC in Japan in December 1997. The document aimed to reduce the industrialized countries' overall greenhouse gas (GHG) emissions by at least 5% compared to the 1990 levels in the commitment period

of 2008 to 2012. The Protocol, which opened for signature in March 1998, came into force on 16 February 2005, seven years after it was negotiated by over 160 nations.

The next cornerstone of action against climate change was the 2015 UN-COP with the Paris Agreement mentioned earlier.

All these UN agreements concern the broad issue of climate change mitigation (which has mainly meant reducing the emissions of greenhouse gases). It should be underlined that when climate change first became prominent on the international political agenda in the early 1990s, talk about adaptation was considered an unwelcome distraction from the need to reach agreement on effective measures for mitigation. Indeed, *“for a long time, it was politically incorrect to speak about adaptation to climate change, because it presumably implies accepting defeat in the battle against evil emissions”*.

Thus, a *few voices had spoken out in favour of adaptation* even in the late 20th and early 21st century. In 2009 and 2010, adaptation began to receive more attention during international climate negotiations. This was after limited progress at the Copenhagen Summit had made it clear that achieving international consensus for emission reductions would be more challenging than had been hoped. In 2009, the rich nations of the world committed to providing a total of \$100 billion per year to help developing nations fund their climate adaptation projects. This commitment was underscored at the 2010 Cancún Summit, and again at the 2015 Paris Conference. The promise was not fulfilled, but the amount of funding provided by the rich nations for adaptations did increase over the 2010 – 2020 period².

In the early years, climate change adaptation has tended to be more of a focus for local authorities, while national and international politics have tended to focus on mitigation. There have been exceptions – in countries that feel especially exposed to the effects of climate change, sometimes the focus has been more on adaptation even at national level. Subsequently, having noted the extent of some recent disasters, adaptation has also become a growing concern at national, European and international levels.

Nowadays, the protection of the environment (both sides of the coin) is a high priority for many governments. Being concerned about severe damages induced by climate change in the near future, *they are actively seeking to design policies that can reduce GHG emissions*. However, despite increased awareness and intensive discussions, the environmental policy implemented by governments tends to be less ambitious than their promised policy and far from sufficient to reach their long-term climate targets. According to the recent UNEP report, with the currently implemented policies, half of the G20 countries, including the United States, are unlikely to meet their original commitments under the 2015 Paris Agreement³.

² Timperley, J. (2021). The broken \$100-billion promise of climate finance—and how to fix it.

³ Olhoff, A., & Christensen, J. M. (2020). Emissions gap report 2020, p. 112.

It is worth reminding that “for more than 50 years, research and innovation has helped to understand, tackle and mitigate the effects of climate change, and embed evidence in decision making and climate policy”. The [history of climate change discoveries](#) includes steps starting from 1938 (proof that global temperatures are rising), 1954 (the birth of the solar cell), 1958 (CO2 levels are rising, and fossil fuels are to blame), and 1967 (Earth’s changing climate modelled for the first time).

As already stated, climate policies can be operationally differentiated in mitigation and adaptation (M&A) policies.

Adaptation policies are those that aim to adapt people and communities to climate change by adapting everyday life to increased temperatures and to the related consequences. These consequences are, on one hand, slow processes (but very significant even in the short and medium term) such as increase of global air temperature, the melting of ice caps/bergs, and the rise of the sea level, as well as important droughts. On the other hand, they are changing dynamic of catastrophic extreme events such as tropical storms, floods, *avalanches*, landslides, heat waves, etc. Events that have always occurred in the past, but which, with climate change, seem to occur with a greater frequency and intensity in connection to climate change (e.g., increase of the temperatures). There are basically two ways in which people “adapt”: (a) by seeking to make sure that such events occur as little as possible and are as little intense as possible (e.g., however this depends also from mitigation policies; see later); (b) by seeking to make sure that human communities are able to withstand such events as best they can (i.e., increasing their resilience). So, [possible adaptation measures](#) are (the list is far from being exhaustive):

- Erecting buildings and infrastructure that are safer and only in areas that are not prone (or at least less prone) to extreme events
- Building green roofs to reduce urban heat island effects
- Developing and disseminating Early-Warning Systems
- Replanting forests (and countering deforestation)
- Restoring damaged ecosystems also thanks to the adoption of nature-based solutions
- Developing blue-green infrastructures for strengthening coastal defence
- Building seawalls to protect against sea level rise
- River Basin Management Plans/Flood Risk Management Plans
- Planting drought-resistant crops
- Developing Community-Based Risk Management schemes tailored to each specific territorial context and in close cooperation with the involved communities
- More generally, all the awareness-raising and training/capacity-building activities aimed at increasing the level of preparedness of communities prone to risk (actually and eventually).

Mitigation policies and measures focus on addressing the root cause of climate change by reducing greenhouse gas emissions and enhancing carbon sinks. These policies cover various sectors, including energy, transport, buildings,



industry, agriculture, and waste management. Possible mitigation measures are (the list is far from being exhaustive):

- Improving energy efficiency and opting for renewable energy in enterprises and in buildings (also in relation to the introduction of new codes and standards compatible with 0 emissions or very low emissions)
- Introduction of energy management systems (also voluntary) in the enterprises
- Brokerage for industrial cooperation
- Introduce new taxes, such as carbon tax, fuel tax and other fossil energy taxes, fertilizer or nitrogen taxes, sprawl tax
- Introduce subsidies, such as fossil fuel subsidy removal, biofuel subsidies, subsidies or tax exemptions for investment in efficient buildings, retrofits and products, subsidies for energy audits for enterprises and buildings, credit lines for low-carbon agriculture
- Enforcement of fuel and vehicle standards compatible with zero emissions or very low emissions
- Emission credits
- Regulatory restrictions to encourage modal shifts (road to rail)
- Restriction on use of vehicles in certain areas/urban planning and zoning restrictions
- Provision of utility infrastructure, such as electricity distribution, district heating/cooling and wastewater connections, etc.
- Reforestation and reduction of deforestation (also in relation to improved laws/regulatory frameworks)
- Investment in improvement and diffusion of innovative technologies in agriculture and forestry
- Information policies to support REDD+ (Reducing emissions from deforestation and forest degradation in developing countries), including monitoring, reporting and verification
- Labelling programmes for efficient buildings
- Promotion of sustainability by developing standards and educational campaign
- Energy advice programmes.

There are climate policies that are both functional to mitigation and adaptation. The most emblematic case (but not unique, as we'll see later in Para. 15) is reforestation and reduction of deforestation since this contributes, on the one hand, to a greater capture (and therefore reduction) of emissions and to a greater stability of the land (with the reduction of risks such as floods, avalanches and landslides); or building green roofs that reduce both urban heat island effects (adaptation); and also emissions (mitigation). There are also measures functional to adapting to climate change that have harmful effects in terms of mitigation (e.g., more air conditioning, which requires an abnormal consumption of energy, often also coming from fossil fuels).

3. THEORETICAL FRAMEWORK

3.1. Objective and scope

The explicit objective of the Task 4.1 is “a systematic analysis of the policy and institutional framework, and instruments of Mitigation of climate change and Adaptation to Climate Change at EU and national levels”, also considering:

- The actual interlinkages, and synergies and contradictions between policies
- Specific synergies between Mitigation & Adaptation
- Bottlenecks and barriers in the decision, implementation and monitoring process.
- The scope of the various policy fields for societal transformation
- The institutional/governance framework.

The T4.1 is looking “only” at the current policies and measures, i.e., ongoing policies and measures, the policies and measures that are being implemented or that should be implemented based on the regulations in force; of course, these policies/measures could have started some time ago and could represent the “evolution” of previous instruments. Present regulations together with the involved actors (or actors expected to be involved) with their specific roles/functions in each country (or at the European or at the global levels) constitute the “institutional” or “governance” framework (in the country, Europe or globally). These frameworks too are taken as they are presently (maybe also considering their recent evolution or expected evolutions in the immediate/near future)

The territorial scope of Task 4.1. is represented by the European countries represented in CROSSEU (Austria, Czech Republic, Denmark, France, Germany, Italy, Romania, UK), as well as, by the EU as a whole. Moreover, relevant international policies (beyond EU – e.g., United Nations level) will be also taken into account (also thanks to the WMO – the United Nation Agency on Meteorology – participation in CROSSEU).

3.2. Framework concepts

‘Policy’ refers to a set of actions (as well as non-actions) taken by public and private actors that are in some way related to a collective problem⁴. Inequality can be taken as a critical lens through which to examine any social and economic policy, because policies are applied to and have effects on different groups of people that are, or can be, very different precisely because of the inequalities we have just discussed. This, of course, also applies to climate change policies, if only because climate change poses a greater threat to exposed and vulnerable countries, communities and social groups.

⁴ Capano, G. (1992). Bruno Dente (a cura di), *Le politiche pubbliche in Italia*, Bologna, il Mulino, 1990, pp. 397, L. 32.000. *Italian Political Science Review/Rivista Italiana di Scienza Politica*, 22(1), 161-164.

Climate policies can be divided into [mitigation and adaptation policies](#) (with some overlap), as shown in the figure below.

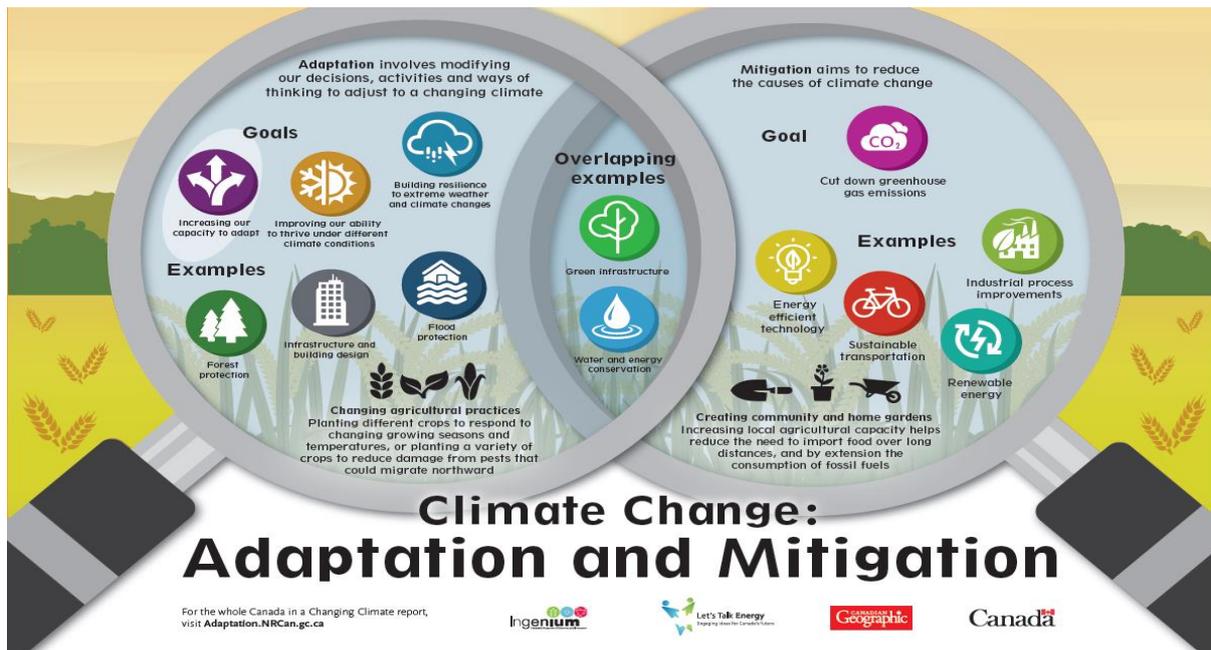


Figure 2 – Climate change: adaptation and mitigation

As already mentioned in the “thematic framework”, adaptation policies or measures are those that aim to help people and communities adapt to climate change by adjusting their daily lives to rising temperatures and their associated consequences. These consequences are, on one hand, slow processes (but very significant even in the short and medium term) such as melting ice, increasing sea and air temperatures, rising sea levels, major droughts, and, on the other hand, catastrophic and often sudden and extreme events such as hurricanes, floods, avalanches, landslides, heat waves, etc. These events have occurred many times in the past, but with climate change they seem to be occurring with much greater frequency.

There are two main ways in which people 'adapt': (a) by trying to ensure that such events are as infrequent and less intense as possible; (b) by trying to ensure that human communities are able to withstand such events as best they can (i.e., by increasing their resilience).

Mitigation policies or measures focus on addressing the root cause of climate change by reducing greenhouse gas emissions and enhancing carbon sinks. These policies cover various sectors, including energy, transport, buildings, industry, agriculture, and waste management.

As already stated in the “thematic framework”, there are trade-offs and overlaps between these policies.

Finally, we mean by “institutional framework”:

- The set of public, private and non-profit actors that play a relevant role (e.g., as main promoters and/or implementers and/or implementation supervisors or evaluators) in relation to the policies/measures that are

identified and analysed; these actors may be central government entities, regional and local public bodies, semi-public bodies, non-profit/civil society organisations, business bodies, scientific community, media

- The relationships between the identified actors.

Institutional frameworks should be drawn up at the EU (and at the global) level and in each of the countries included in the territorial scope. Specific institutional frameworks could also be drawn up at the regional and local level with reference to the territories involved in the CROSSEU case studies. The institutional framework in each country (or at the European or the global level) draws the *governance framework* of the climate policies in the corresponding related context.

3.3. Partners contribution for this first deliverable of T4.1

The contributions provided by the national CROSSEU partners engaged in the implementation of this task (BOKU, CZU, DTU, LGI, K&I, and MeteoRo⁵), were focused on:

- The strategies of M&A being carried out in the case study areas (having also in mind overlapping, trade-offs, contradictions, etc.)
- The related governance framework (in each of the considered countries, and also at the EU and international levels)
- The main dynamic aspects of these strategies (their evolution, the implementation period, the monitoring systems adopted, etc.)
- A first assessment of the effectiveness of the strategies (e.g., the expected results, the main obstacles met)
- Other aspects that each partner considers important (e.g., main actors involved beyond those included in the governance framework, possible implementation conflicts, open issues, perspectives).

Each partner developed the above-mentioned issues in their country. Moreover, BOKU took, beyond Austria, also the responsibility of Germany; and K&I, beyond Italy, also the responsibility of the United Kingdom and, at an upper level, looked at the EU policies.

Finally, these issues were investigated at a global (international) level by our international partner, WMO.

3.4. Comparison

A comparison between the climate policies/measures at the EU level and in the different considered countries is included in this deliverable. Due to the heterogeneity (as we'll see in the next chapters) of the ways in which the various policies/measures are addressed in the various national contexts (beyond several similarities in content), the comparison carried out will be mostly

⁵ BOKU – Universitaet fuer Bodenkultur Wien; CZU – Česká zemědělská univerzita v Praze; DTU – Danmarks Tekniske Universitet; LGI – LGI Sustainable Innovation; K&I – Conoscenza e Innovazione; MeteoRo – Administrația Națională de Meteorologie R.A.

qualitative, except for an attempt to compare, in quantitative terms, the various Mitigation and Adaptation policies/measures according to the 12 sectors considered in CROSSEU (see figure 1), namely: Health, Social justice, Migration, Finance, Insurance, Energy, Tourism, Transport, Biodiversity and ecosystem services, Forestry, Agriculture and food security, and Water management.

Comparisons made it possible to:

- Formulate specific observations (commonalities, specific problems, etc.)
- Define some open issues related to diverse national experiences so as to define the questions for the interviews that will be carried out later.

4. METHODOLOGICAL FRAMEWORK

As already stated, until now, only documentary sources have been used. These were both primary documentary sources, such as texts of laws, decrees, regulations and institutional and legal provisions, adopted plans, official reports and similar; and secondary documentary sources, i.e., surveys, analyses and studies (including assessment studies) carried out by both policy actors and researchers on the various policies/measurements and institutional/governance frameworks. Many documentary sources are available to anyone on the Internet (open sources); some others have been made available by their authors (people or entities). As already specified, documentary sources will be coupled with interviews with relevant key-informants in the continuation of the implementation of Task 4.1. (See Para. 16 in this deliverable).

The analysed documents reported national policies and – when relevant – also regional policies (in cases of strongly regionalized or federal countries). Documents have been chosen based on the relevance and the high authoritativeness of the consulted sources.

The documents were those concerning the main actors of the national M&A policies; they were looked for through a snowball approach.

The analysis implemented in the eight considered countries, as well as at the European and global levels were updated to December 2024. This limitation cannot be avoided, since changes in the political orientations of Governments are part of the overall governance process, including the part concerning managing climate change

The documents have been analysed trying to stress what emerged through the above-mentioned framework concepts. The results were presented through:

- A general description of M&A policies
- Descriptions following a uniform template making it easier to compare different countries' findings
- A comparison for giving an idea of the differences and critical areas
- Single out the issues to be further deepened.



PART Two - Analytical results

The second section of this document includes its main results. Such findings will be distributed in sub-sections, each dedicated to the various levels of our analysis: (i) International level; (ii) European level; (iii) Country level. The climate policies were assessed based on the following criteria: (a) the strategies/policies of Mitigation and Adaptation being carried out; (b) the related governance framework; (c) the main dynamic aspects of these strategies/policies, i.e., their evolution, the implementation period, the monitoring systems adopted, etc.; and (d) a first assessment of the effectiveness of the strategies/policies.



SECTION 1 – International Level

5. INTERNATIONAL POLICIES

5.1. Introduction

5.1.1 Overview of M&A Strategies

The increasing severity of climate change impacts not just globally, but widely within Europe, highlights the urgent need for coordinated strategies that combine mitigation – reducing greenhouse gas (GHG) emissions – and adaptation, which involves strengthening resilience against climate-related risks such as extreme weather events, rising sea levels, and ecosystem degradation. Together, these twin approaches underpin global climate action, balancing the imperative to limit warming to the Paris target of 1.5° with the necessity to cope with its inevitable consequences.

5.1.2 Global Context and Challenges

The [WMO Global Annual to Decadal Climate Update 2024-2028](#) states that “it is likely (80% chance) that global mean near-surface temperature will exceed 1.5°C above the 1850-1900 average levels for at least one year between 2024 and 2028”. Although this threshold was [already temporarily exceeded in 2024](#), it does not mean that the [1.5°C target of the Paris Agreement](#) has been breached. However, we can safely say that it is increasingly at risk. According to the latest Intergovernmental Panel on Climate Change (IPCC) [AR6 reports](#), global emissions are still far from declining at the scale required to achieve net-zero by mid-century. At the same time, adaptation efforts face barriers such as insufficient financing, fragmented governance, and limited capacity in vulnerable regions. These challenges demand strengthened international cooperation, innovative financing mechanisms, and a more integrated approach to mitigation and adaptation.

5.1.3 Purpose and Scope of the chapter

This chapter analyses the international (global, not merely in Europe) context of mitigation and adaptation strategies, focusing on governance frameworks, implementation dynamics, and practical outcomes. It highlights the role of international organisations, such as the World Meteorological Organisation (WMO – a partner in the CROSSEU consortium), and explores lessons learned from European and global contexts. By examining [key outcomes from the UNFCCC COP29](#) in November 2024, the (other two) Rio Conventions, and other governance and political processes, this chapter aims to offer insights for academics, policymakers, and practitioners seeking to advance climate resilience, and contribute to the T4.1 deliverable for the CrossEU project.

5.2. Global Mitigation and Adaptation Strategies

5.2.1 Mitigation Strategies

Mitigation strategies aim to reduce greenhouse gas (GHG) emissions and enhance carbon sinks to address the root causes of anthropogenic climate change – the emission of CO₂ and other GHGs such as methane primarily resulting from humanity's burning of fossil fuels and our impact on global ecosystems. These strategies are vital to achieving the temperature thresholds set by the 2015 Paris Agreement, particularly its goal of limiting global warming to 1.5°C.

Key Mechanisms:

- Nationally Determined Contributions (NDCs): As the foundation of the Paris Agreement, NDCs reflect each country's commitments to reducing emissions. While recent updates demonstrate increased ambition, a UNFCCC synthesis report indicates that current trajectories still fall short of the global targets.
- Carbon Markets and Pricing: The operationalisation of Article 6.4 of the Paris Agreement at COP29 enables international carbon trading, providing a pathway for developed nations to finance mitigation in low-income countries. Such mechanisms offer a dual benefit: generating revenue for large-scale emissions reduction projects while ensuring accountability and transparency in carbon credit generation.
- Nature-Based Solutions (NbS): NbS are increasingly recognised as cost-effective and scalable strategies for carbon sequestration. Initiatives such as reforestation, wetland restoration, and regenerative agriculture enhance carbon sinks while delivering additional environmental benefits, including improved biodiversity, soil health, and water quality. By integrating NbS into urban and rural landscapes, mitigation strategies can address both emissions reduction and ecosystem degradation.

5.2.2 The role of Nature-based Solutions

Nature-Based Solutions (NbS) play an increasingly central role in addressing the interlinked challenges of climate change mitigation and adaptation, across the world. By leveraging natural systems and processes, international policy now recognises that NbS delivers measurable climate benefits while simultaneously enhancing resilience, biodiversity, and human well-being. Seen as cost-effective, scalable, and multifunctional, NbS align closely with sustainable development priorities and are critical to achieving the goals of the Paris Agreement, both in Europe and globally.

In urban environments, NbS have been implemented to manage the growing challenges of heatwaves, flooding, and air pollution. Urban forests, green corridors, and green roofs reduce urban heat island effects, sequester carbon, and improve air quality while enhancing the liveability of cities. For example, increasing urban greenery – through parks, tree planting, and vegetated infrastructure – provides natural cooling, reducing energy demand for air conditioning during extreme heat. Additionally, permeable pavements and

water-sensitive urban design help manage storm-water, lowering the risk of flash flooding in densely populated areas.

In coastal regions, NbS such as tidal marsh restoration, managed floodplains and deltas, and the natural flooding of lands formerly reclaimed from the oceans, play a dual role in carbon sequestration and disaster risk reduction. For example, although outside the scope of climate M&A, such efforts are also vital to help protect communities against seismogenic tsunamis. Allowing floodplains to absorb excess water naturally, for instance, provides a buffer against coastal flooding while restoring ecosystems that act as carbon sinks. Coastal ecosystems like mangroves and wetlands are also essential for stabilising shorelines, protecting communities from storm surges resulting from extreme events such as tropical cyclones, and enhancing biodiversity.

For wetlands and peatlands, restoration efforts focus on rewetting and protecting these vital ecosystems, which serve as critical carbon stores. Degraded peatlands are significant sources of carbon and methane emissions, and their restoration – through water retention and habitat rehabilitation – delivers substantial mitigation benefits while improving water quality, reducing flood risks, and restoring biodiversity.

In agricultural landscapes, NbS include agroforestry and regenerative agricultural practices that enhance soil health, prevent erosion, and increase carbon sequestration. Agroforestry combines trees, crops, and livestock in integrated systems that reduce emissions and build ecosystem resilience. Regenerative agriculture, meanwhile, focuses on restoring soil carbon, improving water retention, and supporting sustainable food systems – particularly in areas vulnerable to desertification.

In mountain ecosystems, NbS are designed to address problems resulting from glacial melt and downstream impacts while supporting local economies. In the European Alps, for example, substantial glacial retreat in the 21stC resulting from a rapidly warming climate is literally [changing national borders](#). Reforestation efforts stabilise soil, reduce erosion, and mitigate the risk of landslides, while sustainable tourism practices and conservation programmes ensure ecosystem health and resilience in alpine regions.

The [integration of digital tools and innovations](#) further enhances NbS's effectiveness. Predictive climate models, geospatial mapping, and nature-based infrastructure dashboards enable decision-makers to design and implement targeted solutions. These tools assist in identifying areas for intervention, assessing risks, and monitoring NbS's long-term effectiveness across diverse geographic and climatic contexts.

By bridging the gap between mitigation and adaptation, NbS provide co-benefits that extend well beyond carbon sequestration and resilience-building. They offer natural, durable, and adaptable solutions to pressing climate challenges while supporting biodiversity conservation, improving livelihoods, and creating healthier environments. With continued investment, innovation, and implementation, NbS will remain an essential component of integrated climate strategies at local, regional, and global levels.



5.2.3 Adaptation Strategies

Adaptation strategies are essential to manage the impacts of climate change, particularly in vulnerable regions, sectors, and communities. Nature-Based Solutions (NbS) are central to these efforts, offering natural buffers against extreme weather events while enhancing the resilience of human and ecological systems.

Key Mechanisms.

- **Ecosystem-Based Adaptation:** Ecosystem-Based Adaptation integrates natural systems, such as wetlands, forests, and mangroves, into adaptation planning. These ecosystems act as buffers against flooding, sea-level rise, and extreme heat, while also delivering co-benefits like improved water quality and biodiversity conservation.
- **Urban Resilience Initiatives:** In cities, NbS such as vegetated walls, green corridors, and water-sensitive urban design help manage extreme rainfall and mitigate urban heat islands. Integrating NbS into grey infrastructure enhances climate resilience by reducing stormwater runoff, improving cooling effects, and lowering energy demand.
- **National Adaptation Plans (NAPs):** More than 90 countries have developed NAPs to guide climate-resilient investments. Many of these plans incorporate NbS as a key adaptation mechanism, recognising their ability to provide long-term, cost-effective solutions for building resilience in rural and urban settings.

Emerging innovations in adaptation strategies include multi-hazard risk assessments, which incorporate NbS into disaster risk management frameworks to address overlapping climate threats, such as floods and droughts. Community-based adaptation approaches are also gaining prominence, ensuring that local populations are involved in the design, implementation, and maintenance of NbS.

Governments and organisations can maximise the effectiveness of climate resilience measures by embedding NbS within national and regional adaptation strategies. This integrated approach reduces exposure to climate hazards and strengthens ecosystems, livelihoods, and infrastructure to withstand future impacts.

5.3. International Governance Framework for M&A Strategies

The governance of climate mitigation and adaptation (M&A) strategies is anchored in key international frameworks that together form the basis of collective action. These frameworks include the United Nations Framework Convention on Climate Change (UNFCCC) with its annual Conference of the Parties (COP), the resultant Paris Agreement of 2015, the Sendai Framework for Disaster Risk Reduction, and the separate Conferences of the Parties (COPs) of the United Nations Convention to Combat Desertification (UNCCD) and the Convention on Biological Diversity (CBD). Together, these structures constitute



a cohesive, albeit complex, architecture for addressing the interlinked crises of climate change, biodiversity loss, and land degradation.

5.3.1 The Paris Agreement and UNFCCC Processes

The [Paris Agreement](#), adopted at COP21 in 2015, is the most comprehensive and legally binding international treaty for climate action. Its overarching goals include:

- Limiting global warming to well below 2°C above pre-industrial levels, with efforts to cap it at 1.5°C
- Achieving net-zero emissions by mid-century
- Mobilising at least \$100 billion annually in climate finance to support mitigation and adaptation in developing countries.

However, the global commitment to the 1.5°C target is increasingly under threat. The IPCC's [Sixth Assessment Report](#) highlights that the world is on track for a 2.4–2.7°C temperature rise by 2100 under current policies, necessitating drastic action to close the emissions gap, and 2024 is expected to be the [first calendar year on record](#) to exceed 1.5° of warming. While the Paris Agreement's mechanisms, such as the Global Stocktake and Nationally Determined Contributions (NDCs), offer pathways for iterative improvement, uneven implementation and lack of ambition remain critical challenges.

The UNFCCC's institutional architecture plays a central role in driving international climate action, and much media reporting focuses on negotiations and outcomes from the annual COP (see section 5.5).

- Annual COPs: These meetings serve as the decision-making platform for global climate policy. COP29 in Baku in November 2024 underscored the challenges of reconciling diverse national interests, particularly on issues of fossil fuel dependency and carbon finance.
- Article 6 Mechanisms: COP29 also advanced market-based mechanisms for carbon trading, unlocking new potential for funding global mitigation projects.

5.3.2 The Rio Conventions: Synergies and Challenges

The [1992 Rio Earth Summit](#) (United Nations Conference on Environment and Development) marked a significant step in international cooperation to address environmental challenges. Recognising the interconnected issues of climate change, biodiversity loss, and land degradation, the Summit established three parallel multilateral environmental agreements: the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), and the United Nations Convention to Combat Desertification (UNCCD). Each convention was designed to address a specific, yet overlapping, global challenge – limiting greenhouse gas emissions and adapting to climate change (UNFCCC), conserving biodiversity and promoting its sustainable use (CBD), and combating desertification to protect land and livelihoods (UNCCD). Collectively, these frameworks aim to support sustainable development by

ensuring the resilience of natural systems, recognising that environmental crises are interlinked and require coordinated action.

Together, the three Rio Conventions (UNFCCC, CBD, and UNCCD) reflect the interconnectedness of climate change, biodiversity, and land management; all must be effective so that the international community can work together to mitigate anthropogenic climate change and adapt people and communities, especially the most vulnerable, to its consequences. While these frameworks operate independently and were designed to operate in concert, greater integration is essential to address the overlapping drivers and impacts of environmental degradation.

Opportunities for Synergy:

- Aligning NDCs with LDN and biodiversity goals to create co-benefits for mitigation and adaptation
- Leveraging innovative finance mechanisms, such as blended finance, to fund cross-cutting solutions
- Expanding the role of international organisations like WMO to provide technical expertise and coordination across the conventions.

Challenges:

- Fragmentation of governance structures
- Limited coordination between convention secretariats
- Persistent funding shortfalls for biodiversity and land restoration projects.

5.3.3 Monitoring Systems: Global and Regional Mechanisms

Robust monitoring and evaluation frameworks are essential to ensure the success of M&A strategies. These systems, summarised here, provide the data needed to assess progress, identify gaps, and refine national and international level approaches to mitigation and adaptation strategies over time.

- **Global Mechanisms:** The UNFCCC's [Global Stocktake](#) – next scheduled for completion in 2028 – evaluates collective progress toward the Paris Agreement goals every five years, while the IPCC provides comprehensive scientific assessments. WMO's Global Greenhouse Gas Watch (G3W) complements these efforts by delivering real-time emissions data to inform mitigation planning.
- **Regional Mechanisms:** Regional initiatives such as the European Union's [Climate Adaptation Monitoring Mechanism](#) track progress at a subnational level, providing granular insights into the effectiveness of adaptation measures.
- **Challenges:** Many developing countries (such as SIDS, Small Island Developing States) face barriers to effective monitoring, including limited technical capacity, inconsistent data collection, and insufficient financing. International organisations, including WMO, are addressing these challenges through capacity-building programmes, programmes like [SOFF](#) which support climate monitoring infrastructure and the deployment of scalable, cost-effective monitoring tools.



5.3.4 The Sendai Framework for Disaster Risk Reduction

The [Sendai Framework](#) (2015–2030) is a pivotal instrument that links disaster risk reduction (DRR) to climate adaptation. Its four priorities focus on:

- Understanding disaster risk
- Strengthening disaster risk governance
- Investing in DRR for resilience
- Enhancing disaster preparedness and “building back better.”

The framework’s emphasis on early warning systems (EWS) aligns closely with WMO’s Early Warnings for All Initiative, which aims to protect vulnerable communities from climate-induced hazards. However, achieving full integration of DRR and adaptation policies requires increased financing and stronger institutional linkages at national and local levels.

5.3.5 UNCCD COP16 in Riyadh: Key Outcomes

[UNCCD COP16](#) took place in Riyadh, Saudi Arabia in December 2024. It was expected to significantly shape global land management policies – land degradation, exacerbated by unsustainable agricultural practices and climate change, is a critical driver of biodiversity loss and desertification, and reversing land degradation is an important facet of climate mitigation – healthy land acts as a carbon sink.

Key expectations from COP16, in advance of the meeting’s conclusion, included:

- Enhanced Commitments to Land Degradation Neutrality (LDN) – Parties are expected to integrate LDN targets into their NDCs and climate adaptation strategies
- Drought Resilience – The development of frameworks for drought preparedness will be central, particularly for regions in Africa and the Middle East
- Financing Mechanisms – Innovative funding solutions, including public-private partnerships, are likely to be explored to scale up land restoration projects.

For WMO and other international organisations, aligning UNCCD outcomes with broader climate action plans offers a significant opportunity to integrate land restoration into mitigation strategies, particularly as healthy soils act as critical carbon sinks.

Key outcomes from COP16 subsequently included the following elements.

- Drought Resilience Framework: Despite extensive discussions, delegates did not reach a legally binding agreement on a global framework to tackle drought. The primary contention was whether the framework should be legally binding, with African nations advocating for binding commitments and others, including the US and EU, favouring non-binding measures. The decision has been deferred to COP17, scheduled for 2026 in Mongolia (the UNCCD COP is biennial).
- Financial Commitments: Significant financial pledges were made to combat land degradation and enhance drought resilience. Notably, over

USD 12 billion was committed through the Riyadh Global Drought Resilience Partnership to support land restoration and drought preparedness initiatives, particularly in vulnerable regions.

- **Inclusion of Indigenous Peoples and Local Communities:** The conference established a Caucus for Indigenous Peoples and a Caucus for Local Communities, ensuring their perspectives and challenges are adequately represented in future UNCCD processes.
- **Science-Policy Interface Continuation:** Delegates agreed to continue the Convention’s Science-Policy Interface, aiming to strengthen decision-making in combating desertification and promoting land restoration.
- **Private Sector Engagement:** The conference underscored the critical role of the global private sector in advancing land restoration and sustainable management goals. Through initiatives such as Business4Land, COP16 encouraged businesses to integrate land degradation neutrality (LDN) objectives into their operations and investment strategies. Delegates emphasised the importance of innovative financing mechanisms, including green bonds and sustainability-linked investments, to mobilise private capital for large-scale restoration efforts. Clear frameworks and measurable targets were proposed to ensure private sector contributions align with the broader objectives of the UNCCD, enhancing accountability and transparency in land restoration activities.

5.3.6 CBD COP16 in Cali: Key Outcomes

The [16th COP](#) of the Convention on Biological Diversity (CBD), held in Cali, Colombia (21 October – 1 November 2024), marked a pivotal moment for implementing the [Kunming-Montreal Global Biodiversity Framework](#) (KMGBF) adopted in 2022. The KMGBF’s ambitious targets to halt biodiversity loss by 2030 align with both mitigation and adaptation priorities, recognising the role of ecosystems in climate resilience.

Major Outcomes of COP16 included the following elements.

- **Progress on National Biodiversity Strategies and Action Plans (NBSAPs):** While many countries have aligned their NBSAPs with the KMGBF, significant gaps in reporting and implementation remain. Only 44 out of 196 parties have submitted updated strategies, making very clear a need for acceleration.
- **Financial Resource Mobilisation:** Discussions highlighted the urgent need for increased funding for biodiversity conservation. Current investments remain well below the \$200 billion annual target set under the KMGBF.
- **Inclusion of Indigenous Peoples:** A landmark agreement was reached to establish a subsidiary body ensuring Indigenous peoples’ active participation in biodiversity governance.
- **Monitoring Frameworks:** Efforts to enhance monitoring mechanisms for biodiversity targets were prioritised, though a unified framework remains in development.

The outcomes of CBD COP16 reinforce the importance of biodiversity in supporting ecosystem services essential for adaptation, such as water

regulation and disaster risk reduction. However, the challenges in mobilising sufficient funding and achieving alignment with climate policies remain critical barriers.

5.3.7 ESG, B Corp Certification, and Greenwashing

The private sector plays an increasingly visible role in M&A strategies through the adoption of Environmental, Social, and Governance (ESG) criteria. ESG frameworks encourage companies to integrate sustainability into their operations, offering a valuable complement to government-led efforts. Certifications like [B Corp](#) provide rigorous validation of a company's social and environmental impact, helping to distinguish genuine commitments from superficial claims.

However, greenwashing – where organisations exaggerate or misrepresent their sustainability credentials – remains a pressing concern for policymakers. The proliferation of unverified ESG claims risks undermining trust in private sector contributions to climate action. Addressing this issue requires:

- Clearer regulatory standards for ESG reporting
- Enhanced accountability mechanisms, such as independent audits
- Greater alignment with internationally recognised frameworks, including the [Task Force on Climate-Related Financial Disclosures](#) (TCFD)
- Improved transparency and public disclosure.

5.4. Dynamic Aspects of M&A Strategies

The dynamic nature of mitigation and adaptation (M&A) strategies reflects the evolving challenges posed by climate change and the corresponding need for integrated, forward-thinking solutions. These strategies must balance short-term urgency with long-term planning, leverage emerging technologies, and adapt to diverse local and regional contexts. This section explores the evolution of integrated approaches, phased implementation periods, and the importance of robust monitoring systems to ensure accountability and progress.

5.4.1 Evolution of Integrated M&A Approaches

Historically, mitigation and adaptation have been treated as distinct components of climate policy, often developed and implemented in isolation. However, the interdependencies between these strategies have become increasingly apparent. For example, nature-based solutions (NbS) such as regenerative agriculture, and afforestation and reforestation, address mitigation by sequestering carbon while simultaneously supporting adaptation through flood control, soil stabilisation, and biodiversity conservation.

Similarly, [urban resilience projects](#) now often integrate mitigation measures. Green roofs, for instance, reduce urban heat islands (adaptation) while decreasing energy demand for cooling and contributing to emissions reductions (mitigation). This integration is critical for maximising the effectiveness of investments, particularly in resource-constrained environments.



The evolution of these approaches is also driven by advances in technology. Artificial intelligence (AI) and machine learning are enabling more precise climate modelling, while geospatial data from Earth [Observation satellites support the monitoring of GHG emissions](#) and the tracking of land-use changes. These tools enhance the ability of the international community to design interventions that align with both mitigation and adaptation goals.

International organisations like the World Meteorological Organization (WMO) play a crucial role in promoting integrated approaches. Through initiatives like the Early Warnings for All programme, WMO demonstrates how adaptation tools (early warning systems) can support mitigation by reducing the economic losses that hinder investments in low-carbon transitions.

5.4.2 Implementation Periods: Short-, Medium-, and Long-Term Goals

Effective M&A strategies require phased implementation plans that balance immediate needs with long-term aspirations.

- **Short-Term Goals:** These include urgent actions such as deploying early warning systems, protecting critical infrastructure, and rolling out pilot projects for renewable energy and ecosystem restoration. Short-term efforts often focus on areas with the highest immediate vulnerability, such as Small Island Developing States (SIDS) and least-developed countries (LDCs).
- **Medium-Term Targets:** These actions typically involve integrating climate resilience into national development plans, scaling up renewable energy, and implementing large-scale reforestation and wetland restoration projects. For example, Denmark's storm surge protection initiatives and Germany's urban flood management systems illustrate medium-term adaptation in action.
- **Long-Term Visions:** These involve transformative actions aimed at achieving net-zero emissions by 2050 and enhancing societal and ecosystem resilience over decades. Long-term planning must incorporate scenarios for shifting climate baselines, such as the increasing frequency of extreme weather events and sea-level rise.

Adopting a phased approach allows governments and organisations to align their climate strategies with broader development goals, such as those outlined in the United Nations' [2030 Agenda for Sustainable Development](#).

As the climate crisis evolves, monitoring systems must also adapt to account for emerging risks and opportunities. For instance, the integration of social metrics, such as equity and inclusivity, into monitoring frameworks ensures that M&A strategies address not only environmental but also socio-economic vulnerabilities.

The dynamic aspects of M&A strategies reflect the complexity and urgency of addressing climate change. Integrated approaches, phased implementation plans, and robust monitoring systems are foundational to ensuring that these strategies achieve their intended outcomes. By leveraging advancements in technology, fostering international cooperation, and maintaining a focus on

equity, M&A strategies can evolve to meet the challenges of a changing climate while supporting sustainable development.

5.5. UNFCCC COP29: Key Outcomes

The 29th Conference of the Parties (COP29) to the United Nations Framework Convention on Climate Change (UNFCCC), held in Baku, Azerbaijan in November 2024, represented a pivotal moment for advancing global climate policy. Building on the momentum from COP28 in Dubai in 2023, COP29 sought to address persistent challenges such as climate finance, carbon market operationalisation, and the global transition away from fossil fuels. This section highlights the [key outcomes from COP29](#) and their implications for mitigation and adaptation (M&A) strategies.

5.5.1 Climate Finance Commitments

Mobilisation of Resources: Developed nations [pledged to increase climate finance to \\$300 billion annually](#) by 2035, an improvement over previous commitment. While this figure is a step forward, it remains well below the estimated \$1.3 trillion needed annually by 2035 to achieve the Paris Agreement’s goals. It is also below the \$500 billion that many developing countries advocated for, leading to significant dissatisfaction and a sense of betrayal among these nations. Nonetheless, an overall climate financing target to reach “at least \$1.3 trillion by 2035” was delivered. The target, or [new collective quantified goal](#) (NCQG), will replace the existing \$100 billion goal that is due to expire in 2025.

Focus on Adaptation: For the first time, COP29 mandated a 40% allocation of climate finance specifically for adaptation projects. This decision responds to mounting pressure from vulnerable nations, particularly Small Island Developing States (SIDS) and Least Developed Countries (LDCs), where adaptation needs are most critical. Concerns persist about whether the overall funding is sufficient to meet the adaptation needs of vulnerable countries.

Loss and Damage Funding: Following COP28’s establishment of a Loss and Damage Fund, COP29 operationalised the Santiago Network’s financing mechanisms. Nations agreed on governance structures for the fund, ensuring contributions from high-emitting countries and the private sector. However, questions remain about enforcement and the adequacy of funding levels, with developing nations expressing disappointment over the limited financial commitments.

5.5.2 Operationalisation of Article 6 Carbon Markets

Global Carbon Market Framework: COP29 marked significant progress in [implementing Article 6.4](#) of the Paris Agreement, which establishes a global framework for carbon credit trading. A UN regulatory body was formally launched to oversee the integrity and transparency of international carbon markets.



Emission Reduction Crediting: Rules for emission reduction projects were clarified, with a focus on high-impact sectors such as renewable energy, reforestation, and methane abatement. Developing countries expressed optimism about the potential revenue streams from selling verified carbon credits.

Equity in Carbon Markets: Concerns about equity were addressed by mandating that a portion of revenues from carbon trading be directed to adaptation projects in vulnerable regions. This mechanism ensures that the benefits of carbon markets are shared globally.

5.5.3 Progress and Limitations on Fossil Fuel Transition

Fossil Fuel Phase-Down: The presidency of COP29 facilitated intense discussions on transitioning away from fossil fuels. While some progress was made in reaffirming commitments to reduce coal reliance, consensus on oil and gas phase-downs remained elusive due to opposition from key fossil fuel-producing nations. However, the lack of a definitive timeline for phasing out fossil fuels was a major point of contention. Developing nations and climate advocates argued that the absence of concrete commitments undermines efforts to limit global warming to 1.5° C.

Just Transition Framework: COP29 introduced guidelines for implementing just transition principles, ensuring that the social and economic impacts of fossil fuel phase-downs are mitigated. These guidelines emphasise workforce retraining, social safety nets, and financial support for affected communities.

Challenges and Criticism: Despite these advancements, critics argued that the lack of a definitive timeline for phasing out fossil fuels undermines global efforts to meet the 1.5°C target. The debate highlighted persistent geopolitical divides, with some (fossil fuel producing) nations prioritising energy security over climate ambitions.

Overall, COP29 in Baku achieved meaningful progress in areas such as climate finance, carbon market operationalisation, and just transition planning. However, significant challenges remain, particularly in scaling up funding levels and securing global consensus on fossil fuel phase-downs. These outcomes underscore the complexity of international climate negotiations and the need for sustained ambition and cooperation to achieve the goals of the Paris Agreement.

5.6. UNFCCC Santiago Network

The Santiago Network for Loss and Damage, established at COP25 in Madrid (2019), has been instrumental in addressing the adverse impacts of climate change, particularly in developing countries. Its primary function is to catalyse technical assistance from various Organisations, bodies, networks, and experts to support nations in averting, minimizing, and addressing loss and damage associated with climate change.

5.6.1 Operationalisation and Governance:

At COP28 in December 2023, significant progress was made in setting up the Santiago Network. The United Nations Office for Disaster Risk Reduction (UNDRR) and the United Nations Office for Project Services (UNOPS) were selected to co-host the network's secretariat, providing the necessary administrative and infrastructural support for its effective functioning.

In September 2024, the Santiago Network Advisory Board convened in Bonn, Germany, for its third meeting. During this session, the board approved key guidelines and processes essential for the network to begin delivering technical assistance to countries and communities most vulnerable to climate change. This included establishing guidelines for responding to requests for technical assistance, managing funding, and preventing conflicts of interest.

5.6.2 Membership and Engagement:

The network has actively sought to expand its membership base. In July 2024, it launched a [call for expressions of interest](#) from Organisations, bodies, networks, and experts working in loss and damage. Becoming a member enables entities to respond to calls for technical assistance, exchange knowledge, and contribute to the global effort in addressing climate-induced loss and damage.

5.6.3 Recent Developments:

By November 2024, the [Santiago Network](#) had established its secretariat in Geneva, Switzerland, under the leadership of Director Carolina Fuentes. This development marked a significant milestone in the network's operationalization, positioning it to effectively coordinate technical assistance and support to vulnerable countries.

The Santiago Network's evolution reflects a concerted effort by the international community to provide structured and effective support to nations disproportionately affected by climate change, ensuring that technical assistance is both accessible and impactful.

COP29 operationalised financing channels for the Santiago Network, including:

- Private Sector Contributions: Encouraging businesses to fund projects addressing loss and damage, particularly in high-risk sectors.
- Multilateral Financing: Leveraging contributions from developed nations and international development banks to ensure sustainable funding for technical assistance and capacity-building projects.

5.6.4 Key Outcomes and Challenges for the Network

Progress Achieved:

- Governance Finalisation – The Santiago Network's governance framework has provided much-needed clarity on roles and responsibilities
- Operational Efficiency – The establishment of a dedicated secretariat ensures streamlined coordination of technical assistance and funding.

Remaining Challenges.

- Funding Adequacy – Despite operational progress, the overall funding for loss and damage remains insufficient to meet the needs of vulnerable countries. Many developing nations have expressed concerns about the limited contributions from high-emitting nations.
- Implementation Bottlenecks – Limited technical capacity in recipient nations and delays in fund disbursement have hindered the full realisation of the network's potential.
- Equity Concerns – Ensuring that resources reach the most affected communities requires robust monitoring and transparent allocation mechanisms.

The Santiago Network operationalisation delivers a vital step forward in addressing climate-related loss and damage, particularly for vulnerable nations disproportionately affected by climate change. While the operationalisation at COP29 marked a milestone in governance and capacity-building efforts, significant challenges in funding and equitable implementation are outstanding. Strengthening collaboration between international organisations, governments, and the private sector will be essential to maximising the network's impact in the years to come.

5.7. The Role of WMO in M&A

The World Meteorological Organization (WMO) occupies a central role in global efforts to address climate change: its comprehensive work on global climate monitoring, observation, and free data exchange underpins international efforts on mitigation and adaptation. By leveraging its scientific expertise and global partnerships, WMO supports nations in developing robust policies and practical tools to combat climate-related challenges. This section describes WMO's contributions, with a focus on its collaboration with other UN system entities, and its flagship initiatives like [Early Warnings for All](#) and [the Global Greenhouse Gas Watch \(G3W\)](#).

5.7.1 Enhancing Cooperation with UN Entities on Mitigation and Adaptation

WMO recognises a need for a unified approach within the UN system to achieve meaningful progress in climate action, and has outlined (and is delivering on) several strategies to strengthen collaboration with other UN entities, focusing on alignment, resource sharing, and technical integration.

Key areas of collaboration include:

Integration with UN Climate Policy Frameworks:

- WMO aligns its climate data and forecasts with the UNFCCC processes, ensuring that Nationally Determined Contributions (NDCs) are informed by the latest climate science.
- The organisation contributes to the Global Stocktake under the Paris Agreement by providing assessments on climate observations and trends.



Joint Projects with UN Partners:

- United Nations Development Programme (UNDP): WMO works with UNDP to integrate climate risk data into national adaptation plans (NAPs), enhancing resilience planning for vulnerable regions.
- United Nations Office for Disaster Risk Reduction (UNDRR): Collaboration focuses on disaster risk reduction frameworks that incorporate WMO's hazard monitoring systems.
- International Telecommunications Union (ITU): Work on standards, such as those related to the use of Common Alerting Protocols in early warning systems, or in the use of AI for weather and climate-related technologies.

WMO, UNDRR, and ITU (along with IFRC) are [pillar leads](#) in the UN's Early Warnings for All initiative, which seeks to ensure global coverage by early warning systems before the end of 2027.

- Capacity Building Across Member States: Through partnerships with UN Environment Programme (UNEP) and UN-Habitat, WMO provides technical support for [urban climate resilience projects](#), particularly in cities exposed to extreme weather events.
- Enhancing Data Sharing Across UN Agencies: WMO spearheads the consolidation of meteorological and hydrological data across UN systems, ensuring that (specialised UN) agencies like the Food and Agriculture Organisation (FAO), the World Food Programme (WFP) and the International Fund for Agricultural Development (IFAD) can address climate impacts on agriculture and food security effectively.
- Climate and Health Nexus: WMO and the World Health Organisation (WHO) collaborate through the [Joint Climate and Health Programme](#) to address the health impacts of climate change, particularly in urban settings, with a focus on issues including extreme heat and air quality. This partnership has led to the development of the Global Heat Health Information Network, enhancing capacities to protect populations from extreme heat. Additionally, the [ClimaHealth](#) portal provides actionable information linking climate and health data. Their joint efforts focus on improving air quality monitoring and early warning systems, integrating meteorological and health data to mitigate risks associated with heatwaves and pollution in urban environments. This collaboration aims to strengthen resilience against climate-related health challenges in cities worldwide.

5.7.2 Early Warnings for All Initiative

The Early Warnings for All initiative is a critical adaptation strategy aimed at providing universal access to early warning systems by 2027. In partnership with UN agencies such as UNDRR, the initiative addresses key challenges in disaster preparedness and response, with progress tracked and monitored using a [comprehensive dashboard](#).



Key Achievements and Goals:

- Establishing regional early warning systems in vulnerable areas, such as Small Island Developing States (SIDS) and sub-Saharan Africa
- Developing standard protocols for multi-hazard early warning dissemination, ensuring alignment with UN disaster risk management frameworks
- Strengthening community engagement through localized early warning mechanisms, particularly in regions prone to cyclones, floods, and heatwaves.

5.7.3 Global Greenhouse Gas Watch (G3W)

The [Global Greenhouse Gas Watch](#) is WMO's flagship initiative for climate mitigation, providing accurate and actionable data on greenhouse gas (GHG) concentrations. The G3W program is instrumental in supporting UN-led mitigation efforts by enhancing the transparency and accountability of GHG emissions reporting. Its collaborative Focus Areas include:

- Monitoring and Verification of NDCs – WMO works with UNFCCC to validate emissions reduction claims made in NDCs, ensuring consistency and scientific accuracy
- Strengthening Satellite Observation Networks – In coordination with space agencies like NASA and ESA, WMO integrates satellite data with surface-based monitoring systems to provide comprehensive GHG assessments
- Data-Driven Climate Action – WMO collaborates with UNEP to use GHG data in identifying high-priority areas for renewable energy deployment and energy efficiency programs.

5.7.4 Emerging Areas of Focus

From its [78th Executive Council meeting](#) in June 2024, WMO identified several emerging areas critical to advancing climate mitigation and adaptation:

- Urban Climate Adaptation – WMO plans to expand its collaboration with UN-Habitat and WHO to develop urban heat resilience strategies, integrating meteorological data with city planning tools
- Water Resources Management – Partnerships with FAO and UNESCO aim to improve climate-informed water resource management, addressing the growing impact of droughts and floods on global water systems
- [Climate Services for Agriculture](#) – Collaborating with WFP and FAO, WMO seeks to enhance agro-meteorological services to safeguard food security in climate-vulnerable regions.

5.7.5 Effectiveness and Future Directions

WMO's growing collaboration with UN system entities underscores its commitment to advancing mitigation and adaptation efforts. The focus on harmonised data sharing, joint capacity building, and integrated policy frameworks ensures that climate action is both science-driven and equitable.



Key next steps include:

- Expanding early warning systems to cover 100% of the world’s population by 2027, under the Early Warnings for All initiative
- Scaling up the operationalisation of G3W, ensuring that all 193 WMO member states can access high-quality GHG data for mitigation planning
- Strengthening partnerships with regional Organisations to localize UN initiatives and make them more accessible to vulnerable communities.

By working closely with partner organisations in the UN system, WMO acts as a fulcrum of global climate action, supporting impactful and coordinated responses to the pressing challenges of climate mitigation and adaptation with accurate, timely, and universally shared weather and climate data and observations.

5.8. Effectiveness of Current M&A Strategies

Both globally and within Europe, the effectiveness of mitigation and adaptation (M&A) policies and strategies is a critical determinant of the global community’s efforts to adhere to the Paris agreement and limit warming to 1.5°C. While there has been notable progress globally in deploying renewable energy, advancing carbon market mechanisms, and enhancing resilience through adaptation projects, significant gaps remain. This section evaluates the effectiveness of current strategies in achieving their goals, highlighting successes, challenges, and opportunities for improvement.

5.8.1 Assessment of Mitigation Progress

International scale mitigation strategies have seen significant advancements in recent years, particularly in the areas of [renewable energy adoption](#), emissions reductions in key sectors (for example, the [IMO ruling](#) on the reduction of sulphur in ships’ fuel oil from 2020), the operationalisation of carbon markets, and improvements in carbon capture and storage pilot programmes. However, these achievements must be measured against a backdrop of rising global emissions, which continue to outpace reductions in many regions.

Successes.

- **Renewable Energy Deployment:** Renewable energy sources now account for most new power capacity globally. Nations such as Denmark and Morocco have set benchmarks for integrating wind and solar power, demonstrating the feasibility of transitioning away from fossil fuels. Most prominently, [China](#) is expected to install 3,207 GW of new renewable electricity capacity between 2024 and 2030, more than tripling growth of 2017-2023.
- **Carbon Market Mechanisms:** The finalisation of Article 6.4 of the Paris Agreement at COP29 represents a major step forward in leveraging international carbon trading to finance mitigation projects. Countries can now generate carbon credits through projects that reduce emissions and

trade them on global markets, unlocking new revenue streams for developing nations.

- Nature-Based Solutions (NbS): NbS, such as reforestation, soil carbon sequestration, or the practice of regenerative (rather than intensive) agriculture, are gaining prominence as cost-effective, scalable options for mitigation. These solutions simultaneously address biodiversity loss and land degradation, offering co-benefits that extend beyond emissions reductions.

Challenges.

- Insufficient Ambition in NDCs: Many countries' Nationally Determined Contributions (NDCs) lack the ambition needed to align with the 1.5°C target. A [UNFCCC synthesis report](#) highlights that current commitments, if fully implemented, would still result in warming of 2.4–2.7°C by 2100.
- Fossil Fuel Dependency: Despite progress in renewables, fossil fuels remain the dominant energy source in many regions. Subsidies for coal, oil, and gas exacerbate this dependency, undermining global mitigation efforts.
- Equity in Carbon Markets: Ensuring that carbon markets benefit the most vulnerable remains a challenge. Transparent mechanisms and robust safeguards are needed to prevent exploitation and inequitable outcomes.

5.8.2 Gaps in Adaptation Financing and Implementation

Adaptation strategies are critical for managing the impacts of climate change, particularly in vulnerable regions such as Small Island Developing States (SIDS) and sub-Saharan Africa. While adaptation finance and implementation have improved, they remain inadequate compared to the scale of the challenge.

Successes.

- [Urban Adaptation Projects](#) – In Europe, cities like Rotterdam and Copenhagen have implemented innovative adaptation measures, such as multifunctional water plazas and green roofs, to mitigate the impacts of flooding and heatwaves.
- Early Warning Systems – WMO's Early Warnings for All initiative has [already significantly expanded access](#) to early warning systems, particularly in developing countries. By reducing vulnerability to extreme weather events, these systems exemplify the intersection of adaptation and disaster risk reduction.
- National Adaptation Plans (NAPs) – Over [90 countries have submitted NAPs](#), which provide frameworks for integrating adaptation into national development plans. These plans are increasingly aligned with broader climate and biodiversity goals, offering a more holistic approach.

Challenges.

- Funding Gaps – Adaptation finance continues to be lagging mitigation funding. While COP29 pledged to increase climate finance commitments, current levels remain insufficient to meet the estimated [\\$340 billion annually needed for adaptation by 2030](#).

- Implementation Barriers – Many developing countries face challenges in implementing adaptation projects, including limited technical capacity, governance issues, and inadequate data. These barriers hinder the effectiveness of even well-funded initiatives.
- Monitoring and Evaluation – The lack of robust metrics to assess the effectiveness of adaptation measures complicates efforts to scale up successful projects. Monitoring systems must capture not only environmental but also social and economic outcomes to ensure that adaptation strategies address vulnerabilities equitably.

5.8.3 Opportunities for Improvement

To enhance the effectiveness of current M&A strategies, several key actions are broadly accepted as being needed:

- Scaling Finance – Meeting global adaptation and mitigation goals requires significant increases in climate finance. Innovative mechanisms, such as blended finance and public-private partnerships, can help bridge funding gaps
- Strengthening International Cooperation – Greater alignment across international frameworks, such as the Paris Agreement, Sendai Framework, and Rio Conventions, can leverage synergies and streamline implementation
- Integrating Equity – Addressing inequities in funding distribution and project outcomes is essential for ensuring that M&A strategies deliver benefits to the most vulnerable
- Harnessing Technology – Advances in AI, satellite monitoring, and climate modelling offer opportunities to improve the precision and scalability of interventions.

While significant progress has been made in implementing mitigation and adaptation strategies, the global response remains insufficient to meet the scale and urgency of the climate crisis. Addressing gaps in financing, ambition, and implementation is critical to ensuring that M&A strategies achieve their intended outcomes. By leveraging international cooperation, fostering innovation, and prioritising equity, these strategies can better align with the goals of the Paris Agreement and the broader sustainable development agenda.

As the global community grapples with the complexities of climate change, mitigation and adaptation (M&A) strategies must counter the multifaceted challenges that hinder cohesive action. In addressing these obstacles, it is equally critical to identify future directions that can strengthen the effectiveness and inclusivity of climate policies.

5.8.4 Current barriers to Improvement

The implementation of effective M&A strategies is impeded by systemic barriers, with funding shortfalls and political divisions vying as two of the most significant challenges.



Funding Shortfalls: Climate finance remains inadequate relative to the scale of the crisis. While COP29 in Baku marked progress with the [pledge to mobilise \\$300 billion annually by 2035](#), this commitment falls short of the estimated \$3 trillion per year needed by 2050 to meet global climate goals. Specific issues include the following elements.

- **Insufficient Adaptation Finance** – Adaptation projects receive only a fraction of total climate finance, with the vast majority allocated to mitigation. This disparity leaves vulnerable populations underprepared for climate impacts.
- **Delayed Disbursements** – Many pledged funds remain undelivered or tied to lengthy bureaucratic processes, undermining timely implementation.
- **Private Sector Hesitation** – Despite increased interest in climate investments, many private financiers remain reluctant to engage in adaptation projects due to perceived risks and lower returns compared to mitigation initiatives.

Political Divisions: Climate action requires coordinated efforts across national, regional, and global levels, yet political divisions often obstruct progress.

- **Geopolitical Tensions** – Disagreements between developed and developing countries over issues such as climate finance, loss and damage, and historical emissions responsibility create significant roadblocks in negotiations. For example, debates at COP29 over fossil fuel phase-outs revealed persistent rifts.
- **Domestic Policy Inconsistencies** – Even within individual countries, conflicting policies can undermine climate strategies. For instance, subsidies for fossil fuels in some nations coexist with ambitious renewable energy targets, creating policy incoherence.
- **Erosion of Multilateralism** – Rising populism and nationalism in key nations threaten global cooperation, as seen in the potential policy shifts under a renewed Trump administration.

These challenges underscore the urgency of strengthening international solidarity, fostering innovative financing solutions, and aligning national policies with global commitments.

5.8.5 Future Directions

To overcome these challenges, future M&A strategies must prioritise equity, innovation, and collaboration. Key areas of focus could include the following elements.

Strengthening Equity in Climate Finance: Equity must be at the forefront of climate finance, ensuring that resources are distributed fairly and effectively:

- **Prioritising Vulnerable Populations** – Targeted financing for least-developed countries (LDCs), small island developing states (SIDS), and marginalised communities can address disproportionate vulnerabilities. Mechanisms like the Santiago Network for Loss and Damage exemplify how equitable frameworks can support those most affected by climate impacts.

- Innovative Financing Mechanisms – Blended finance models, which combine public and private funding, can unlock resources for adaptation and mitigation projects. Sovereign risk pools and catastrophe bonds also offer innovative approaches to mobilising finance for disaster-prone regions.
- Transparent Reporting – Enhanced monitoring of climate finance flows, including independent audits, can build trust and accountability, reducing inefficiencies and ensuring that funds reach intended beneficiaries.

Fostering Public-Private Partnerships (PPPs): The private sector has a crucial role to play in scaling up M&A strategies. Public-private partnerships (PPPs) can leverage the resources and expertise of businesses while aligning their efforts with public goals.

- Technology Deployment – Collaboration between governments and technology companies can accelerate the adoption of AI, satellite monitoring, and clean energy solutions. For example, partnerships under the World Meteorological Organisation’s Global Greenhouse Gas Watch (G3W) provide high-quality data for emissions tracking.
- Incentivising Private Investment – Regulatory frameworks and risk-sharing mechanisms can encourage private financiers to invest in adaptation projects. Tax incentives, green bonds, and sustainability-linked loans are proven tools for driving private-sector engagement.
- Localised Approaches – Encouraging private sector participation at the community level can amplify the impact of PPPs, ensuring that projects address local needs while benefiting from global expertise.

Expanding Multilateral Collaboration: Strong partnerships between international organisations, governments, and civil society are essential for addressing systemic barriers.

- Integrating Frameworks – Aligning the objectives and avoiding duplication of effort and activities between the Rio Conventions, Sendai Framework, and can streamline efforts and reduce duplication.
- Capacity Building – Supporting developing countries through training, knowledge-sharing, and technical assistance can strengthen institutional capacities to implement and monitor M&A strategies.
- Youth and Indigenous Engagement – Amplifying the voices of youth activists and Indigenous leaders in climate decision-making processes fosters inclusivity and innovation, drawing on diverse perspectives and traditional knowledge.

Addressing funding shortfalls and political divisions is vital to ensuring the effectiveness of M&A strategies. By prioritising equity in climate finance, fostering public-private partnerships, and strengthening multilateral collaboration, the global community can overcome these challenges and chart a more inclusive and resilient path forward. Future strategies must embrace innovation and inclusivity, recognising that collective action and equitable resource allocation are foundational to achieving global climate goals.



5.9. Conclusions

5.9.1 Summary of Key Findings

This chapter has underscored the critical importance of integrating mitigation and adaptation (M&A) strategies to address the escalating impacts of climate change. Key findings include the following.

- **Global Progress and Gaps:** While significant strides have been made in renewable energy deployment, carbon market mechanisms, and urban adaptation projects, these efforts remain insufficient to achieve the Paris Agreement's 1.5°C target. Emissions continue to rise, and adaptation financing lags far behind what is needed to build resilience in vulnerable regions.
- **Governance Frameworks:** International agreements such as the Paris Agreement, Sendai Framework, and Rio Conventions provide essential structures for collective climate action. However, persistent challenges, including insufficient ambition in Nationally Determined Contributions (NDCs) and geopolitical tensions, hinder cohesive implementation.
- **The Role of International Organisations:** The World Meteorological Organisation (WMO) has demonstrated leadership through initiatives such as Early Warnings for All (EW4All) and the Global Greenhouse Gas Watch (G3W), which enhance global capacity for mitigation and adaptation. These programmes make clear the importance of robust data, monitoring systems, and early warning mechanisms in reducing vulnerabilities. In addition, the active involvement of WMO and other international organisations in EU Horizon funded projects such as CrossEU allows a closer exchange of expertise with national, regional, and even local stakeholders that international organisations otherwise struggle to engage with.
- **Emerging Challenges:** Funding shortfalls and political divisions continue to impede progress. The underrepresentation of adaptation finance and the inequitable distribution of climate resources exacerbate vulnerabilities in low-income and high-risk regions.

Despite these challenges, the extensive M&A policy and practice work being funded under EU Horizon programme projects, showcase how integrated M&A strategies can deliver tangible benefits, combining emissions reductions with enhanced resilience, in Europe and globally.

5.9.2 Opportunities for Integrated Approaches to M&A

In the coming years, the integration of M&A strategies offers a pathway to more effective and equitable climate action. Key opportunities include the following.

- **Equity-Driven Climate Finance:** Scaling up finance for adaptation, particularly in vulnerable regions, is essential. Mechanisms such as blended finance, catastrophe bonds, and sovereign risk pools can help bridge funding gaps while ensuring equitable distribution.
- **Leveraging Technology and Data:** Innovations in artificial intelligence, satellite monitoring, and data analytics can enhance the precision and scalability of M&A strategies, and are a strong focus for international

organisations, including UN system entities and pan-European organisations such as ECMWF, [Copernicus](#), and [ESA](#). Programmes like WMO’s G3W, or the [DestinE programme](#), demonstrate how high-quality data can inform both mitigation planning and adaptation measures.

- **Public-Private Partnerships (PPPs):** Strengthening PPPs can mobilise private sector resources for climate resilience projects. By aligning corporate sustainability goals and funding with public policies at international and national scales, such partnerships can drive innovation and expand the reach of climate solutions.
- **Multilateral Collaboration:** Enhancing alignment across global frameworks, including the Paris Agreement and Sendai Framework, can maximise synergies and streamline efforts. Capacity-building initiatives and inclusive decision-making processes can further strengthen the implementation of integrated strategies.

Integrated approaches not only address the interconnected challenges of climate change but also unlock co-benefits such as improved public health, biodiversity conservation, and economic stability. By prioritising inclusivity, innovation, and collaboration, the global community can achieve more sustainable and resilient outcomes.

5.9.3 Is the COP process delivering M&A goals?

Despite its acknowledged slow and incremental nature, the COP process under the UNFCCC continues to hold significant value as the leading global platform for negotiating climate change policies. However, its effectiveness and ability to meet urgent climate goals are increasingly under scrutiny, with the two most recent COPs (Dubai in 2023, and Baku in 2024) being hosted by countries economically bound to fossil fuel extraction. Additionally, the UNFCCC COPs overshadow COPs for the other two Rio Conventions – on biodiversity (CBD) and desertification (UNCCD) – due to structural, political, and thematic factors.

5.9.3.1 Is the COP Process Still Valuable?

Why the COP Process Remains Valuable

Global Visibility and Political Momentum: The UNFCCC COPs, including COP29, bring together heads of state, negotiators, activists, and business leaders to create visibility for climate action. Even partial progress – such as operationalising Article 6 carbon markets or the Santiago Network for Loss and Damage at COP29 – provides frameworks that nations and stakeholders can build upon.

Universal Participation: The COP process uniquely convenes nearly every nation on Earth and is designed to progress based on consensus. It ensures that both developed and developing nations have a voice, offering a forum for smaller or vulnerable states, such as Small Island Developing States (SIDS), to demand accountability (and financing) from larger emitters.

Incremental Progress in Key Areas: Although slow, the COP process has achieved significant milestones over time, such as the Paris Agreement, regular NDC updates, and the establishment of the Loss and Damage Fund. These



achievements would likely be unattainable without such a broad, multilateral forum.

Catalyst for Parallel Action: The COPs foster initiatives outside the formal negotiation process. For example, non-state actors often announce major commitments at COPs, such as private-sector decarbonisation pledges, regional adaptation strategies, and partnerships like the [Race to Zero](#) campaign.

Challenges to Effectiveness

Geopolitical Stalemates: The consensus-driven nature of COPs often leads to watered-down agreement language (e.g., ‘phase-out’ being replaced by ‘phase-down’ as a phrase). At COP29, the inability to agree on an unequivocal timeline for phasing out fossil fuels highlighted the limits of the process, especially in the face of opposition from fossil-fuel-dependent economies.

Insufficient Financing Commitments: Climate finance remains a chronic issue, with pledges like the \$300 billion annually by 2035 at COP29 falling short of what developing nations say they need. This mismatch creates dissatisfaction and deepens trust deficits between developed and developing nations.

Incrementalism Amid Urgency: The COP process’s incremental nature often fails to match the urgency of the climate crisis. Scientific reports warn that current trajectories make limiting warming to 1.5°C unlikely, yet decisive action, such as phasing out fossil fuels or significantly scaling up adaptation finance, remains elusive.

Overwhelming Complexity: The sheer scale of negotiations – covering finance, loss and damage, mitigation, adaptation, technology transfer, and more – can dilute focus and make outcomes feel insufficient or overly bureaucratic. A further issue is the complexity of event attribution: currently an emerging facet of climate science, extreme event attribution seeks to determine to what extent specific events are directly the result of, or made more intense, by anthropogenic climate change.

5.9.3.2 Why Does the UNFCCC COP Overshadow the Other Rio Conventions?

Structural Factors

Climate Change as a Global Crisis: Climate change has become the defining global challenge for humanity in the 21st. Its existential nature and immediate impacts – extreme weather, sea-level rise, and heatwaves – affect all sectors and nations, giving the UNFCCC an outsized role.

UNFCCC’s Broader Scope and Ambition: The UNFCCC tackles issues with far-reaching implications, including energy transitions, industrial policy, and economic systems. In contrast, the CBD and UNCCD, while crucial, focus on biodiversity conservation and land management, which may seem less urgent to policymakers, the global public, and the private sector. They also lack a simple, single, and clear target, such as the Paris Agreement’s 1.5°C.

Political and Financial Investment: The UNFCCC COPs command significantly more political and financial investment, reflected in larger delegations, higher-



profile attendance by heads of state, and greater media coverage. The financial mechanisms (e.g., the Green Climate Fund) and market-based solutions discussed at UNFCCC COPs also attract more private-sector engagement).

Thematic and Procedural Challenges in CBD and UNCCD COPs

Fragmented Linkages to Broader Agendas: The CBD focuses on biodiversity, which, despite its clear links to climate resilience, is often relegated to a niche or secondary concern in global governance. The UNCCD deals primarily with desertification and land degradation, issues that are vital but regionally focused, affecting arid and semi-arid countries disproportionately.

Weaker Institutional Frameworks: The UNFCCC benefits from robust mechanisms such as the Paris Agreement, NDC processes, and the Global Stocktake. By contrast, the CBD and UNCCD lack similarly high-profile, binding frameworks, reducing their visibility and perceived effectiveness.

Lower Public Awareness: Biodiversity and desertification receive less attention in the global public discourse compared to climate change, limiting the pressure on governments to prioritise the CBD and UNCCD COPs.

5.9.3.3 Bolstering the Rio Conventions

To ensure the UNFCCC COPs do not overshadow the broader goals of sustainable development, several steps could serve to strengthen the Rio Conventions' overall impact and raise up their role in mitigation and adaptation policy.

- **Integrate Climate, Biodiversity, and Land Goals:** Enhance synergies between the conventions by aligning NDCs, National Adaptation Plans (NAPs), and biodiversity strategies. For example, integrating Land Degradation Neutrality (LDN) targets with carbon sequestration goals could simultaneously address desertification and climate mitigation.
- **Unified Reporting Mechanisms:** Create streamlined reporting frameworks for countries to align their commitments across the UNFCCC, CBD, and UNCCD, reducing administrative burdens and fostering collaboration.
- **Increase Financing for Biodiversity and Land Restoration:** Scaling up investment in initiatives like the Kunming-Montreal Global Biodiversity Framework (CBD) or drought resilience programmes (UNCCD) could elevate the importance of these conventions.
- **Leverage High-Profile Champions:** Greater involvement of high-profile figures and cross-sector partnerships in CBD and UNCCD COPs could enhance visibility and political engagement.

The annual UNFCCC COPs remain essential for advancing global climate action, but their limitations highlight the need for reform. Meanwhile, the lower visibility of the CBD and UNCCD COPs makes clear the importance of integrating efforts across the Rio Conventions. Greater synergies, stronger financing mechanisms, and elevated political support for biodiversity and land restoration could ensure that the Rio Conventions collectively address the interlinked crises of climate change, biodiversity loss, and desertification.

6. EU CLIMATE (MITIGATION AND ADAPTATION) POLICIES

6.1. Introduction: The European Green Deal

The approach at the European Union level to tackling and responding to climate change is first based on acts from a plurality of actors, of which, in this context, only a few have been taken into consideration: European Commission, European Parliament, European Investment Bank and European Central Bank. For all these actors, the general context is presently the [European Green Deal](#), even if many of the policies (or individual measures) we will discuss have an origin prior to the birth of the EGD. Through the EGD, EU was the first major economy to submit its emissions reduction goal under the Paris agreement reached at the [UNCoP](#) in 2015 (see the previous chapter) and signed by 194 countries as well as the European Union, promising to reduce its CO₂ emissions 40% by 2030, compared to 1990 levels. Broadly speaking, the whole EU climate strategy is aligned with the UNFCCC process and aims to align the policies of all the EU member states (with all the many difficulties that will be seen, partly in this chapter and partly in the following ones dedicated to the policies in the various countries).

The European Green Deal, approved in 2020 (presented at the end of 2019), is a set of policy initiatives by the European Commission with the overarching aim of making the European Union (EU) climate neutral in 2050.

Such an objective was and is far removed from the real situation. For example, we can consider the situation of housing. Before 1970, almost half of all European residential structures were built. At the time, no consideration was given to the amount of energy used by materials and standards. At the present rate of refurbishment, reaching a highly energy-efficient and decarbonised building stock might take more than a century. So, one of the major aims of the European Green Deal is to “at least double or even triple” the current refurbishment rate of approximately 1%. This is also true outside of the EU. In addition to rehabilitation, investment is required to enable the development of new efficient and ecologically friendly structures.

The European Green Deal entails the review of each existing law on its climate merits, and also introduces new legislation on the circular economy, building renovation, biodiversity, farming and innovation.

The EU should finance the policies set out in the Green Deal through an investment plan – InvestEU, which forecasts at least €1 trillion in investment. Furthermore, for the EU to reach its goals set out in the deal, it is estimated that approximately €260 billion a year is going to be required by 2030 in investments.

The EGD “history” of implementation can be summarised as follows.

- 11 December 2019: The European Green Deal was presented.
- 14 January 2020: The European Green Deal Investment Plan as well as the Just Transition Mechanism were presented.

- 4 March 2020: There was a proposal for a European climate law to ensure a climate neutral European Union by 2050.
- 10 March 2020: The European Industrial Strategy was adopted (which is a plan for a future ready economy).
- 11 March 2020: There was a proposal for a Circular Economy Action Plan that focused on sustainable resource use.
- 20 May 2020: The ‘Farm to fork strategy’ was presented in order to increase the sustainability of food systems. The EU Biodiversity Strategy for 2030 was presented which focuses on the protection of fragile natural resources.
- 8 July 2020: Adoption of the EU strategies for energy system integration and hydrogen to pave the way towards a fully decarbonised, more efficient and interconnected energy sector.
- 12 July 2020: The taxonomy for sustainable activities comes into force, to reduce greenwashing and help investors choose green options.
- 17 September 2020: The 2030 Climate Target Plan was presented.
- 9 December 2020: The European Climate Pact was launched.
- 14 July 2021: The “Fit for 55” Package was presented by the European Commission, containing a large number of legislation proposals to achieve the EU Green Deal.
- 5 April 2022: Adoption of several initiatives under the action plan, including:
 - legislative proposal for substantiating green claims made by companies
 - review of requirements on packaging and packaging waste in the EU
 - new policy framework on bio-based, biodegradable and compostable plastics
 - measures to reduce the impact of micro-plastic pollution on the environment.
- 21 December 2024: The European Union Green Bonds Regulation comes into force, allowing the issue of “European Green Bond” (or “EuGB”) by companies, regional or local authorities and EEA supra-nationals.

All the strategies and policies presented below (starting from Para. 2) should be understood in this broad framework.

The plan also includes potential carbon tariffs for countries that don't curtail their greenhouse gas pollution at the same rate. The mechanism to achieve this is called the Carbon Border Adjustment Mechanism. It also includes:

- A circular economy action plan
- A review and possible revision (where needed) of the all-relevant climate-related policy instruments, including the Emissions Trading System,
- A Farm to Fork strategy along with a focus shift from compliance to performance (which will reward farmers for managing and storing carbon in the soil, improved nutrient management, reducing emissions, ...)
- A revision of the Energy Taxation Directive which is looking closely at fossil fuel subsidies and tax exemptions (aviation, shipping),
- A sustainable and smart mobility strategy and
- An EU Forest strategy, having as its key objectives' effective afforestation, and forest preservation and restoration in Europe.

It also leans on Horizon Europe, to play a pivotal role in leveraging national public and private investments more related to concrete results of R&I. Through partnerships with industry and member States, it will support research and innovation on transport technologies, including batteries, clean hydrogen, low-carbon steel making, circular bio-based sectors and the built environment, as well as on Nature-based Solutions (NBS), which, as stated in the previous chapter, play an increasingly central role in addressing the interlinked challenges of climate change mitigation and adaptation, across the world.

6.2. The strategies of Mitigation and Adaptation being carried out

Climate strategies will be presented below divided into “mitigation” and “adaptation”, while being aware of the overlaps and trade-offs between these two pillars, and therefore aware that this division is partly artificial.

6.2.1 The EU Mitigation policy

The EU mitigation policy has been formalized through the European Climate Law (published in the Official Journal on 9 July 2021 and entered into force on 29 July 2021) and through multiple collateral and subsequent provisions that we will talk about in this paragraph.

Specific aims of the EU Mitigation policy are:

- 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
- Set a more ambitious EU 2030 target, to set Europe on a responsible path to becoming climate-neutral by 2050
- 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.

The European Climate Law writes into law the goal set out in the European Green Deal for Europe’s economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels (‘Fit for 55’ legislation), in a fair, cost effective and competitive way. The EU Institutions and the Member States are bound to take the necessary measures at EU and national level to meet the target, taking into account the importance of promoting fairness and solidarity among Member States.

The Climate Law includes:

- A legal objective for the Union to reach climate neutrality by 2050
- An ambitious 2030 climate target of at least 55% reduction of net emissions of greenhouse gases as compared to 1990, with clarity on the contribution of emission reductions and removals
- Recognition of the need to enhance the EU's carbon sink through a more ambitious LULUCF regulation, for which the Commission made a proposal in July 2021, and which entered into force in May 2023

- A process for setting a 2040 climate target, taking into account an indicative greenhouse gas budget for 2030-2050 to be published by the Commission
- A commitment to negative emissions after 2050
- The establishment of European Scientific Advisory Board on Climate Change, that will provide independent scientific advice
- Stronger provisions on adaptation to climate change
- Strong coherence across Union policies with the climate neutrality objective
- A commitment to engage with sectors to prepare sector-specific roadmaps charting the path to climate neutrality in different areas of the economy.

The EU has legally binding climate targets covering all key sectors of the economy. The overall package includes:

- Emissions reduction targets across a broad range of sectors
- A target to boost natural carbon sinks
- An updated emissions trading system to cap emissions, put a price on pollution and generate investments in the green transition, and
- Social support for citizens and small businesses.

Member States should spend 100% of their emissions trading revenues on climate and energy-related projects and the social dimension of the transition.

Adopted measures are the following.

- a) EU Emissions Trading System reform (EU's key tool for reducing greenhouse gas emissions): The reform of the system is a part of the 'Fit for 55' package – a set of proposals to revise and update EU climate, energy and transport legislation, which will contribute to the EU's climate goals of reducing net greenhouse gas emissions by at least 55% by 2030 and reaching climate neutrality by 2050 (see also following items).
- b) New EU Emissions Trading System for building and road transport fuels (from 2027, building and transport fuels will be covered by emissions trading, putting a price on pollution, stimulating cleaner fuel use, and re-investing in clean technologies. Moreover, to complement new EU rules on buildings and guide Member States' efforts, there is a new indicative national benchmark of 49% of renewable energy in the buildings sector. The public sector will also be subject to a new annual energy consumption reduction target of 1.9%. The obligation of Member States to renovate each year at least 3% of total floor area of buildings owned by the public administration is extended from the central government to all levels of public administration).
- c) Energy Performance of Buildings Directive (to gradually improve the energy performance of buildings across Europe, taking carefully into account national circumstances. The necessary improvements can be achieved through several individual measures, such as installing insulation, replacing old windows or doors, upgrading heating systems, or installing solar panels).
- d) Social Climate Fund (*SEE BOX 1*).

- e) Effort Sharing Regulation (set a target for each member state to cut greenhouse gas emissions in several economic sectors, which currently represent 60% of the total EU emissions) .
- f) Regulation on Land Use, Forestry and Agriculture (see *BOX 2*).
- g) CO₂ emissions standards for cars and vans (new cars and vans registered in Europe will be zero-emission by 2035. As an intermediary step towards zero emissions, average emissions of new cars will have to come down by 55% by 2030, and new vans by 50% by 2030. This will put road transport on a firm path to zero-emission mobility in 2050).
- h) Carbon Border Adjustment Mechanism (the new Carbon Border Adjustment Mechanism will ensure that imported products will also pay a carbon price at the border in the sectors covered. This is a valuable tool for promoting global emissions reductions and leveraging the EU market to pursue our global climate goals).
- i) Renewable Energy Directive and Energy Efficiency Directive.
- j) Alternative Fuels Infrastructure Regulation.
- k) ReFuel EU Aviation Regulation (To promote sustainable aviation fuels (SAF), the minimum share of SAF required to be blended with kerosene by aviation fuel suppliers and supplied to EU airports has been increased; Carbon pricing also applies to the aviation sector. Until now, it applied to flights within the EEA and departing flights to Switzerland and the UK. From 2024, non-domestic flights to and from outermost regions are covered too).
- l) Fuel EU Maritime Regulation. A target for gradual reductions for the annual average greenhouse gas intensity of the energy used onboard by ships has been established to promote the uptake of renewable and low-carbon fuels).
- m) Updated EU rules to decarbonise gas markets and promote hydrogen.
- n) EU Methane Regulation for the energy sector.
- o) Net-Zero Industry Act (presented in March 2023, is part of the [Green Deal Industrial Plan](#) to scale up manufacturing of clean technologies in the EU, create green jobs and make sure the Union is well-equipped for the clean-energy transition. It will create better conditions to set up net-zero projects in Europe and attract investments).
- p) Biodiversity strategy for 2030 (See *BOX 3*).

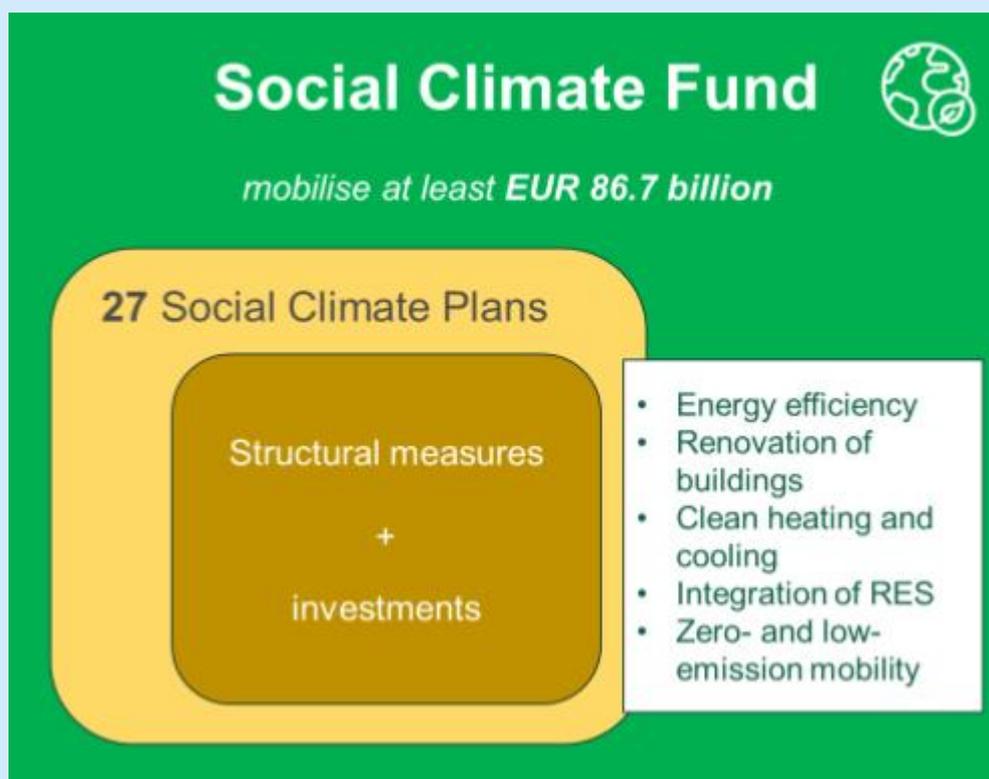
BOX 1 – THE SOCIAL CLIMATE FUND

The Social Climate Fund is a funding programme designed to contribute to a socially fair transition in the Union's effort to reach climate neutrality by 2050. It aims to address the social and economic impact of the climate transition on vulnerable groups. Notably, it aims to tackle energy and transport poverty and counterbalance the rising costs of fossil fuels resulting from extending the scheme for greenhouse gas emission trading to additional sectors in the European Union.

The general objective of the Social Climate Fund is to contribute to a socially fair transition towards climate neutrality by addressing the social impacts of the inclusion of greenhouse gas emissions from buildings and road transport. To this end, the Fund aims at mitigating the adverse impact of the climate transition on vulnerable groups.

The specific objective of the Fund is to support vulnerable households, vulnerable micro-enterprises and vulnerable transport users, through temporary direct income support and through measures and investments intended to increase the energy efficiency of buildings, decarbonisation of heating and cooling of buildings, including through the integration in buildings of renewable energy generation and storage, and to grant improved access to zero- and low-emission mobility and transport. It will provide Member States with financial support with a view to achieving milestones and targets set out in Social Climate Plans.

Figure 3 – visual representation of the structural set-up



Source: https://commission.europa.eu/social-climate-fund_en

The Social Climate Fund allows the Commission to disburse funds to support Member States in implementing structural measures and investments, which contribute to a socially fair transition towards climate neutrality by addressing the social impact of the inclusion of greenhouse gas emissions from buildings and road transport. The plan should help Member States reach the EU's 2030 climate and energy targets and, ultimately, achieve climate neutrality by 2050. Moreover, the plan should be in line with the reforms and commitments included in Member States' updated integrated national energy and climate plans, and also with the directive on energy efficiency, the European Pillar of Social Rights action plan, the cohesion policy programmes, the territorial just transition plans (see BOX 4), the recovery and resilience plans, the Modernisation Fund and the Member States' long-term building renovation strategies.

The Social Climate Fund provides non-repayable financial support (grants) to Member States to support the public investments and structural measures set out in the national Social Climate Plans. This will be generated on an exceptional and temporary basis through the auctioning of allowances under the emissions trading system. Notably, the fund will make available a maximum amount of EUR 65 billion for its implementation for the 2026-2032 period, and together with the mandatory co-financing from Member States it will mobilise at least EUR 86.7 billion.

The Social Climate Fund is a new Fund. Each Member State is expected to submit a Social Climate Plan detailing structural measures and investments it plans to implement between 2026 and 2032. To facilitate process, the Commission launched a dedicated initiative to help Member States develop their Social Climate Plans under the Technical Support Instrument. 10 Member States (Belgium, Czechia, Denmark, Greece, Finland, Croatia, Lithuania, Latvia, Romania, and Slovakia) are being supported through this instrument over the 2024-2025 period.

Sources: https://commission.europa.eu/social-climate-fund_en; <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R0955>; <https://op.europa.eu/en/publication-detail/-/publication/af68b4c7-3508-11ef-b441-01aa75ed71a1/language-en>; https://ec.europa.eu/commission/presscorner/api/files/attachment/869947/Social_factsheet_EN.pdf.

BOX 2 – THE EU forest strategy

The Forest strategy aims to contribute to the reduction of EU net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. Moreover, it aims to increase the size and quality of Europe's forests and improve their resilience to challenges such as climate change; while also supporting communities whose livelihood depends on forestry. The Strategy was adopted by the EU Council on November 15, 2021.

The measures proposed by the Commission to restore Europe's forests and protect forest-based industries include:

- Promoting sustainable forest management (SFM), including by encouraging the sustainable use of wood-based resources
- Providing financial incentives for forest owners and managers to adopt environmentally friendly practices such as those linked to carbon storage and sequestration
- Improving the size and biodiversity of forests, including by planting 3 billion new trees by 2030
- Promoting alternative forest industries such as ecotourism, as well as non-wood products such as cork, honey and medicinal plants
- Encouraging the take-up of financial support under the Common Agricultural Policy, which can help forests and forest-based industries mitigate against climate change
- Providing education and training for people working in forest-based industries and making these industries more attractive to young people
- Establishing a legally binding instrument for ecosystem restoration
- Protecting the EU's remaining primary and old-growth forests.

The Strategy also entails the need to strike a balance between the environmental, social and economic aspects of sustainable forest management, and stresses the importance of respecting and maintaining the diversity of forests and forest management practices in different member states and regions.

Sources: <https://www.consilium.europa.eu/en/press/press-releases/2021/11/15/council-adopts-conclusions-on-the-new-eu-forest-strategy-for-2030/>; <https://data.consilium.europa.eu/doc/document/ST-13537-2021-INIT/en/pdf>; <https://www.consilium.europa.eu/en/policies/deforestation/>; <https://www.consilium.europa.eu/en/policies/green-deal/>; <https://www.consilium.europa.eu/en/policies/climate-change/>.

BOX 3 – THE EU’s biodiversity strategy for 2030⁶

The EU’s biodiversity strategy for 2030 is a comprehensive, ambitious and long-term plan to protect nature and reverse the degradation of ecosystems. It includes the issue “Restoring nature and enabling biodiversity to thrive again offers a quick and cheap solution to absorb and store carbon”; so, it is included in the broad EU mitigation policy. The strategy includes the first ever Nature Restoration Law currently under negotiation. Moreover, bioenergy contributes to the phase-out of fossil fuels and the decarbonisation of the EU economy. But it must be used sustainably. A strict, new criteria to avoid unsustainable forest harvesting and to protect areas of high-biodiversity value will be applied in line with the increased climate and biodiversity ambition.

The biodiversity strategy aims to put Europe’s biodiversity on the path to recovery by 2030 for the benefit of people, climate and the planet. In the post-COVID-19 context, the strategy aims to build our societies’ resilience to future threats such as (i) the impacts of climate change; (ii) forest fires; (iii) food insecurity; (iv) disease outbreaks - including by protecting wildlife and fighting illegal wildlife trade.

The EU biodiversity contains specific commitments and actions:

- Enlarging the existing Natura 2000 areas, the EU-wide network of protected land and sea areas
- Launching an EU nature restoration plan, including the first ever Nature Restoration Law adopted on June 24, 2024
- Unlocking funding for biodiversity, to enable the necessary transformative change
- Introducing measures to tackle the global biodiversity challenge.

In particular, nature restoration plays an important role in limiting the progress of global warming by capturing and storing carbon, and in adapting to climate change, as well as in mitigating the impact of increasingly violent natural disasters such as floods, droughts and heat waves. Additionally, the unsustainable use of natural resources, in particular the degradation and pollution of soils, is a major driver of the climate and biodiversity crises. To tackle this, the Commission proposed a Soil Monitoring Law, which will put the EU on a pathway to healthy soils by 2050, by gathering data on soil health and making it available to farmers and other soil managers. Enhancing net carbon removals and boosting carbon sinks in the EU is paramount. The EU target for net carbon removals by natural sinks will increase to 310 million tons of CO₂ equivalent by 2030. Member States share responsibility for removing carbon from the atmosphere, they are responsible for caring for and expanding their carbon sinks to meet the new EU target.

This Nature Restoration Law lays down rules to contribute to:

- The long-term and sustained recovery of biodiverse and resilient ecosystems across the Member States’ land and sea areas through the restoration of degraded ecosystems
- Achieving the Union’s overarching objectives concerning climate change mitigation, climate change adaptation and land degradation neutrality

⁶ https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en
<https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal>
https://environment.ec.europa.eu/topics/nature-and-biodiversity/nature-restoration-law_en
<https://biodiversity.europa.eu/natura2000/en/natura2000#:~:text=The%20Natura%202000%20network%20is%20the%20biggest%20network,and%20around%209%20percent%20of%20its%20marine%20area> .
https://wwfeu.awsassets.panda.org/downloads/assessment_of_the_2030_eu_biodiversity_strategy_wwf_eu.pdf

- Enhancing food security
- Meeting the Union’s international commitments.

This Regulation establishes a framework within which Member States shall put in place effective and area-based restoration measures with the aim to jointly cover, as a Union target, throughout the areas and ecosystems within the scope of this Regulation, at least 20 % of land areas and at least 20 % of sea areas by 2030, and all ecosystems in need of restoration by 2050.

The European Commission’s Nature Restoration Law is the first continent-wide, comprehensive law of its kind. It is a key element of the EU Biodiversity Strategy, which calls for binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters.

Biodiversity is also addressed by all the projects that promote Nature-based-Solutions⁷/NBS (e.g., in the Horizon Europe program, being NBS one of the key mechanisms for promoting mitigation and facilitating adaptation).

Last but not least, it should be recalled that the European Union is a key actor in the framework of the Convention on Biological Diversity (CBD – described in the previous chapter), based on its ambition and accomplishments of the European Green Deal, thanks to the EU Biodiversity Strategy for 2030 and the comprehensive Nature Restoration Law with its binding targets to restore degraded ecosystems provide a strong basis to deliver on international commitments.

Sources: https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en;
<https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal>;
https://environment.ec.europa.eu/topics/nature-and-biodiversity/nature-restoration-law_en;
[https://biodiversity.europa.eu/natura2000/en/natura2000#:~:text=The%20Natura%202000%20network%20is%20the%20biggest%20network,and%20around%209%20percent%20of%20its%20marine%20area](https://biodiversity.europa.eu/natura2000/en/natura2000#:~:text=The%20Natura%202000%20network%20is%20the%20biggest%20network,and%20around%209%20percent%20of%20its%20marine%20area;);
https://wwfeu.awsassets.panda.org/downloads/assessment_of_the_2030_eu_biodiversity_strategy_wwf_eu.pdf;
https://environment.ec.europa.eu/news/eu-submits-targets-implement-global-biodiversity-framework-2024-08-02_en.

BOX 4 – The EU Just Transition Mechanism⁸

The Just Transition Mechanism addresses the social and economic effects of the (ecological/energy) transition, focusing on the regions, industries and workers who will face the greatest challenges, through three pillars



1. A new Just Transition Fund of €19.7 billion in current prices, which should mobilise (as co-funding) around €7.3 billion of national co-financing, amounting to a total of €27 billion. The Just Transition Fund counts €20.28 billion in grants for the period 2021-2027. This sum is invested in the regions and territories most affected by the transition into a climate-neutral economy. For that purpose, the EU has mobilized €20.28 billion in current prices. To be precise, the Just Transition Fund comprises €9248 million from

⁷ NBS are defined by the European Commission as: “Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions”. See: https://research-and-innovation.ec.europa.eu/research-area/environment/nature-based-solutions_en

the EU's financial programme, €10872.9 million from Next Generation EU funds, and €167.7 million stemming from other countries and entities' contributions. Access to the fund is conditional to the adoption of the European Union's 2050 climate objectives and the Commission's approval of the individual Territorial Just Transition Plans drafted by the Member States through the European Semester Framework. Each Territorial Just Transition Plan should detail the national strategies for transitioning into a more sustainable economy, identifying the regions and communities most affected by the phase out of high-carbon industries. These plans include measures for economic diversification, job creation, retraining programs for workers, infrastructure development for clean energy, and other projects that will facilitate the transition to a greener economy.



2. InvestEU “Just Transition” scheme will provide a budgetary guarantee under the InvestEU programme across the four policy windows and an InvestEU Advisory Hub that will act as a central entry point for advisory support requests. It is expected to mobilise €10-15 billion in mostly private sector investments. Through the InvestEU Just Transition Scheme, the European Investment Bank (EIB) will provide technical support and budgetary guarantees to incentivize investment in those areas that will bear the brunt of the green transition. It is expected to mobilize €15 billion in mostly private sector investments. These funds should be directed towards the development of sustainable energy infrastructures, transport, small business and education programs; targeting the territories identified in the Territorial Just Transition Plans prepared by the Member States.



3. A new Public Sector Loan Facility will combine €1.5 billion of grants financed from the EU budget with €10 billion of loans from the European Investment Bank, to mobilise €18.5 billion of public investment. The Public Sector Loan Facility is the third pillar of the Just Transition Mechanism. It involves a sum comprising €1.5 billion in grants, financed by the EU budget, and €10 billion in loans, from the European Investment Bank, mobilizing €18.5 billion of public investment. These funds aim to incentivize investment and economic growth in those areas most concerned by the green transition. These loans and grants are only accessible by legal entities established under the public or private law regimes of the different Member States; on the condition that their investment projects contribute to addressing the social, economic and environmental challenges deriving from the implementation of the Union's 2030 climate and energy targets.

The timeframe of the Just Transition Mechanism is 2021-2027.

Sources: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism_en;
<https://www.europarl.europa.eu/factsheets/en/sheet/214/just-transition-fund>

6.2.2 REPowerEU - Affordable, secure and sustainable energy for Europe

REPowerEU⁹ is a European Commission initiative to respond to the energy crisis caused by Russia's invasion of Ukraine. It aims to reduce gas demand, diversify

⁹ https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131

supplies, secure affordable energy and accelerate the clean energy transition. These are measures adopted because of an unforeseen situation, which, however, should have considerable effects in terms of climate change mitigation. Indeed, if the general objective is “to safeguarded EU citizens and businesses from energy shortages, supported Ukraine by weakening Russia's war chest, accelerated the transition to clean energy and stabilised prices”, the specific objectives are to help the EU to save energy; diversify energy supplies; produce clean energy (so, all with actual or potential effects on mitigation).

So, EU countries added specific chapters to their National Recovery and Resilience Plans (NRRPs) under Next Generation EU to finance key investments and reforms that will help achieve the REPowerEU objectives. These objectives include energy savings, diversification of energy supplies and faster deployment of renewable energy. Specifically, reforms and investments should focus on:

- Improving energy infrastructure and facilities to meet immediate needs for security of supply of gas, including liquefied natural gas, in particular to enable diversification of supply, in the interests of the EU as a whole
- Increasing energy efficiency in buildings
- decarbonising industry
- Increasing the production and deployment of sustainable biomethane and renewable or fossil-free hydrogen
- Increasing the share and faster deployment of renewable energy
- Tackling energy poverty
- Incentives to reduce energy demand
- Removing internal and cross-border bottlenecks in energy transmission and distribution and supporting zero-emission transport and related infrastructure, including railways.

6.2.3 The EU strategy on adaptation to Climate Change

The European Commission adopted the new EU Strategy on Adaptation to Climate Change in February 2021¹⁰, as an integral part of the European Green Deal and the European Climate Law. The 2021 Strategy sets new, more ambitious goals than the 2013 EU Adaptation Strategy. The 2021 strategy is, among others, connected with the [Sendai Framework for Disaster Risk Reduction 2015-2030](#) (mentioned in the previous chapter)¹¹.

The Strategy outlines a [long-term vision](#) for the EU to become a climate-resilient society, fully adapted to the unavoidable impacts of climate change by 2050. Complementing the EU's ambitious goal to become climate neutral by mid-century, this strategy aims to reinforce the adaptive capacity of the EU and the

https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repower-eu-affordable-secure-and-sustainable-energy-europe_en

https://energy.ec.europa.eu/topics/markets-and-consumers/actions-and-measures-energy-prices/repower-eu-2-years_en

<https://www.consilium.europa.eu/it/policies/eu-recovery-plan/repower-eu/>

¹⁰ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0082&from=EN>

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD:2021:26:FIN>

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN>

¹¹ European Commission (2023). Sendai Framework for Disaster Risk Reduction Midterm Review 2023 - Working towards the achievement of the Sendai priorities and targets.

world and minimise vulnerability to the impacts of climate change, in line with the Paris Agreement and the European Climate Law. The Strategy seeks to step up action across the economy and society in synergy with other Green Deal policies such as biodiversity protection and sustainable agriculture. This should be done by making adaptation smarter, swifter and more systemic, as well as stepping up international action on adaptation. This means improving our knowledge of climate impacts and adaptation solutions; stepping up adaptation planning and climate risk assessments; accelerating adaptation action; and helping to strengthen climate resilience globally. This strategy sets out a whole-economy approach, with particular consideration for those among us who are most vulnerable to guarantee that resilience is achieved in a just and fair way.

The EU adaptation strategy claims that the EU can move closer to its overarching goal of a climate-resilient society only by achieving progress on all the following four objectives.

- 1) Smarter adaptation focuses on improving knowledge and data and supporting digital innovation to boost understanding of present and future climate impacts at planetary and local scale (since there are gaps in data and methodologies to underpins decision making, due to insufficient knowledge and awareness on climate change adaptation, risk, vulnerability and resilience).
- 2) More systemic adaptation aims to support national, regional and local authorities in further developing adaptation strategies at all levels and enhancing frameworks for adaptation monitoring and reporting, building on national adaptation plans and other efforts (considering weaknesses in planning, monitoring, reporting and evaluating climate change adaptation, including the low priority and commitment given to adaptation in some regions, which have led to the generally slow pace of adoption and implementation of local adaptation strategies).
- 3) Faster adaptation is about increasing support for adaptation solutions through innovation and enabling activities, resilient infrastructure and resilient use of water resources (having noted the slow pace of action due to inadequate public and private-sector investment, and a lack of awareness or implementation of cost-effective solutions, which all hinder action).
- 4) Stepping up international action for climate resilience aims to support sub-national, national and regional approaches to adaptation, with a specific focus on adaptation in Africa, Small Island Developing States (SIDS), and Least Developed Countries (LDCs) (considering climate impacts generated outside the EU, which the 2013 adaptation strategy did not take into account or address, with international policy developments and increasing spillovers).

Under this strategy, the [Commission should](#):

- Help to close knowledge gaps on climate impacts and resilience, including on oceans, through Horizon Europe, Digital Europe, Copernicus and EMODnet

- Improve the state of the art on adaptation modelling, risk assessment and management tools – towards “asset-level modelling”
- Promote and support the use of its Risk Data Hub to harmonise the recording and collection of comprehensive and granular climate-related risk and losses data, and promote national level public-private partnerships to collect and share such data
- Explore with EIOPA (European Insurance and Occupational Pensions Authority) and industry the best ways to improve the collection of uniform and comprehensive insured loss data, and will empower EIOPA as needed
- Extend the scope of public access to environmental information in the INSPIRE Directive to include climate-related risk and losses data
- Update and expand Climate-ADAPT as source of knowledge on climate impacts and adaptation, including by federating various sources of information, and as monitoring and reporting mechanism (see below)
- Establish a European climate and health observatory under Climate-ADAPT
- Stimulate cooperation regionally and across borders and enhance the guidelines on national adaptation strategies in cooperation with the Member States
- Upgrade adaptation monitoring, reporting and evaluation by using a harmonised framework of standards and indicators
- Provide ex-ante project assessment tools to better identify co-benefits and positive impacts on the economy of adaptation and prevention projects
- Update its Better Regulation guidelines and toolbox to better reflect the principles of climate-risk management policy coherence
- Step up support to planning and implementation of local adaptation and launch an adaptation support facility under the EU Covenant of Mayors
- Support the reskilling and requalification of workers for a just and fair resilience with education and training through ESF+, Erasmus+ and European Solidarity Corps
- Continue to ensure the enforcement of existing employment and social legislation, and, where relevant, consider proposing new initiatives that increase workers’ protection from climate impacts
- develop ways to measure the potential impact of climate-related risks on public finances, develop tools and models for climate stress testing, and engage in discussions with Member States on better take into account climate change in national reporting and fiscal frameworks
- Explore and discuss with Member States actions to dampen the fiscal impact of climate-related events and reduce fiscal-sustainability risks
- Explore with Member States whether and to what extent Stability and Convergence Programmes could factor in the climate adaptation dimension
- Promote better coordination and complementarity between the post-disaster emergency and recovery operations supported by the European Union Solidarity Fund and other EU funds to encourage the “build back better” principle
- Propose nature-based solutions for carbon removals, including accounting and certification in upcoming carbon farming initiatives

- Develop the financial aspects of nature-based solutions and foster the development of financial approaches and products that also cover nature-based adaptation
- Continue to incentivise and assist Member States to rollout nature-based solutions through assessments, guidance, capacity building, and EU funding
- Implement the planned Horizon Europe Mission on ‘Adaptation to Climate Change’ and other adaptation-relevant Missions, including on soil health, climate-neutral cities, and oceans once these are endorsed
- Support the development of further adaptation solutions, including rapid response decision support tools to enrich the toolbox for adaptation practitioners
- Integrate adaptation in the update of Natura 2000 and climate change guidance, and in guidelines on biodiversity-friendly afforestation and reforestation, and in the forthcoming Forest Strategy
- Strengthen its support to protect the potential of genetic resources for adaptation, including by proposing legislation on the production and marketing of seeds
- Further develop the EU taxonomy for sustainable activities for climate adaptation
- Enhance climate proofing guidance, and promote its use in Europe and abroad
- Develop an EU-wide climate risk assessment and strengthen climate considerations in EU disaster risk prevention and management
- Address EU-level preparedness and response to climate-related health threats, including through the EU Framework on Health Threats and, as relevant, the planned Health Emergency Preparedness and Response Authority
- Increase cooperation with standardisation organisations to climate-proof standards and to develop new ones for climate adaptation solutions
- Support the integration of climate resilience considerations into the criteria applicable to the construction and renovation of buildings and critical infrastructure
- Help to examine natural disaster insurance penetration in Member States, and promote it, for example through guidelines and invite EIOPA to develop its natural catastrophe dashboard allowing country-level assessments
- Strengthen dialogue between insurers, policymakers and other stakeholders
- Identify and promote best practices in financial instruments for risk management, in close cooperation with EIOPA
- Explore the wider use of financial instruments and innovative solutions to deal with climate-induced risks
- Help ensure climate-resilient, sustainable use and management of water across sectors and borders by improving coordination of thematic plans and other mechanisms, such as water resource allocation and water-permits

- Help reduce water use by raising the water-saving requirements for products, encouraging water efficiency and savings, and by promoting the wider use of drought management plans as well as sustainable soil management and land-use
- Help to guarantee a stable and secure supply of drinking water, by encouraging the incorporation of the risks of climate change in risk analyses of water management
- Strengthen the support for the development and implementation of Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs) in EU partner countries and mainstream conflict-sensitive, anticipatory and preventive climate resilience and preparedness in relevant EU policies and instruments for external action (as established by the UNCoP – see the previous chapter -, NDCs should reflect each world country's commitments to reducing emissions; while NAPs should guide climate-resilient investments)
- Intensify and broaden adaptation support to local authorities in EU partner countries and develop regional programmes, including for countries in the EU Southern and Eastern neighbourhoods, and in candidate countries and potential candidates
- Include climate change considerations in the future agreement on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction
- Aim to increase international climate finance for adaptation through the EU instruments for external action and by leveraging private sector investments
- Promote the design and implementation of disaster risk finance strategies to increase macroeconomic climate resilience in partner countries
- Support partner countries in the design of policies and incentives to promote climate-resilient investment, including in nature-based solutions
- Enhance the climate-proofing of all EU external investments and actions
- Submit the EU's adaptation plans and actions under the Paris Agreement
- Deepen political engagement on climate change adaptation with international and regional partners, and partner countries
- Increase the pool of knowledge and tools on adaptation available to non-EU countries and promote adaptation in Green Alliances and partnerships.

Financial support for adaptation is made available through the European Structural and Investment Funds, the Common Agricultural Policy, the LIFE Programme, and the Recovery and Resilience Facility. The Horizon Europe Mission on Adaptation to Climate Change also leverages significant resources in the effort to make Europe climate resilient.

The strategy includes the set-up of the “[Climate Adaptation Investment Advisory platform](#) (Climate Adapt)” – Sharing adaptation knowledge for a climate-resilient Europe”. This is an Adaptation Support Tool (AST) that assists policy makers and coordinators on the national level in developing, implementing, monitoring and evaluating climate change adaptation strategies and plans. The AST was developed as a practical guidance tool for national level actors for all steps needed to develop, implement, monitor and

evaluate a national adaptation strategy. It also supports sub-national actors and trans-national actors to prepare for, develop, implement and monitor and evaluate adaptation strategies. Furthermore, ADAPT will provide advisory on tailored financial instruments in climate change adaptation, including advisory services for Financial Intermediaries, for example National Promotional Banks, to pilot support for the design, launch and implementation of adaptation financing products.

The platform also includes detailed description of Case studies i.e., flagship of the Climate-ADAPT platform and showcase initiatives that are already being carried out in Europe. They have a comprehensive structure that covers all the key aspects in the implementation cycle of adaptation. Finally, the country profiles showcase the current status of national adaptation actions reported under the Governance Regulation per country.

Last but not least It is necessary to specify that, beyond what is promoted and implemented in order to achieve a greater and better adaptation of the countries (territories) of Europe to climate change, the European Union promotes adaptation policies at a global level and therefore well beyond the territory of the European Union, mostly through multiple projects promoted and financed outside Europe, also in collaboration with other international organisations (two examples are the [“Building Disaster Resilience to Natural Hazards in Sub-Saharan African Regions, Countries and Communities Program”](#) from 2016 to 2021; or the [“Regreening Africa programme”](#), which second phase was launched in December 2024), but also in the framework of the UNCCD (see previous chapter), e.g., recently, pushing for increased global cooperation on desertification, drought and land degradation at [UNCCD COP16](#).

BOX 5 – THE EIB ADAPTATION POLICY

The European Investment Bank (EIB) is committed to ensuring that all the operations it supports are adapted and build greater resilience to current weather variability and future climate change, in line with the adaptation goals of the Paris Agreement. This objective aims to ensure that public and private sector projects financed by the EIB can perform well under a changing climate and contribute to protect people, businesses, infrastructure and ecosystem from the impacts of climate. It is anchored in the project-level assessment of physical climate risk, strengthened internal training and leveraging the latest climate data and science for the benefit of clients' and EIB's own decision-making. Moreover, EIB aims to catalyse further investment in adaptation and projects that build climate resilience. This involves actively pursuing investment opportunities in the development and deployment of technologies, products and services that enable adaptation and resilience. By supporting private sector companies and solution providers, EIB looks to play a key role in driving forward technological innovation, and supporting transformative solutions for climate adaptation. And finally, EIB aims to work with public and private sector clients to further develop their capacity and approaches to climate resilience. By providing advisory services to businesses, financial institutions and public authorities, EIB can improve understanding on how climate change may impact clients' activities and support the development of adaptation investment plans.

So, the EIB has developed tools to manage physical climate risks at project and portfolio level. At project level, the EIB introduced the Climate Risk Assessment System (CRA) – a tool to systematically assess physical climate risk in direct lending operations. The CRA system is a business process that helps the EIB and its clients understand how climate change may affect investments and identify adaptation responses. Through the knowledge partnerships with climate service providers described above, the EIB will leverage the latest findings in climate science. As the science on the impacts of a changing climate advances, the EIB will improve and further enhance the Bank's CRA systems.

By 2025, the EIB will: (i) Grow the share of EIB climate action for adaptation to 15% of EIB's overall climate financing (against 4-5% in 2012-2019); (ii) Ensure high impact and measure the results of adaptation finance through a series of new dedicated indicators.

Key investment areas are as follows.

A) COPING WITH WATER SCARCITY AND THE INCREASED RISK OF FLOODING

- i. Coastal and inland flood prevention, preparedness and protection
- ii. Urban storm-water management and sustainable drainage systems
- iii. Water storage, supply and efficiency to manage water scarcity and droughts

B) PROTECTING ENERGY AND TRANSPORT SECTORS

- i. Enhancing the climate resilience of electricity systems
- ii. Protection of transport infrastructure networks

C) GREATER RESILIENCE IN CITIES AND REGIONS

- i. Urban regeneration, water and storm-water management, including nature-based solutions to address more severe flooding, heat waves, storm surges, and droughts
- ii. Protecting urban infrastructure and buildings

D) STRENGTHENING CLIMATE RESILIENCE OF FOOD SYSTEMS, FOREST AND ECOSYSTEMS

- i. Sustainable production and food value chain that can withstand extreme weather

- ii. Afforestation, reforestation, climate resilient land management practices, land and marine ecosystem protection and restoration
- E) HEALTH, EDUCATION AND PUBLIC RESEARCH
- i. Prevention and care for people confronted with climate-induced diseases and heat stress
 - ii. Increasing the understanding of climate change and its impacts
- F) INNOVATION
- i. Research and development in innovative technologies and solutions
 - ii. Research on the effects of climate change on health
 - iii. Climate resilience innovation
- G) DISASTER RISK MANAGEMENT
- i. Supporting water-related disaster management, emergency response and recovery in regions that are vulnerable to flooding
 - ii. Disaster risk management for anticipating and responding to extreme weather events
- H) PROMOTING GENDER-RESPONSIVE ADAPTATION FINANCING

6.2.4 The European Central Bank Climate Agenda

This Climate Agenda has been adopted in May 2022 since ECB should play its role in the fight against climate change, both since all public actors should be engaged and, more specifically, since as a European institution they should play their part in supporting general economic policies which contribute towards the achievement of the [EU's Treaty-based objectives](#) (and such objectives include protecting the environment).

[ECB work on climate change](#) focuses on three main areas:

- 1) Managing climate-related risk – “We work to better understand, monitor and manage climate-related risks in monetary policy and investment operations, and in the financial system. We also assess the economic impact of climate-related policies and explore the relationship between climate, nature and the economy.”
- 2) Support the green transition – “We support an orderly transition to a carbon-neutral economy using measures within our mandate. This includes promoting the development of sustainable finance and creating incentives for a greener financial system.
- 3) Fostering wider action – “We help improve general understanding of climate and nature-related risks and work closely with European and international partners on climate and sustainable finance topics. We also work to improve the transparency of our activities and reduce our own environmental impact.”

In relation to these three areas ECB considers articulated according to six priorities.

- 1) Assess the macroeconomic impact of climate change and mitigation policies on inflation and the real economy:
 - a. Evaluate the impact of climate change mitigation policies on Eurosystem/ECB staff macroeconomic and fiscal projections

- b. Include climate change considerations in macroeconomic modelling for policy simulations
 - c. Assess the impact of energy transition (including carbon prices) on energy prices, inflation, output and monetary policy
 - d. Assess the impact of climate change and mitigation policies on global commodity and financial markets
 - e. Analyse the medium- to long-term economic impact of climate change and the green transition
 - f. Monitor and contribute to discussions on climate change-related policies (in particular carbon pricing) within the EU and at the international level.
- 2) Improve the availability and quality of climate data to better identify and manage climate-related risks and opportunities:
- a. Develop experimental data indicators for use in climate change-related analysis
 - b. Procure climate change-related commercial data for use by the ECB
 - c. Assess data for use in transition and physical risk analysis.
- 3) Enhance climate change-related financial risk assessment:
- a. Develop and perform a (pilot) climate stress test of the Eurosystem balance sheet
 - b. Review and evaluate climate change-related risks in credit ratings; develop minimum standards for in-house credit assessment systems
 - c. Monitor climate change-related risks for the financial system
 - d. Develop and perform climate stress tests of the financial system
 - e. Conduct supervisory assessments and follow-ups in respect of banks' climate risk management capabilities (including a thematic review of climate-related and environmental risk, a targeted review of commercial real estate, and on-site inspections)
 - f. Develop and share best practices regarding banks' climate risk strategies, governance, risk management and disclosures
 - g. Assess and follow up on banks' alignment with ECB supervisory expectations in respect of climate change-related disclosures and compliance with regulatory standards
 - h. Fully integrate climate risks into supervisory methodologies and processes
 - i. Contribute to policy development to integrate climate change-related risks into the prudential framework.
- 4) Consider options for monetary policy operations and assess the impact of climate change on monetary policy:
- a. Introduce climate change-related disclosures as an eligibility requirement in the collateral framework and asset purchases
 - b. Climate change-related risks in the collateral framework: consider policy proposals
 - c. Consider climate change in corporate sector asset purchases
 - d. Assess the impact of climate change on the monetary policy stance and transmission mechanism.

- 5) Analyse and contribute to policy discussions to scale up green finance:
 - a. Assess the role of green financial instruments and investors in financing the transition to a net-zero emissions economy, and other related policies
 - b. Research the potential role of central banks in financial markets and green innovation
 - c. Monitor and contribute to EU-wide and international policy discussions to scale up green and sustainable finance, including by carrying out analytical work to inform the ECB’s policy positions.
- 6) Increase transparency and promote best practices to reduce the environmental impact:
 - a. Disclose climate change-related information about the corporate sector purchase programme and Eurosystem euro-denominated non-monetary policy portfolios
 - b. Invest the ECB’s non-monetary policy portfolios in a sustainable and responsible manner
 - c. Produce and report the ECB’s corporate sustainability disclosures
 - d. Achieve the ECB’s Paris Agreement-aligned corporate sustainability targets
 - e. Increase the environmental sustainability of the cash cycle
 - f. Ensure effective and transparent communication with key audiences on climate change-related matters.

6.3. The governance framework

As already mentioned, there are many actors among the European institutions who have contributed to designing and are contributing to implementing policies related to the mitigation of or adaptation to climate change. We have mentioned the European Commission, the European Parliament (which has adopted or is discussing the Laws, Directives and Regulations we have quoted, together with the European Council – representing directly the Member States, often in a dialectical relationship¹² in search of specific agreements), the European Investment Bank and the Central European Bank.

The European Economic and Social Committee (EESC) is also very active on climate issues in support of the Paris Agreement, with meetings organised to encourage active civil society participation. The EESC produces opinions that cover a wide range of issues such as climate justice, a fair transition to a low-carbon economy and the need for multi-stakeholder, multi-level climate governance collaboration. The EESC takes part in the annual UNFCCC

¹² Sometimes even in a polemical way, as in the case of the EU Forest strategy. In this respect, the EU council “REGRETS that the new EU Forest Strategy was not developed together with the Member States and stakeholders and EXPRESSES willingness and readiness to cooperate with the Commission and RECOGNIZES that there is shared interest in working together on implementing the New EU-forest Strategy for 2030 in an integrated manner. In this regard, STRESSES the importance of cooperation, coordination and joint activities between Member States, the European Commission as well as other important partners in the pan- European region on forest policy related matter”. See: <https://data.consilium.europa.eu/doc/document/ST-13537-2021-INIT/en/pdf>

Conferences of the Parties and in climate-oriented civil society summits that bring together non-state players.

The same can be said about the European Committee of the Regions (CoR). The [Commission for the Environment, Climate Change and Energy of the CoR](#) is responsible for coordinating the Committee of the Regions' work in fields related to the European Green Deal, which include the environment, biodiversity, circular economy, zero pollution, climate change, energy, and space policies. The commission is also responsible for the Green Deal Local Working Group and other networks and platforms, such as the Covenant of Mayors National Ambassadors, CoR Climate Pact Ambassadors, and the Zero Pollution Stakeholder Platform. At the global level, the commission plays a leading role in CoR's involvement at UN conferences for climate change and biodiversity.

Coming back to the European Parliament, it has a Committee on Environment, public health and food safety. Moreover, many other European Parliament Committees are dealing with climate change issues from their own perspective (“Development”, “Industry, research and energy”, “Agriculture and rural development”, and others).

Speaking of the European level, the entity to which we must pay most attention for drawing the governance framework, is still the Commission.

One among the Directorate General of the European Commission is CLIMA (Climate Action). [DG CLIMA](#) leads the European Commission's efforts to fight climate change at EU and international level. Its key mission is to formulate and implement EU climate policies and strategies, so that the EU can turn into the first climate-neutral and climate-resilient continent by 2050. DG CLIMA plays a leading role in developing and facilitating the implementation of cost-efficient policies and legislation to deliver the European Green Deal. The DG promotes innovative decarbonisation technologies to tackle global warming. It aims at ensuring prosperity and wellbeing, instilling a new climate culture in Europe, changing behaviours across our society. It maintains an ambitious global leadership in climate action, protecting the ozone layer, enhancing the international and domestic carbon market. It contributes to greening finance, ensuring the mainstreaming of climate action into the EU budget, into EU and Member States policies.

Mitigation and/or adaptation policies related to climate change are also taken into account by other Directorate Generals, *in primis*:

- The [DG Energy](#), which deals with issues such as Energy Efficiency, Renewable Energy, and Carbon management and fossil fuels
- The [DG Environment](#), who proposes and implements policies that ensure a high level of environmental protection (e.g., Nature and biodiversity and Forests)
- The [DG AGRI](#) (Agriculture and Rural Development), who supports and promotes a knowledge and evidence-based green and digital transition towards a sustainable, competitive, and resilient EU agriculture, rural areas and food systems

- The DG ECHO (European Civil Protection and Humanitarian Aid Operations). Which, among others, manage the EU Civil Protection Mechanism that includes all EU Member States, as well as 10 participating states (Albania, Bosnia and Herzegovina, Iceland, Montenegro, North Macedonia, Moldova, Norway, Serbia, Türkiye, and Ukraine), and acts worldwide; moreover, through this DG, the European Union works with national civil protection authorities also to support, complement, and coordinate their efforts in prevention and risk management planning, including financing relevant prevention and preparedness projects
- The DG MOVE (Mobility and transports), who deals, among other, on issues, such as clean transport and sustainable transport
- The DG RTD (Research & Innovation), responsible for EU policy on research, science and innovation and more specifically of the Horizon Europe program, which include a specific cluster on “Climate, energy and mobility” and a further one on “Food, bioeconomy, natural resources, agriculture, and environment”
- We should mention also the Directorate General for International Partnership (INTPA). INTPA includes one branch (INTPA-F) dealing with Green Deal and the digital agenda. INTPA focus is the world beyond Europe and so, support multiple programs mainly in Africa, but also in other world regions. In connection with the Green Deal, these programs are also functional to the obligations established within the framework of the United Nations mechanisms described in the previous chapter in relation to climate strategies (UNFCCC, UNCCD, and CBD) and the achievement of the climate goals set by the parties within the framework of these instruments in developing, emerging and transition countries¹³.

Coming back to the European region, an important role is also played by the European Climate, Infrastructure and Environment Executive Agency (CINEA), which manages European Commission programmes contributing to decarbonisation and sustainable growth (among others, the Just Transition mechanism mentioned above; the Horizon Europe’s projects on Mobility and transport, Energy, and Climate action; and the LIFE program¹⁴).

Looking at the European Commission, we have also to mention the Recovery and Resilience Task Force (RECOVER) established within the EC’s Secretariat-General. RECOVER is responsible for steering the implementation of the

¹³ In 2023, the European Union and its 27 member states contributed €28.6 billion in climate finance from public sources (funds have more than doubled in the last 10 years, being €9.6 billion in 2013), including the EU budget, the European Development Fund and the European Investment Bank and mobilised an additional €7.2 billion in private finance to support developing countries to reduce their greenhouse gas emissions and adapt to the impacts of climate change. Half of the public funding was dedicated to either climate adaptation or cross-cutting action (involving both climate change mitigation and adaptation initiatives) in developing countries.

¹⁴ The LIFE Programme is the EU’s funding instrument for the environment and climate action – See: https://cinea.ec.europa.eu/programmes/life_en. One of the four sub-programs of LIFE is the Climate Change Mitigation and Adaptation sub-programme, which, on one hand supports projects in the areas of farming, land use, peatland management, renewable energies and energy efficiency and promotes integrated approaches, to implement climate change mitigation strategies and action plans at regional or national level; on the other, co-finances projects on urban adaptation and land-use planning, resilience of infrastructure, sustainable management of water in drought-prone areas, flood and coastal management, resilience of the agricultural, forestry and tourism sectors, and preparedness for extreme weather events, notably in coastal areas in the EU’s outermost regions. See: https://cinea.ec.europa.eu/programmes/life/climate-change-mitigation-and-adaptation_en

Recovery and Resilience Facility, which has the aim to make European economies and societies more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions.

Finally, we have also to mention the European Environment Agency (EEA). It is an agency of the European Union that delivers knowledge and data to support Europe's environment and climate goals. In collaboration with its partner European Environment Information and Observation Network (Eionet)¹⁵, the EEA informs decision-makers and the public about the state of Europe's environment, climate change and wider sustainability issues. The [EEA's core tasks](#) include: (i) supporting policy development and key global processes; (ii) offering analytical expertise; (iii) providing and maintaining an efficient reporting infrastructure for national and international data flows.

The related adaptation and mitigation policies we discussed in the Para. 2 do not involve only bodies at the European level, such as the ones mentioned above, but also at the national level in the EU Member States. Indeed, climate change policies need strong cooperation.

More specifically, to help the EU reach its 2030 climate and energy targets (i.e., EU mitigation policy and EU adaptation policy), the "[Regulation on the Governance of the Energy Union and Climate Action](#)" set common rules for planning, reporting and monitoring. The Regulation also ensures that EU planning and reporting are synchronised with the ambition cycles under the Paris Agreement. Under the Governance Regulation, EU Member States develop integrated national energy and climate plans based on a common template. The plans cover the five dimensions of the Energy Union: (i) decarbonisation (greenhouse gas reduction and renewables); (ii) energy security; (iii) energy efficiency; (iv) internal energy market; (v) research, innovation and competitiveness.

Member States had to submit their 2021-2030 draft plans by the end of 2018 and final plans by the end of 2019. The Commission has assessed these both at EU and Member State level. Member States had also to update their national energy and climate plans by the end of June 2023 in a draft form and by 30 June 2024 in a final form in order to reflect an increased ambition. Member States are also required to develop national long-term strategies and ensure consistency between these strategies and their national energy and climate plans. Member States will report on the [progress made in implementing their energy and climate policies](#), including their national energy and climate plans.

The EU Forest strategy should be implemented in each Member State under EC coordination. Nevertheless, the [Member States expressed doubt about the value of developing national strategic plans for forestry](#), as envisaged in the Commission's communication, and encouraged the use of existing international monitoring and reporting processes.

¹⁵ Eionet is a partnership network of the EEA and its 38 member and cooperating countries. EEA and Eionet gather and develop data, knowledge, and advice to policy makers about Europe's environment.

Finally, looking at the Nature Restoration Law (EU Biodiversity strategy for 2030) Member States are expected to submit National Restoration Plans to the Commission within two years of the Regulation coming into force (so by mid-2026), showing how they will deliver on the targets. They will also be required to monitor and report on their progress. The European Environment Agency will draw up regular technical reports on progress towards the targets. The Commission, in turn, will report to the European Parliament and to the [Council on the implementation of the Nature Restoration Law](#).

Of course, as we'll see in the next chapters, "Member States" means very complex and articulated contexts. So, in each Member State, there are specific branches (Ministries, Directorate-General, Authorities or anything else that are responsible for a specific policy in the country).

For instance, with respect to the implementation of the EU Social Climate Funds, the following table illustrates the responsible authorities for these strategies at the national levels (some of them having also further responsibilities).

Table 1 – Competent authorities by Member State

MEMBER STATE	Member State national authorities responsible for the Social Climate Plans
Belgium	Federal Public Service (FPS) Health, Food Chain Safety and Environment; Flemish Energy and Climate Agency; Walloon Agency for Air & Climate (AWAC); Brussels Environment
Bulgaria	Ministry of Environment and Waters
Czechia	Ministry of Environment
Denmark	Ministry of Climate, Energy and Utilities
Germany	Ministry for Economic Affairs and Climate Action or Ministry for Labour and Social Affairs
Estonia	Ministry of Finance
Ireland	Department of the Environment, Climate and Communications
Greece	Ministry of Environment and Energy
Spain	Ministry for the Ecological Transition and the Demographic Challenge
France	Prime Minister's office - General Secretariat of European Affairs
Croatia	Ministry of Environmental Protection and Green Transition
Italy	Ministry of Environment
Cyprus	Ministry of Finance
Latvia	Ministry of Climate and Energy
Lithuania	Ministry of Environment
Luxembourg	Ministry of Environment
Hungary	Ministry of Energy and the Ministry of Economics and Sustainable Development
Malta	Ministry for EU Funds
The Netherlands	Ministry of Social Affairs and Employment
Austria	Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology and Ministry of Finance
Poland	Ministry of Development Funds and Regional Policy
Portugal	Ministry for Territorial Cohesion and Ministry for Environment and Energy
Romania	Ministry of Investments and European Projects
Slovenia	Ministry of Environment, Climate and Energy
Slovakia	The National Implementation and Coordination Authority under the Government Office
Finland	Ministry of Environment
Sweden	Ministry of Climate and Enterprise

6.4. The main dynamic aspects of these policies/strategies

The policies designed at the EU level were characterized by some interesting dynamics in the last years based on the interaction among the various actors composing the Governance Framework briefly described above.

6.4.1 Mitigation

As a further step on the path towards climate neutrality, the Commission presented its assessment of the EU mitigation policy for a 2040 climate target for the EU in February 2024. It recommended reducing net greenhouse gas emissions in the EU by 90% by 2040 compared to 1990 levels, which is in line with recent scientific advice and the EU's commitments under the Paris Agreement. The European Parliament and Member States will discuss this target, and the next Commission will put forward legislative proposals on that basis.

6.4.2 Adaptation

The EU strategy on Adaptation to Climate Change was designed after an open public consultation between May and August 2020. Two policy options were assessed against their potential impact and achievement of these objectives, compared to a baseline to continue action under the 2013 strategy.

- Option 1 (more ambition) proposes making ambitious changes to both the form and nature of the eight actions in the 2013 strategy. It also proposes a wide range of new measures to deepen their impact. This represents a clear step up in ambition, with commensurate increases in visibility and effectiveness for EU-level action while remaining well within the policy scope of the 2013 strategy.
- Option 2 (more ambition and change) includes the changes proposed under Option 1 and adds 6 new actions to the strategy, each of which include several new measures. This represents a higher level of political ambition in EU adaptation policy, including in its international commitments. It expands into thematic areas of prime importance (e.g., innovation, ecosystem services, closing the climate protection gap) and by seeking to add greater policy coherence to EU actions on adaptation, including internationally, it constitutes a clear step up from the baseline.

Option 2 performs best on almost all measures and is therefore the preferred option. The assessment was made in the context of different climate (temperature) scenarios and shows robustness to this sensitivity check. Economic modelling and qualitative analyses estimate that it would yield the greatest benefits for economic welfare, reducing losses to economic welfare and employment compared to the baseline. It would also generate a more positive impact overall than Option 1 on the economic impacts of competitiveness, trade and investment, and innovation and research. Option 2 identifies positive social impacts in terms of income distribution, welfare and social inclusion, as well as major positive impacts for public health and safety. The assessment of Option 2 was also positive on environmental impacts, in terms of its impact on climate resilience, the quality and availability of natural

resources, reducing pollution, and on biodiversity and ecosystem services. Lastly, it was assessed to generate considerably more positive impacts in non-EU countries and international relations. The benefits of both options increase at higher temperature (where climate damages are higher), but Option 2 remains best.

6.4.3 Just Transition Fund

The Just Transition Fund experienced several hurdles during its implementation. Initially, Eastern Member States proposed delaying implementation of the EU's green agenda to focus instead on the economic repercussions of the Covid-19 pandemic. Additionally, the deadlock at the Next Generation EU negotiations further complicated the fund's deployment.

One of the main points of contention during the negotiation was the discrepancies between Western and Eastern Member States regarding the framing of the EU's climate-neutrality objectives. A group of countries including Sweden, Austria, Luxembourg, Denmark and Spain wanted to apply the climate neutrality target to each Member State individually and not just to the EU. Meanwhile Eastern European countries favoured a less ambitious framing that would take into consideration the national circumstances of each Member State, their degree of technological development and their respective capacity to implement the Union's 2030 and 2050 climate objectives.

6.5. A first assessment of the effectiveness of the strategies/policies

The "[Regulation on the Governance of the Energy Union and Climate Action](#)" includes the necessary elements to track progress in the implementation of EU climate legislation. It also lays down a monitoring mechanism for greenhouse gas emissions and other climate information so that the EU will be able to comply with its reporting obligations under the UNFCCC and Paris Agreement.

In 2023, for the first time, the Commission assessed progress towards the climate neutrality and adaptation objectives, as required under the European Climate Law. The findings were published as part of the 2023 Climate Action Progress Report and in a separate [Staff Working Document on national progress with implementing adaptation](#).

Although greenhouse gas emissions continue to fall and there are encouraging signs of action on the ground, the Commission's assessment is that current progress towards the EU's climate neutrality objective appears to be insufficient. Action is most needed in areas which still require significant reductions in emissions (e.g., buildings, transport), where progress is too slow (e.g., agriculture), or where, in recent years, there has been a deteriorating trend, as is the case for the carbon sink (e.g., land use, land-use change, and forestry). Numerous technologies and policies exist to reduce Greenhouse gases emissions. Significant technical progress has been made in the last 5 years in areas such as wind turbines, hybrid engine cars, underground CO₂ storage, etc. But significant barriers exist. Barriers add to the cost of implementation and reduce the realizable potential implementing mitigation measures can face

various barriers, such as financial, technical, social, political, or institutional challenges related to the different sectors. [Specific barriers](#) have been identified in relation to the different sectors (e.g., building, transport, energy supply, industry, forestry, agriculture, waste management).

The European Union has made broad progress on adaptation to climate change, in particular through the ongoing implementation of the EU Adaptation Strategy. However, progress has been uneven across areas. The assessment of progress on adaptation at the national level shows that Member States need to take significantly more action to adapt to climate change – for instance, on governance, funding, risk assessments, nature-based solutions, as well as monitoring, reporting and evaluation in order to reduce their social and economic vulnerabilities to the intensifying climate-related risks.

With respect to the “EU Biodiversity strategy for 2030” an ex-ante assessment has been implemented in 2020 by WWF, called “The European Commission commitment to increase its contribution to global biodiversity finance remains vague, as no specific target is mentioned. [Increased financing should go hand in hand with other measures](#), such as capacity building and promotion of policy reforms especially in the context of EU’s cooperation with Least Developed Countries (LDCs), Small Island Developing States (SIDS) and fragile developing partner countries.”

An assessment of the just transition policies implemented in 2022 highlighted the characteristics of plans to phase out the fossil fuel industry, spread over several years, and starting with a coal phase-out. This type of just transition policy will derail the development of low-carbon economies worldwide. These policies through the establishment of just transition funds in 2019 and 2020 have (we might say paradoxically) led to subsidizing the fossil fuel industry indefinitely, since it is to this industry that they apply, albeit with a view to its phased out. Proactive policy needs to be developed, and finance re-allocated to deliver the just transition to a low-carbon economy. In essence a just transition policy overhaul is needed to complete revision if society is to achieve [Energy & Climate 2030 goals and targets](#). Recent research has also highlighted the lack of sufficient funding for the Just Transition Fund to meet the EU's 2030 and 2050 climate goals¹⁶. The [Bankwatch Network](#) argued in 2021 that the Just Transition Fund is minuscule – between 1% and 3% – to effectively support the transition of these regions. The sceptical viewpoint suggests that the Just Transition Fund might serve as a tool for the European Commission to secure political support from Eastern member states for the [EU's Climate Law and 2050 carbon neutrality](#). Another criticism is that the major challenge in achieving a just transition to a low-carbon economy lies in the current financial support for fossil fuels. Critics argue that establishing just transition funds will inadvertently lead to the indefinite subsidizing of the fossil fuel industry¹⁷. Finally, the Just Transition Mechanism’s sectorial and territorial focus, seems to favour male-

¹⁶ Pianta, M., & Lucchese, M. (2020). Rethinking the European Green Deal: An industrial policy for a just transition in Europe. *Review of Radical Political Economics*, 52(4), 633-641.

¹⁷ Heffron, R. J., & McCauley, D. (2022). The ‘just transition’ threat to our Energy and Climate 2030 targets. *Energy Policy*, 165, 112949.

dominated sectors and neglects those where women are disproportionately represented, often characterized by low wages and job insecurity. This trend threatens to reinforce existing gender segregation and other disparities within these sectors and the broader labour market, while a gender-focus, adopting an intersectional approach, is needed.

Finally, an extensive picture can be drawn on the results achieved by the REPowerEU. It emerges that REPowerEU has played a crucial role in safeguarding EU citizens and businesses from energy shortages, while also providing vital support to Ukraine by weakening Russia's war chest. Through joint efforts, Europe has not only made a massive cut in Russian energy imports but has also accelerated its transition to clean energy. Among the results achieved, we highlight here those are the most related to climate change mitigation. SAVING ENERGY - Thanks to the actions of citizens, businesses and EU countries alike, the EU has overachieved its voluntary target to reduce gas demand by 15%. Natural gas demand declined by 18% between August 2022 and March 2024. This helped the EU save 125 billion cubic meters (bcm) of gas. RENEWABLE ENERGY – Rapidly increasing renewable energy installation – reaching a record of almost 96 GW of new solar energy capacity installed and increasing wind capacity by 33 GW since 2022. Mid-2024, Europe is producing more electricity from wind and solar than from gas for the first time, since 2022.

Broadly speaking, two years on, the EU has successfully met most of the ambitious targets set out in the REPowerEU Plan and is now on good track to completely get rid of Russian fossil fuels while continuing to pursue the green transition and supporting Ukraine.

SECTION 2 – National Level

7. AUSTRIA

7.1. Introduction

Austria's approach to tackling climate change integrates mitigation and adaptation efforts through the development of its **National Adaptation Strategy (NAS)** and the **Climate Action Plan**. This allows the country to both reduce its carbon footprint and prepare for future climate impacts simultaneously. Austria's climate policies are also aligned with EU-level strategies like the European Green Deal, which aims for a carbon-neutral Europe by 2050.

Both mitigation and adaptation actions are backed by legislation, financial mechanisms, and regular assessments to ensure that Austria meets its climate commitments and builds resilience against climate-related risks.

7.2. The strategies of mitigation and adaptation being carried out

The objectives of Austria's mitigation and adaptation strategies are designed to address both the reduction of greenhouse gas emissions and the enhancement of resilience to climate change impacts.

The primary objective of Austria's mitigation strategy is to significantly reduce its greenhouse gas emissions by transitioning to a carbon-neutral economy. This includes achieving 100% renewable electricity by 2030, improving energy efficiency across all sectors, and promoting the use of clean energy sources such as solar, wind, and hydropower. Another key objective is to decarbonize the transport sector by reducing emissions through the adoption of electric vehicles, expanding public transportation, and promoting sustainable mobility practices. In addition, Austria aims to reduce emissions from agriculture by encouraging sustainable farming practices, such as organic farming and precision agriculture, and minimizing methane and nitrous oxide emissions. The country also seeks to implement market-based mechanisms, such as carbon pricing and participation in the EU Emissions Trading System, to incentivize emission reductions across sectors.

On the adaptation side, the main objective is to build resilience to the impacts of climate change, such as rising temperatures, extreme weather events, and flooding. This involves adapting infrastructure to withstand the changing climate, including upgrading flood protection systems, improving water management, and making buildings more resilient to heatwaves. Austria aims to manage water resources sustainably, ensuring that both urban and rural areas can cope with fluctuating water availability. Another key objective is to protect biodiversity and restore ecosystems that provide essential services, such as carbon sequestration and flood prevention. Adaptation efforts also focus on enhancing public awareness and providing communities with the tools and

knowledge needed to cope with climate change impacts. Additionally, the adaptation strategy targets the health sector by strengthening systems to handle heat-related health risks and emerging diseases, particularly for vulnerable populations.

Ultimately, Austria's mitigation and adaptation strategies are interconnected, aiming not only to reduce emissions but also to safeguard the country's ecosystems, infrastructure, and communities from the unavoidable consequences of climate change.

7.2.1 Rationale and Timeframe

The rationale behind Austria's mitigation and adaptation strategies is rooted in the recognition of climate change as a critical and urgent challenge that poses significant risks to the country's economy, environment, and society. Austria, as part of the European Union, is committed to meeting the EU's climate goals, including the overarching objective of achieving carbon neutrality by 2050. To contribute to this, Austria aims to reduce its greenhouse gas emissions in line with its national climate targets, which involve decarbonizing key sectors such as energy, transport, industry, and agriculture.

Austria is a "Federal State"; which means it has one federal/national government and nine so-called federal "provinces". For the last decades, the federal (=national) and provincial governments (=9 Austrian provinces) have been increasingly cooperating on adaptation under the umbrella of the Austrian Adaptation Strategy. The focus is particularly on cross-sectoral areas of action, the successful implementation of which is accelerated by close cooperation due to their complexity. These activities are presented hereafter:

The development of the precautionary check for natural hazards in climate change was initiated and supported as part of a federal-state working group on the topic of personal precautions. This aims to increase risk awareness and the precautionary capacity of municipalities¹⁸.

Since the start of the KLAR! programme (Climate Change Adaptation Model Regions) was launched in 2016, there has been even closer cooperation between the federal and provincial governments to counteract the consequences of climate change at regional and local level and exploit opportunities accordingly.

The KLAR! programme aims to:

- (i) Strengthen the implementation of the Austrian Strategy for Adaptation to Climate Change at the local level. With local level both the federal provinces as well as the municipal levels are meant
- (ii) Foster a process-oriented approach comprising the dimensions adaptation, mitigation, nature conservation and the avoidance of maladaptation
- (iii) Raise awareness for climate change and climate change adaptation in regions (across the federal provinces) and municipalities (= the local level)

¹⁸ Austria to date has 2,095 municipalities (*Ortsgemeinden*), for explanations in English see here: <https://www.wien.gv.at/english/administration/organisation/austria/structure/authorities.html> (last access 18/01/2025)



- (iv) Implement findings of the Austrian climate research in practice
- (v) Strengthen regions (across the nine federal provinces) and municipalities (= local levels) against climate change impacts and help them to exploit the benefits of climate change.

To raise awareness of the consequences of climate change among stakeholders at regional level, regular dialogue events have been held since 2013 to transfer knowledge and highlight a wide range of options for action in cooperation between the BMK, the Climate and Energy Fund, the federal states and the Federal Environment Agency.

The Austrian “[Network of Innovative Climate Change Adaptation for Practitioners at Regional Level](#)” (Adaptation Network, KWAN) was established in 2021 as a platform for the cooperation and exchange of experience.

The BMK, the nine federal provinces and the Climate and Energy Fund support the network activities in the form of a core steering group.

Since 2017, [climate status reports](#) have been published regularly on behalf of the nine federal provinces and the Climate and Energy Fund. The reports show how extreme weather events are categorised in the context of climate change and what effects they have.

The [EU Climate Change Adaptation Mission](#) aims to support regions and local authorities in their efforts to implement preventive and coping measures and to strengthen resilience to the effects of climate change. As of June 2023, there were 15 Austrian signatories to the mission charter. Since the end of 2021 the [Austrian Mission Action Group CCA Climate Change Adaptation](#) has been supporting the national implementation (across the nine provinces) as well.

This holistic approach not only helps mitigate the harmful effects of climate change but also ensures that Austria remains competitive in the global economy by transitioning to sustainable, low-carbon technologies and industries. In parallel, the rationale for adaptation is driven by the need to prepare for the unavoidable impacts of climate change, such as increased extreme weather events, flooding, and heatwaves. These impacts threaten public health, infrastructure, water resources, and agricultural productivity, which makes adaptation strategies essential for protecting the country’s well-being and maintaining a high quality of life. Moreover, by investing in resilience now, Austria aims to reduce long-term costs and ensure a sustainable future for its citizens.

The time frame for Austria’s mitigation and adaptation strategies is aligned with both national and EU-wide climate objectives. Austria’s mitigation efforts are structured around the 2030 climate and energy framework, with clear targets such as achieving 100% renewable electricity by 2030. In line with the EU’s Green Deal, Austria aims for carbon neutrality by 2050, setting an ambitious trajectory for emissions reductions over the next few decades.

The long-term goal is underpinned by interim targets and policies designed to ensure that the country meets the necessary milestones along the way.

Adaptation efforts are also framed within the context of the coming decades, with many actions set to unfold gradually over time.

The National Adaptation Strategy (NAS), which guides these efforts, outlines long-term actions with ongoing assessments and updates to ensure resilience to the evolving climate risks. Austria's strategies are therefore designed to be dynamic, continuously evolving as new scientific data and climate projections become available, with an emphasis on flexibility to respond to the changing nature of climate impacts.

Both the mitigation and adaptation strategies are intended to ensure that Austria is well-prepared to face the challenges of climate change over the coming decades, with an ongoing focus on meeting both short-term and long-term objectives.

7.2.2 Mitigation strategy in Austria

Austria's mitigation strategy is focused on reducing greenhouse gas emissions across various sectors of the economy, with the ultimate goal of achieving carbon neutrality by 2050. A central component of the strategy is the transition to renewable energy sources. Austria aims to achieve 100% renewable electricity by 2030, relying heavily on hydroelectric power, wind, solar, and biomass energy to replace fossil fuels. The strategy also emphasizes increasing energy efficiency throughout all sectors, including residential, industrial, and transport sectors. For example, Austria promotes the retrofitting of existing buildings to meet higher energy efficiency standards and supports the development and implementation of energy-efficient technologies in industries.

In the transportation sector, Austria seeks to reduce emissions by encouraging the adoption of electric vehicles (EVs) and expanding the necessary charging infrastructure. The country is also enhancing its public transportation network to offer low-emission alternatives to private car use, while promoting cycling and walking as sustainable modes of transport. Alongside these initiatives, Austria aims to reduce emissions from agriculture, which is a significant contributor of methane and nitrous oxide. This is achieved by promoting sustainable farming practices, such as precision agriculture and agroforestry, as well as encouraging the adoption of renewable energy on farms.

Moreover, Austria is required by the EU to submit NECPs (National Energy and Climate Plans) outlining its 10-year strategic plan to contribute to the EU's climate targets. The initial NECP was submitted in December 2019 aimed for a 27% reduction in emissions by 2030 compared to 2005 levels, but this was revised to a 48% reduction target. However, projections indicate that the current and planned policies will still fall short of this ambitious target.

To further drive emission reductions, Austria is also exploring market-based instruments such as carbon pricing and participating in the European Union Emissions Trading System (EU ETS). These measures create financial incentives for businesses and industries to reduce their carbon footprints. In addition, Austria supports innovation in green technologies and is committed to reducing emissions from industrial processes through advancements in clean

technologies. Overall, Austria's mitigation strategy is an integrated approach, focusing on both technological solutions and policy measures, aiming to reduce emissions and support the country's transition to a low-carbon, sustainable economy.

7.2.3 Adaptation strategy in Austria

Austria's adaptation strategy is focused on enhancing the country's resilience to the inevitable impacts of climate change, such as extreme weather events, rising temperatures, and flooding. The central aim of the strategy is to reduce vulnerability and ensure that Austria's infrastructure, ecosystems, and communities can cope with the changing climate. A key aspect of this approach is the modernization of infrastructure to withstand the increased frequency and intensity of climate-related events. For instance, Austria is upgrading its flood protection systems, including the construction of new dams, retention basins, and flood barriers, as well as restoring natural floodplains to mitigate the risk of flooding. Overall, since 1990, Austria has implemented a climate protection act in 2013 with binding targets towards 2020, and the Adaptation Strategy (NAS). This strategy involves the creation of new institutions, programs, and climate change mitigation measures at local and regional levels to address the impacts of climate change and reduce emissions across different sectors.

In the water management sector, for instance, Austria is working to ensure sustainable use and distribution of water resources. This includes enhancing water storage capacity, improving irrigation practices, and developing advanced technologies to manage water more efficiently in agriculture and urban areas. As part of its adaptation strategy, Austria is also addressing the challenge of rising temperatures by making buildings more resilient to heatwaves. This is achieved through measures such as improving insulation, installing green roofs, and promoting the use of cool materials in urban areas to reduce heat islands.

Austria recognizes the importance of preserving biodiversity and protecting ecosystems, which play a vital role in mitigating climate impacts. To this end, the country is focusing on ecosystem restoration, including reforestation areas and protecting wetlands that help regulate the climate and water cycles. Additionally, the adaptation strategy includes efforts to support agriculture, particularly in adapting farming practices to changing weather patterns. This involves promoting drought-resistant crops, improving soil management techniques, and providing farmers with climate data and guidance on sustainable practices.

Public awareness and education are also key components of Austria's adaptation efforts. The government is working to ensure that citizens, businesses, and local authorities are well-informed about the risks posed by climate change and are equipped with the knowledge and tools to respond effectively. In the health sector, Austria's adaptation strategy seeks to strengthen the healthcare system's capacity to deal with heat-related health risks, such as heatstroke and vector-borne diseases. This includes improving

early warning systems, developing heat action plans, and ensuring that vulnerable groups, such as the elderly, have access to necessary support.

Overall, Austria's adaptation strategy is designed to be flexible and responsive, regularly updated in line with evolving climate risks and scientific knowledge, with the overarching goal of ensuring the country's long-term resilience to climate change.

7.2.4 Adaptation policies in the nine Federal Provinces of Austria

In Austria, adaptation policies are implemented at both the national (=federal) and at the level of the nine federal provinces, where regional conditions and climate vulnerabilities shape specific actions and strategies. Each of the nine federal provinces has developed its own adaptation measures, tailored to local climate risks, while aligning with the broader objectives of the National Adaptation Strategy. In many provinces, adaptation policies focus on addressing climate-related challenges such as flooding, heatwaves, droughts, and biodiversity loss, which vary depending on the geographical and environmental context of each region.

For instance, in provinces with mountainous terrain like Tyrol and Vorarlberg, the adaptation policies emphasize the protection of landscapes from the impacts of landslides, avalanches, and glacial retreat due to rising temperatures. These regions have invested in infrastructure improvements such as stabilizing slopes, enhancing early warning systems, and restoring natural barriers. In contrast, provinces with large agricultural sectors, such as Lower Austria and Burgenland, have focused on improving water management and promoting climate-resilient farming practices. These measures include drought-resistant crop varieties, efficient irrigation systems, and the use of precision farming technologies to optimize water usage and mitigate the effects of changing precipitation patterns.

In urbanized regions, such as Vienna¹⁹, the adaptation strategy has concentrated on reducing the urban heat island effect and enhancing the resilience of city infrastructure. This includes expanding green spaces, planting more trees, and retrofitting buildings to improve their energy efficiency and heat resistance. The city has also focused on improving public transportation networks to reduce the reliance on private cars, which contributes to both air pollution and increased urban temperatures.

In addition to these region-specific strategies, the nine provinces have collaborated with each other and the federal (=national) government to ensure that adaptation actions are coordinated and that resources are shared. This includes joint initiatives on flood protection, water conservation, and climate risk assessments, which are critical in a country in which river basins, such as the Danube, cross multiple provincial borders. Furthermore, the provinces are actively involved in raising awareness about climate change and its potential

¹⁹ In the Austrian political system, Vienna counts as both: A Federal Province and the Capital City. Hence it has two councils: A city council and a federal council.

impacts, offering training and educational programs for local authorities, businesses, and citizens to prepare for climate-related disruptions.

Overall, adaptation policies in the nine federal provinces of Austria reflect the diverse challenges posed by climate change in different regions and aim to ensure that each province can effectively respond to the specific risks it faces while contributing to the national goal of building resilience across the country.

7.3. The governance framework

The governance framework for climate change policies in Austria is structured around a multi-level approach that involves coordination between federal (referring to national), regional (nine federal provinces), and local (municipalities) authorities, ensuring that climate action is both effective and tailored to specific local needs. At the federal level, the Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation, and Technology (BMK) plays a central role in the development and implementation of national climate policies. This ministry is responsible for overseeing Austria's commitment to international climate agreements, such as the Paris Agreement, and ensuring that national targets for emissions reductions, energy transition, and adaptation are met. The BMK also coordinates with other ministries, such as the Ministry of Agriculture, Forestry, Environment, and Water Management, to address the cross-cutting nature of climate change, ensuring that policies in sectors like agriculture, energy, and transportation align with climate goals.

A key feature of Austria's governance framework is its decentralized structure, with significant responsibilities delegated to the nine federal provinces (*Länder*). Each province has the authority to develop its own climate policies, which are designed to address region-specific vulnerabilities and priorities. This decentralized system allows for greater flexibility and responsiveness to local needs, ensuring that adaptation and mitigation strategies are suited to the geographical, economic, and social context of each region. Provinces, in turn, coordinate with municipalities to implement climate actions at the local level, particularly in urban planning, infrastructure development, and environmental protection.

To facilitate the coordination of climate change policies across levels of government, Austria has established various national and regional platforms. These include the [Austrian Climate Change Adaptation Platform Models for regions in Austria](#), which fosters collaboration between federal and regional authorities, researchers, businesses, and civil society. The platform is funded by the Austrian Climate and Energy Fund and helps align climate policies, share knowledge, and develop joint solutions to address Austria's climate challenges. Additionally, Austria's National Climate Strategy, which is developed by the federal government in consultation with stakeholders, provides a comprehensive framework for action across all sectors and regions.

The governance of climate policies in Austria is also supported by financial mechanisms, including national funds and EU climate funding programs. These

funds are used to finance projects related to climate mitigation and adaptation, with a focus on innovation, renewable energy, and sustainable infrastructure. The Austrian government also engages with the private sector and civil society to foster climate-friendly practices through incentives, subsidies, and public-private partnerships.

Austria's governance framework is designed to be dynamic and adaptable, allowing for regular updates to policies and strategies based on the latest scientific research and climate data. This includes the periodic review and adjustment of climate targets and action plans, ensuring that Austria's climate policies remain aligned with both national objectives and international commitments. Through this comprehensive and multi-level governance framework, Austria seeks to address the complexities of climate change while fostering broad-based support and participation in climate action.

7.4. The main dynamic aspects of the strategies

The main dynamics of climate change policies in Austria are shaped by a combination of national commitments, regional initiatives, and international obligations, all aimed at achieving long-term sustainability and climate resilience. At the core of Austria's climate policies is the commitment to meeting European Union climate goals, such as the EU Green Deal and the 2050 carbon neutrality target. Austria's policies are designed to reduce greenhouse gas emissions, transition to renewable energy, and promote energy efficiency across sectors like industry, transportation, and agriculture. This commitment is underpinned by a clear focus on decarbonizing the energy sector, with the goal of achieving 100% renewable electricity by 2030.

Another key dynamic is Austria's emphasis on both mitigation and adaptation. While mitigation efforts focus on reducing emissions through clean energy technologies, sustainable transportation, and energy-efficient infrastructure, adaptation strategies aim to prepare for the inevitable impacts of climate change, such as heatwaves, flooding, and changing precipitation patterns. The country's adaptation efforts are closely aligned with its mitigation strategies, ensuring that climate resilience is built into long-term development plans.

A unique dynamic of Austria's climate policies is the active role of its federal system, where the national government collaborates with regional governments (the nine provinces) to develop and implement climate actions tailored to local needs. Each province is encouraged to create its own adaptation and mitigation plans based on its specific climate vulnerabilities, whether that be in urban areas, agricultural regions, or mountainous terrains. This decentralized approach ensures that climate policies are flexible, context-specific, and responsive to local conditions.

Additionally, Austria's climate policies are characterized by an increasing integration of scientific research and stakeholder involvement. The government works closely with researchers, businesses, local authorities, and civil society organizations to ensure that climate action is informed by the latest data and that policies are inclusive and widely supported. Public engagement and

awareness campaigns also play a vital role in fostering climate responsibility at the community level.

Finally, financial dynamics are central to Austria's climate policy implementation. The country uses a mix of public and private investment, including EU funding programs, to support climate action initiatives. This financial support is critical for fostering innovation in clean technologies, improving infrastructure resilience, and financing climate adaptation projects. Overall, Austria's climate change policies are dynamic in their integration of science, governance structures, financial mechanisms, and local adaptability, positioning the country to address both the causes and consequences of climate change effectively.

7.5. A first assessment of the effectiveness of the strategies

Austria's climate change policies reflect a significant commitment to addressing environmental challenges, but their effectiveness is a topic of evaluation and scientific critique ([Niedertscheider, Haas and Görg, 2018](#); [Winkler and Winiwarter, 2016²⁰](#); [Schaffrin, Sewerin and Seubert, 2014](#); [Kettner and Kletzan-Slamanig, 2018](#); [Steurer and Clar, 2015](#); [Steurer, Clar, and Casado-Asensio, 2020](#)). The Austrian government has aligned its strategies with the European Union's climate goals, including achieving climate neutrality by 2040, which is notably ambitious. Measures such as promoting renewable energy, enhancing energy efficiency, and advancing sustainable transportation are central to its approach.

Some progress has been observed in increasing the share of renewable energy in electricity generation, with a substantial reliance on hydropower and growing investments in wind and solar energy. Austria's expansion of public transport infrastructure, particularly in urban areas, can be seen as a proactive stance on reducing emissions from the transport sector, one of the largest contributors to its greenhouse gas emissions. Moreover, policy frameworks like the Climate and Energy Strategy and the establishment of carbon pricing signal the country's commitment to systemic changes.

Despite these efforts, challenges remain. Austria has struggled with high emissions in sectors like agriculture and transportation, which undermine its overall reductions. Critics argue that while the policies are well-intentioned, implementation and enforcement often lag, and the pace of change may not be sufficient to meet the ambitious 2040 target. Additionally, reliance on voluntary measures in some areas has raised concerns about their adequacy in driving the necessary transformation.

In other words: Despite this target and Austria's non-binding ambition of becoming fully "climate neutral" by 2040, Austria's emissions reductions in 2021 have been slower than the EU average ([European Parliament, 2021](#)). Current projections predict that emissions will remain relatively constant in Austria

²⁰ Winkler, T., & Winiwarter, W. (2016). Greenhouse gas scenarios for Austria: a comparison of different approaches to emission trends. *Mitigation and Adaptation Strategies for Global Change*, 21, 1181-1196.

(Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology/ [Bundesministerium fuer Klimaschutz, Umwelt, Energie, Mobilitaet, Innovation und Technologie](#) 2023), highlighting the need for policy intervention if the country is to meet its climate goals

In summary, while Austria's climate policies are commendable for their ambition and alignment with international goals, their ultimate effectiveness will depend on consistent implementation, stronger measures in lagging sectors, and sustained public and political support, which is highly questioned at the moment.

Effectiveness of CC policies in the Austrian Provinces

The effectiveness of climate change policies in Austria's provinces varies significantly, reflecting regional priorities, economic structures, and levels of commitment to sustainability. Some provinces, such as Vorarlberg and Tyrol, have made considerable progress by prioritizing renewable energy and sustainable transport systems. Vorarlberg, for instance, has become a leader in energy-efficient building practices and has significantly increased the share of renewable energy in its energy mix. Tyrol has focused on leveraging its alpine geography to develop hydropower and promote eco-tourism as a sustainable economic model.

On the other hand, provinces like Lower Austria and Upper Austria have made strides in renewable energy production, particularly through wind and solar power projects. Lower Austria stands out for its early achievement of a 100% renewable electricity supply target, underscoring its commitment to sustainable energy transitions. Upper Austria, with its strong industrial base, has invested heavily in energy efficiency programs for businesses, aiming to balance economic growth with environmental responsibility.

However, provinces such as Styria and Carinthia face challenges in addressing emissions from agriculture and transportation, which remain significant contributors to regional greenhouse gas outputs. In these areas, policy implementation has sometimes been slower or less impactful due to conflicting economic interests and the reliance on traditional industries. Similarly, Vienna, as the capital and an urban hub, grapples with reducing emissions from dense traffic and high energy demand, although it has achieved notable success in expanding public transport and energy-efficient housing.

Overall, while Austria's provinces demonstrate varying degrees of effectiveness in implementing climate change policies, the collective impact is hampered by inconsistencies in policy ambition and implementation. Enhanced coordination, greater investment in sustainable infrastructure, and stronger enforcement mechanisms are necessary to ensure that all provinces contribute equitably to Austria's national and international climate targets.

All provinces reported recently in the [National report on The Energy and Climate Plan](#) (NAEK).

Lower Austria (*Niederösterreich*): The measures include climate protection, expansion of renewable energy sources, and adaptation to climate change.



These efforts are part of the broader strategy to achieve decarbonization by 2040, with climate protection and adaptation being considered equally important.

Carinthia (*Kärnten*): The province has integrated adaptation measures within its existing climate protection strategies under the [Klimaagenda Kärnten](#). This indicates a proactive approach to addressing climate change impacts.

Vienna (*Wien*): Adaptation to climate change is incorporated into overarching strategies such as the Smart City framework. The [Klima-Fahrplan](#) (2022) aims for decarbonization by 2040, treating climate protection and adaptation as equally significant 1.

Burgenland: Adaptation measures are directly integrated into other sectoral programs and strategies, reflecting a comprehensive approach to climate change adaptation.

Styria, Vorarlberg and Salzburg (*Steiermark, Vorarlberg, and Salzburg*): These provinces have their own strategies for climate change adaptation, indicating a region-specific approach to addressing climate impacts.

Upper Austria (*Oberösterreich*): The province has updated its strategy to an integrated climate and energy strategy, which includes climate change adaptation measures.

Tyrol (*Tirol*): [A new sustainability and climate strategy](#) was published in 2021, which integrates both adaptation and climate protection measures.

As stated above, the effectiveness of these measures will ultimately depend on their implementation and the continuous monitoring and adjustment of strategies based on emerging challenges and progress.

7.6. Other aspects that each partner considers important

This report is based on the policies being implemented based on the former Austrian government orientations. New directions can be expected, as Austria will have a new government from early 2025 onwards. Changes to this chapter will be necessary once the expected policy acts will be released. From the anticipation regarding the new climate policy of the Austrian government, it seems that the Governance structure of policies (institutional setting) described above should not be changed significantly. However, the Austrian Green Party has left government, and the new eurosceptic, Russia-friendly FPO came first in September's parliamentary election with around 29% of the vote but was tasked with forming a government only after a centrist attempt to do so without it collapsed earlier this month (January 2025). As of today, Austria's far-right Freedom Party (FPO) and conservative People's Party (OVP) plan to improve the state's finances by scrapping [climate-change-related measures and collecting more in dividends from state-owned companies](#). One of the biggest items in their plan is to save nearly 2 billion euros by eliminating the so-called “climate bonus”, a payout of hundreds of euros a year to each taxpayer intended to

redistribute proceeds from carbon-emissions-based taxation introduced by the outgoing [OVP-Greens coalition](#).

Retrospectively, despite the implementation of various climate strategies, adaptation strategies, and climate change mitigation measures at national, local and regional levels, the overall impact has been limited. Emissions in Austria peaked in 2005 and have generally fallen since²¹, but this reduction is attributed more to short-term drivers and structural changes in the economy rather than effective policy measures. [The reasons for the failure of Austrian climate policy](#) include inconsistency across policies, low commitment levels, and the federalist political system, which has led to watered-down policies at the provincial level to find lowest-common-denominator solutions.

²¹ See especially: Niedertscheider, M., Haas, W., & Görg, C. (2018). Austrian climate policies and GHG-emissions since 1990: What is the role of climate policy integration? *Environmental science & policy*, 81, 10-17; Winkler, T., & Winiwarter, W. (2016). Greenhouse gas scenarios for Austria: a comparison of different approaches to emission trends. *Mitigation and Adaptation Strategies for Global Change*, 21, 1181-1196.

8. CZECH REPUBLIC

8.1. Introduction

As a member of the European Union and a signatory to the Paris Agreement, Czechia has committed to the international climate goals focused on mitigation and adaptation. At the international level, the country's long-term priorities for sustainable development have been addressed by the [Strategic Framework Czech Republic 2030](#). The document fulfils the Czech obligations coming from the UN's Agenda 2030 and the SDGs. This is the first actualization of the framework (the first version was from 2017) that should secure the inter-sectoral coordination of policy tools. The Strategic Framework is evaluated every 3 years, using a set of indicators. Based on the evaluation reports the national sectoral policies and strategies are corrected.

At the EU level, Czechia's efforts to balance economic growth, environmental sustainability, and societal needs align with broader European objectives such as the European Green Deal and the EU's Fit for 55 targets, which include [reducing net greenhouse gas \(GHG\) emissions](#) by at least 55% by 2030 compared to 1990 levels. This document further explores national strategies for mitigation and adaptation that aim to implement the EU targets and commitments to the Czech legal system.

8.2. Strategies of Mitigation and Adaptation

At the national level, Czechia's main mitigation and adaptation strategies have been defined by the [State Environmental Policy](#) (SEP 2030) that integrates international conventions, strategies, legislation as well as national sectoral strategies and legislation. The SEP 2030 represents a top-level, overarching strategic document and is implemented through other thematic strategies under the responsibility of the [Ministry of the Environment](#) (MŽP) and other ministries.

8.2.1 Mitigation Strategies

Mitigation measures in Czechia aim to reduce GHG emissions by 55% by 2030 and achieve carbon neutrality by 2050. These efforts include reforming the energy sector, increasing energy efficiency, promoting renewable energy sources, and reducing emissions from transportation and industrial activities. Two main documents that define the mitigation strategies of Czechia are as follows:

[Climate Protection Policy](#) (CPP) of the Czech Republic: The policy defines the main objectives and measures of climate protection at the national level to ensure the fulfilment of reducing greenhouse gas emissions in connection with the obligations arising from international agreements (Kyoto Protocol, the Paris Agreement and the European Union legislation) between 2017 and 2030. According to the draft update of CPP from the spring 2024, Czechia committed

to reduce its emissions by “55% by 2030 compared to 1990” (which is equivalent to 30% compared to 2005).

The National Energy and Climate Plan (NECP): The document serves as a cornerstone document, outlining targets for achieving the mitigation goals. It contains objectives and policies in all five dimensions of the Energy Union for 2021–2030 with an outlook till 2050. Czechia is committed to meet the EU's climate-energy goals (emission decrease, increase in renewable energy, increase in energy efficiency). The NECP combines outcomes of the National Energy Policy (NEP) and CPP.

“The Czech Republic’s strategic objective is to reduce the share of fossil fuels (used without the capture technology) in primary energy consumption to 50% by 2030 and 0% by 2050 and to completely phase out the use of coal for electricity and heat production by 2033.” These targets are to be achieved via development of renewable energy sources (especially photovoltaic power plants), improved energy efficiency (e.g., decarbonization of the central heating system) and security (e.g., via reducing the import of fossil fuels from geographically unstable countries (Russia) and strengthening flexibility of transmission networks), and investments to research, development and innovation in the field of sustainable energy:

Transition from Coal

The Czech government recognizes coal as a significant source of energy and emissions, responsible for 43.1% of the country’s electricity production in 2020. The decision to remove coal from the energy mix by 2033 is a cornerstone of the country’s mitigation strategy. This plan involves the following measures.

- (i) Energy Diversification: Energy security is a priority for the Czech government, and the continued diversification of energy sources is crucial in this regard. The National Action Plan for Adaptation to Climate Change (Adaptation Action Plan) highlights the development of smart grids, decentralised energy sources and the diversification of energy sources as key measures.
- (ii) Further development of nuclear energy is an important element of the energy strategy. The share of nuclear energy in energy production (already contributing 37% of the country’s electricity in 2022) is expected to increase up to 68% by 2040. “This will be achieved through construction of new nuclear reactors and small and medium modular reactors.” In the meantime, green hydrogen and natural gas imported from geo-politically stable countries are expected to be used as a transitional fuel for power plants after the coal phase out.
- (iii) Support from the Modernization Fund: The transition from coal will be financed primarily from the EU sources. The Modernization Fund financed by the EU Emissions Trading System (ETS) provides approximately €5.76 billion for Czechia (15.6% of the total resources of the Modernisation Fund) to support the replacement of coal-fired power plants with low-carbon alternatives such as renewable energy projects and advanced gas facilities.

Renewable Energy Expansion

Despite a [slower adoption rate](#) (16% of total energy consumption (TEC) in 2019), Czechia has committed to [increase the share of renewables](#) to 23%, 26%, and 41% of TEC by 2030, 2040, and 2050, respectively. Key initiatives include the following.

- (i) [Solar and Wind Energy Development](#): “Czechia is in the process of revising its legal and regulatory framework for the development of renewable energy sources. Pending the approval of the draft legislation, the sector is left without appropriate operational support programmes, while investment support continues to be available.” Despite its stagnation in recent years, “the development of photovoltaic power plants is on the rise. Main efforts should therefore be focused on the [development of wind energy](#).” By 2030, the government assumes the installed capacity of 10.1 GW of photovoltaic power plants and 1.5 GW of wind farms involved in the grid.
- (ii) [Biomass Utilization](#): Biomass energy has been the key driver of the growth in renewables. Accounting for 92% share of TEC from renewables in 2021, it is being expanded through the use of agricultural and forestry residues. Strategic documents, such as the [Biomass Action Plan in the Czech Republic](#), mention [high biomass potential to replace the use of coal](#) in the heating sector.

Energy Efficiency Programmes

“[The energy intensity of the Czech economy](#) is among the highest in the EU, mainly due to the presence of large energy-intensive industry sectors.” Energy efficiency is a critical aspect of mitigation policies in Czechia, targeting both households and businesses.

- (i) [Boiler replacement scheme](#) (Kotlíková dotace): Local air pollution remains a key priority of Czechia’s energy and environmental policy. “At the heart of the government policy is the boiler replacement scheme [in the residential sector that has been operating since 2013](#)” under the [Operational Programme Environment](#) (OPE). The programme resulted in the replacement of over 82,000 boilers from 2015 to 2020 and realized [yearly emission reductions](#) of “3.4 kilotonnes (kt) of PM_{2.5}, 1.8 kt of SO₂ and 512 kt of CO₂.” The original goal was to replace 100,000 boilers by 2020. The boiler replacement continues under the programme “Nová zelená úsporám.”
- (ii) “[Nová zelená úsporám](#) (New Green Savings)” Programme: Since its inception in 2014, this programme has allocated over €2.5 billion (60 billion CZK) for energy-efficient building retrofits, including insulation, renewable heating systems, and solar panels. By reducing energy demand, these measures simultaneously lower emissions and household energy costs. By the programme’s initiation, these measures were claimed to result in [annual energy savings](#) of 2.35 TWh and reduced CO₂ emissions by up to 893kt/year.
- (iii) In addition to the financial incentives, the government also uses regulatory and legal measures. The sale of high emission boilers (Class 1 and Class 2 out of a total of five classes) was banned on 1 January 2014. The sale of Class

3 boilers was banned on 1 January 2018. And finally, from 1 January 2020, only Class 5 (the lowest emission class) can be sold in Czechia. Moreover, the 2019 amendment of the [Air Protection Act](#) (No. 201/2012) prohibits the use of Class 1 and Class 2 boilers after September 2024. This legislation [affects approximately 450,000 boilers](#) in the country.

- (iv) Industrial Efficiency: Industries receive tax incentives and grants to adopt energy-efficient machinery and processes via several subsidy programmes, including [Operational programmes Technologies and Applications for Competitiveness](#) (OPTAK) and [Just Transition](#) (OPST), and the [EU’s Modernization Fund](#).

Emissions Reduction in Industry and Transport

- (i) Emission Trading System – EU ETS has been considered an important and efficient tool in reducing GHG emissions. As of 2019, [the mitigation measures have led to a 38% reduction in GHG emissions](#) since the 1990s and 17% reduction since 2005 (the implementation of EU ETS) in Czechia. While GHG emissions from facilities covered by EU ETS [decreased by 33.7% in the period 2005–2020](#), emissions outside EU-ETS (i.e., especially waste management, agriculture and transport and households) decreased only by 8.4% in the same period. The International Energy Agency’s (IEA) Energy Policy Review (2021) recommends to “introduce a [carbon tax](#) in sectors not covered by the EU ETS to stimulate further low-carbon investment and reduce fossil fuel consumption in Czechia.”

- (ii) “Off Track” Transport Sector.

According to the IEA report, energy-related CO₂ emissions declined across all sectors (electricity and heat generation by 21%, industry by 32%) in Czechia between 2009 and 2019, except for the transport sector (increased by 18% since 2013), [due to the increasing vehicle fleet and oil consumption](#). Moreover, the country [was not “on track to reach the target](#) for the use of renewables in the transport sector in 2020,” while [95% of the renewable energy in transport comes from biofuels](#). These figures have been reflected in the recent policies and subsidy programmes, to support low-emission transport and electric mobility:

- In the 2019 update of the [National Action Plan for Clean Mobility](#), the government has set targets for electric mobility and the promotion of electric vehicles. By 2030, the government aims to have between 220,000 and 500,000 battery-only and/or plug-in hybrid vehicles in Czechia, compared to about 6 000 vehicles in 2020. This would [require 35,000 charging points in 2030](#), while in 2020 there were about 1 000 charging points in the country.
- In order to achieve these ambitious targets, the Parliament has approved the [Low-emission Mobility Act](#) (No. 360/2022) that sets the minimum share of no-/low-emission (<50 g/km CO₂) transport vehicles (e.g., 41% and 60% of public transport vehicles by 2025 and 2030, respectively) purchased in public tenders (i.e., by municipalities, government, public institutions, etc.). Consequently, several subsidy



programmes have been opened to facilitate the purchase of low emission vehicles and development of the required infrastructure.

8.2.2 Adaptation Strategies

The two main adaptation documents in Czechia.

Strategy of Adaptation to Climate Change in the Czech Republic (Adaptation Strategy): The main climate-change-related challenges that require adaptation measures in Czechia are: prolonged droughts, heavy rainfalls and floods, increasing temperatures, heat waves, extreme wind storms, wildfires; and the main economic sectors that are at risk of climate change impacts are: forestry, agriculture, water management, biodiversity, public health, urbanized areas, tourism, industry and energy sector, transport, cultural heritage and civil protection. Based on this, a first version of the document was prepared in accordance with the EU's Adaptation Strategy in 2015, an updated version was approved in 2021. In addition to the assessment of the expected impacts of climate change in key sectors, it contains proposals for specific adaptation measures for the period 2021–2030, summarizes current legislation and proposals for its amendments, and provides an overview of existing and prospective economic instruments as well as education and public awareness activities. The linkages with mitigation measures are also addressed within all sectors. The strategy has been prepared in collaboration with more than 170 experts in the field, and material provided by the relevant national institutions (Czech Hydrometeorological Institute – CHMI, Czech Environmental Information Agency – CENIA) and by experts from the Czech Academy of Sciences (especially the Global Change Research Institute – CZECHGLOBE).

National Action Plan on Adaptation to Climate Change (Adaptation Action Plan – AAP): The document is an implementation document of AS. AAP elaborates the framework of measures for the years 2021–2025 set out in AS into specific tasks, to which it assigns responsibility, deadlines, relevance of measures to individual manifestations of climate change and sources of financing. AAP contains 108 adaptation measures divided into 322 specific tasks, which are assigned to the relevant ministries, and specifies deadlines for implementation, relevance of measures to individual manifestations of climate change, sources of financing and estimated costs until 2025. The development of indicators assessing Czechia's vulnerability to climate change impacts has been monitored in the Information System of Statistics and Reporting (ISSaR) by CENIA.

“The most important principles of climate change adaptation in Czechia include:

- (i) Integrated Approach: Assessing the synergies between adaptation and mitigation measures and evaluating the suitability of proposed actions for various environmental components, the economy, and the social sphere.
- (ii) Priority Implementation of Multi-Benefit Solutions: Focusing on “win-win” solutions that offer multiple benefits with minimal risks or costs.
- (iii) Identification of Opportunities: Recognizing opportunities associated with the adaptation process.

- (iv) Prevention of Maladaptation: Avoiding inappropriate adaptation measures that could increase vulnerability or have adverse effects.
- (v) Knowledge Base Development: Building a robust knowledge base and providing objective information to support decision-making processes at all levels.”

Funding sources for the adaptation measures in Czechia are largely provided through the EU and national grant programmes, such as:

- (i) [Podpora obnovy přirozených funkcí krajiny](#) (Support for the Restoration of the Natural Functions of the Landscape) – for adaptation of water, forest and other ecosystems.
- (ii) [Program péče o krajinu](#) (Landscape Care Programme) – supports non-profit adaptation measures focused on the protection and improvement of biodiversity.
- (iii) [Program prevence před povodněmi](#) (Flood Prevention Programme) – subsidy programme for national water and forest management companies, and municipalities for flood prevention measures.
- (iv) [Operational Program Environment](#) (OPE) – EU-funded programme for mitigation and adaptation projects in various sectors.

A list of all relevant grant programmes is available on the websites of [the Agency for Nature Conservation and Landscape Protection of Czechia](#) (AOPK) and the [State Environmental Fund](#) (SFŽP).

The [main adaptation measures](#) outlined by AS (based on a summary by [faktaoklimatu.cz](#)) are related to the following sectors.

Forestry

- (i) Cultivating species-diverse forests that are naturally resistant to the manifestations of climate change. An important aspect is the preservation of native plant and animal species. Additionally, emphasis should be placed on nature-friendly forest management.
- (ii) [Number of completed tasks](#) (in 2019): 74%

Agriculture

- (i) A necessary condition for future agriculture is sustainable land use and the addition of organic matter. It is also important to implement measures for water retention and to prevent soil erosion. Other adaptation measures include cultivating and breeding resilient agricultural crops and utilizing current technologies and knowledge to optimize production.
- (ii) Number of completed tasks: 71%

Water Management

- (i) Adaptation measures focus on retaining water in the landscape, promoting the infiltration of rainwater, reducing potable water consumption, and landscape planning focused on prevention of droughts and floods. Water retention in the landscape should be supported by revitalizing watercourses and existing aquatic biotopes, as well as creating new biotopes such as ponds, oxbow lakes, and other nature-friendly small water

reservoirs. Measures to promote infiltration include establishing permeable surfaces in urban areas. An important aspect of a better water management is the separation of rainwater from sewage systems for later use.

- (ii) Number of completed tasks: 67%

Biodiversity and Ecosystem Services

- (i) Improved long-term planning, to preserve native species and ecosystems. It is essential to limit landscape interventions that fragment ecosystems and to reconnect those previously divided by human activities. Adaptation efforts should also focus on curbing activities that favour invasive species and conducting regular monitoring of these species.

- (ii) Number of completed tasks: 58%

Public Health

- (i) AS emphasize preventing infectious and non-infectious diseases, ensuring adequate healthcare infrastructure, and informing the public about risks and preventive measures.

- (ii) Number of completed tasks: 33%

Tourism

- (i) Adaptation measures emphasize educating all participants in the tourism sector. Each stakeholder should be encouraged to consider the consequences of their actions.

- (ii) Number of completed tasks (in 2019): 66%

Transport

- (i) Research into new technologies should aim at enhancing the resilience of infrastructure to temperature fluctuations, torrential rains, frost, high temperatures, and similar challenges. Air conditioning systems in urban public transport vehicles should be optimized in anticipation of projected temperature changes.

- (ii) Number of completed tasks: 62%

Industry and Energy

- (i) Adapting industry and energy sectors involves ensuring sufficient electricity production for critical state infrastructure, even during extreme weather events. This may include securing adequate reserves and alternative suppliers of imported fuels for electricity and heat generation and maintaining the functionality of the transmission network despite potential failures of individual components. Additionally, optimizing manufacturing processes, particularly concerning water consumption, is essential.

- (ii) Number of completed tasks: 89%

Emergency Events and Civil Protection

- (i) AS aims supporting and developing early warning systems for emergency events. The priority should be to establish appropriate crisis scenarios to protect both the population and the environment.



- (ii) Number of completed tasks: 80%

Urban Resilience

- (i) Construction and renovation of energy-efficient buildings; improved rainwater management, which includes creating more green areas for water infiltration, separating rainwater from sewage systems, and preventing contamination.
- (ii) Number of completed tasks: 58%

Urban areas face unique climate challenges, including urban heat islands and storm-water management issues. By 2022, 57 municipalities counting 3,4 million inhabitants (34% of Czech residents) drafted [their adaptation strategies to climate change](#) (see table 13.1.3 in the link). Prague, the capital city (and a stand-alone NUTS 3 region), hosting about 1.6 million residents and daily commuters, has been a pioneer of climate mitigation and adaptation strategies among the cities.

The main climate policy documents of the City of Prague include the Prague Strategic Plan; the Climate Plan of the City of Prague 2030; and the Climate Change Adaptation Strategy of the Capital City of Prague.

[Prague Strategic Plan](#): The plan sets a vision for Prague in 2030 with the first pillar “Comprehensive and Health City” that focus on:

- (i) [Cohesive City](#) – Prague aims to be an open and socially cohesive city, enhancing the quality of life for all residents. Beyond economic considerations, the city will actively support conditions that enable the elderly and those with health or social disadvantages to remain active in both work and life for as long as possible.
- (ii) [City of Short Distances](#) – the aim is to increase the quality of life and stop the decline in the number of green areas via prioritizing the city's intensive development in transformation areas over extensive development and further expansion into undeveloped zones.
- (iii) [Healthy City](#) – the city aims to create a hierarchical structure of green spaces, support its connectivity; prioritize the nature-based water management activities; pooling the technical infrastructure to support the greening of the city; set the index of the greenery per inhabitant; implement sustainable drainage management with infiltration measures; implement new tree species suitable for city conditions, implement agro-technological measures on the agronomic areas, support renewable energy sources and low and zero-emission heat sources.
- (iv) [Sustainable Mobility](#) – the city will support public transport, electromobility, bicycle transport, walking, park-ride zones, rail transport etc. The aim of the city is to “increase the share of public, pedestrian and bicycle transport above 70% by 2030.”

[Climate Plan of the City of Prague 2030](#): The document specifies the default state of the city's carbon footprint and indicates the carbon budget for 2030–2050 and how to reach it. The main goals of the document:

- (i) [Sustainable Energy and Buildings](#) – new heat producers using renewable energy, renovation of buildings owned by the city, community energy, and modern street lighting system will “reduce the CO₂ emissions from electricity and heating by 60%.”
- (ii) [Sustainable Mobility](#) – support effectiveness and capacity of public transport, increase attractiveness and prepare infrastructure for non-motorized transport, decrease automobile transport, support non- and low emission vehicles, and sustainable air transport. The aim is to “reduce the use of fossil fuels by 25% compared to 2010.”
- (iii) [Circular Economy](#) – the main goal, by 2030, is to “reduce the amount of produced municipal waste by half and increase its recycling to 65%, compared to 27% in 2019.”
- (iv) [Heat Adaptation](#) – the plan introduces 10 specific measures with the aim to improve the quality of life in the city via improvement of microclimatic conditions in the city, increased share of greenery, decreased share of impervious surface, implementation of a sustainable drainage system, enhanced adaptation of buildings and public spaces, and improvements of the risk management.

[Climate Change Adaptation Strategy of the Capital City of Prague](#): Introduced in 2015, the strategy focuses on reducing the negative impacts of climate change via using nature-based solutions to preserve water, soil and biological components of the landscape and to preserve and restore ecosystems resistant to climate change and contributing to disaster prevention. Where inappropriate, technical (so-called grey) and soft measures (e.g., early warning systems, information campaigns, etc.) are proposed. The main adaptation measures related to the impacts of climate changes in the city focus on:

- (i) Increased impacts of heat waves, urban heat island and temperatures increase,
- (ii) Increased impacts of flash floods, river flooding, long-term drought,
- (iii) Decreased energy consumption and building adaptation,
- (iv) Improved crisis management and civil protection,
- (v) Support of sustainable mobility,
- (vi) Facilitation of environmental education.

The Strategy is followed by the [Implementation Plan of the Climate Change Adaptation Strategy 2020–2024](#), in which individual measures and their implementation are elaborated in more detail, including the determination of competencies and responsibilities for individual activities and their time frames. An [update of the Implementation Plan for years 2025–2029](#) has been approved by the City Council in December 2024.

8.3. Governance Framework

The governance framework for climate policies in Czechia is multi-tiered, involving national, regional, and local levels. Collaboration with the EU institutions further strengthens these efforts.

8.3.1 National Governance

The central government plays a critical role. The main institutions responsible for adaptation and mitigation policies are:

- (i) Ministry of the Environment (Ministerstvo životního prostředí – MŽP): Oversees the development and implementation of climate policies, including NECP and AS.
- (ii) State Environmental Fund (Státní fond životního prostředí – SFŽP): Is the main funding agency that administers financial mechanisms like the Modernization Fund, operational programmes funded by the EU (e.g., Operational Programme Environment) and national subsidy programmes to support climate initiatives.
- (iii) Ministry of Industry and Trade (Ministerstvo průmyslu a obchodu – MPO): Oversees the development of climate energy policies and implementation of mitigation strategies via OPTAK.
- (iv) Coal Commission: The Coal Commission was established on July 30, 2019 as an advisory body of the Government. The chairpersons of the commission are the Minister of Industry and Trade (MPO) and the Minister of the Environment (MŽP). The commission has a total of 19 members, including the two commission chairpersons and other 17 commission members. The main goal of the commission is to provide the Government of Czechia with objective and, to the maximum extent possible, consensus outputs with regard to the future phase out of brown coal in Czechia, including all related aspects.

8.3.2 Regional and Local Governance

Regional and municipal governments translate national policies into local actions. Some example are presented below.

- (i) Prague’s Climate Plan 2030: Focuses on renewable energy integration, energy-efficient public transport, and urban greenery. Compared to 2010, the plan aims to reduce emissions by 45% and increase the use of renewable energy and heat production by 470% in 2030.
- (ii) Regional Adaptation/Transition Plans: Not all the 14 NUTS 3 regions have adopted their own climate plans and adaptation strategies. However, most regions have adopted other strategic documents that also include adaptation and mitigation strategies. For example, an important policy in the mitigation and policy of Czechia is the Regional Just Transition Plan of Czechia, a key framework for implementation of the EU’s Just Transition Fund. Its aim is to support the three most disadvantaged regions in the country—Karlovy Vary Region, Ústí and Labem Region, Moravian-Silesian Region—that are expected to be most negatively impacted by national mitigation policies and the coal phase out.²² The affected regions have adopted their local-specific just transition plans (e.g., the Regional Just Transition Plan for Karlovy Vary region approved in 2021).

²² Coal deposits and related industry (coal power plants, metallurgy) are located mainly in these three regions.

- (iii) **Local Adaptation Plans:** The number of municipalities that have implemented local-specific adaptation strategies has been increasing. In 2022, 57 municipalities counting 3,4 million inhabitants (34% of Czech residents) introduced their adaptation strategies.

8.3.3 International Collaboration

Czechia’s alignment with the EU directives ensures its climate policies contribute to broader regional goals. The national climate strategy has been driven mainly by:

- (i) [Participation in the European Green Deal](#)
- (ii) [Compliance with the EU Fit for 55 package.](#)

Czechia has also adopted the [United Nations’ Agenda 2030](#) for a sustainable development, implemented by the [Strategic Framework Czech Republic 2030](#) (Czech Republic 2030).

8.4. Dynamic Aspects of Strategies

Climate policies have evolved from basic environmental protections in the 1990s to comprehensive climate action plans today (Table 1). Key mechanisms of monitoring systems include:

- (i) [Czech Hydrometeorological Institute](#) (CHMI): Collects and monitors data on GHG emissions, air quality, and climate impacts and provides recommendations for policy adjustments.
- (ii) [Czech Environmental Information Agency](#) (CENIA): Collects and monitors data about the state of the environment, including selected indicators of the National Adaptation Strategy by the [ENVIROMETR](#) system and the [Waste Management Monitoring System](#).
- (iii) [Supreme Audit Office](#) (Nejvyšší kontrolní úřad – NKÚ): NKÚ is the supreme audit institution in the country with the mission to review the state’s management of public revenue and expenditure, including effective use of resources for climate mitigation and adaptation policies.
- (iv) **EU Reporting Requirements:** Regular reports to the European Commission ensure transparency of the subsidy policies and alignment with EU standards.

Table 2 - Main Environmental and Climate Protection Policies in Czechia Since the 1990s

Year of implementation	Policy/Legislation	Objective
1992	Environment Act No. 17/1992	Establishes basic principles of environmental protection and sustainable development.
1995	State Environmental Policy (SEP) - First Edition	Broad strategy focusing on pollution reduction, biodiversity conservation, and sustainable development.
1992	Environmental Impact Assessment (EIA) Act No. 244/1992	Introduced mandatory EIAs for projects with potential environmental impacts.
2004	State Environmental Policy 2004–2010	Updated policy focusing on compliance with EU environmental standards.
2004	National Programme to Abate the Climate Change Impacts	First national-level strategy addressing climate change mitigation.

Year of implementation	Policy/Legislation	Objective
2004	Greenhouse Gas Emission Allowance Trading Act No. 695/2004	Established a national emissions trading scheme in alignment with the EU ETS.
2002	Air Protection Act No. 86/2002	Provided measures to reduce air pollution and align with EU directives.
2010	National Renewable Energy Action Plan	Increase the share of renewable energy to meet EU targets.
2015	Strategy on Adaptation to Climate Change	Address climate impacts through sectoral adaptation strategies.
2017	Climate Protection Policy of the Czech Republic	Set national goals for greenhouse gas reduction and low-emission economic transition.
2017	National Action Plan on Adaptation to Climate Change	Implementation measures for the 2015 Adaptation Strategy.
2012	Updated State Environmental Policy 2012–2020	Focus on biodiversity, sustainable resource use, and reducing environmental risks.
2019	National Energy and Climate Plan (NECP)	Set 2030 targets for renewables, energy efficiency, and emission reduction.
2021	Updated State Environmental Policy 2030	Align with the European Green Deal to achieve carbon neutrality by 2050.
2022	Low-emission Mobility Act No. 360/2022	Sets the share of low-emission transport vehicles by 2030
2024	Updated National Energy and Climate Plan (NECP)	Set 2030 targets for renewables, energy efficiency, and emission reduction with a 2050 perspective.

8.5. A first assessment of the effectiveness of the strategies

Evaluation of the effectiveness of climate policies and mitigation strategies has been based mainly on the [Evaluation of the Climate Protection Policy of Czechia \(2021\)](#), The Czech Republic 2021: [Energy Policy Review \(2021\)](#), and the [Update of National Energy and Climate Plan \(2024\)](#).

8.5.1 Effectiveness of Strategies - Achievements in Climate Policies and Adaptation Strategies

1) Emission Reductions

Czechia has demonstrated significant progress in emission reductions, achieving its 2020 targets largely through the implementation of the EU Emissions Trading System (EU ETS). This regulatory framework incentivized shifts away from coal toward cleaner energy sources. “Greenhouse gas emissions from EU ETS facilities have seen a 33.7% reduction since 2005,” [highlighting the efficacy of this mechanism](#). These reductions reflect a broader trend of improving carbon efficiency within energy-intensive sectors.

2) Renewable Energy Development

Renewable energy has been an important part of Czechia’s climate strategy, with the share of [renewable energy in gross total energy consumption \(TEC\)](#) reaching 16% in 2019 – an increase by 71% since 2009. Progress has been done particularly due to bioenergy and solar photovoltaic initiatives. These gains position the country for future advancements, with a goal of [achieving 23% of TEC and 31% of renewable in electricity production by 2030](#). The government’s

support for distributed generation and community energy projects has also facilitated local-level participation in the energy transition.

3) Energy Efficiency

Energy efficiency improvements have been demonstrated by a “15% reduction in the carbon intensity of the energy mix and a 20% decline in the energy intensity of the Czech economy between 2009 and 2019.” Programmes targeting the renovation of buildings have streamlined processes, enabling widespread energy savings across residential and industrial sectors. These efforts not only reduce energy demand, but also alleviate pressure on the power grid, creating a more resilient energy system.

4) Coal Phase-Out Strategy

Czechia has set a goal to phase out coal by 2033. This strategy will be supported by investments in alternative energy sources, including natural gas, nuclear power, and renewables. A Regional Just Transition Plan (RJTP) has been introduced by the Ministry of Regional Development to solve the negative impacts of the coal phase out in the three most affected regions of Czechia. The RJTP implements EU’s Just Transition fund via the Czech Operational Programme Just Transition. In total, €1.64 billion (additional to resources from the Modernization Fund) has been allocated to the three regions between 2021 and 2029.

5) Adaptation Frameworks

Czechia’s Adaptation Strategy (AS) and Adaptation Action Plan (AAP) have been pivotal strategic documents in addressing climate risks. Adaptation measures such as enhanced flood protection infrastructure, reforestation programs, and sustainable water management practices have become a priority after the extremely dry period in 2015–2019.

6) Public Awareness and Monitoring

Efforts to enhance climate data collection and forecasting systems have improved the public ability to plan and respond to climate challenges. Collaboration between government agencies, local stakeholders, and academic institutions has raised public awareness about climate issues, fostering greater community engagement in adaptation initiatives.

8.5.2 Challenges in Climate Policies and Adaptation Strategies

1) Insufficient mitigation efforts

Despite significant reduction of CO₂ emissions since the 1990s and meeting the recent targets, “achieving the objectives of the Climate Protection Policy (CPP) for 2030 is dependent on implementing additional mitigation measures.” Moreover, the carbon intensity of Czechia has been above-average among the IEA countries as coal is still the largest electricity and heat generation source in the country.

Based on the Evaluation Report of CPP from 2021, “current policies and measures are projected to fall short by approximately 2.5% in 2030.” While

significant progress was made between 2005 and 2015 in reduction of industrial emissions, the overall emissions have remained relatively stable since then, mainly due to considerably dry period between 2015 and 2019 that caused [increased emissions of CO₂ related to land use](#), land-use change and forestry (Czech forests remain in poor condition after this dry period). Moreover, “the [current trajectory of emission reduction is insufficient](#) to meet the indicative reduction target of 80% by 2050 compared to 1990 levels. Czechia also lacks comprehensive scenarios that would facilitate the attainment of climate neutrality.”

2) Insufficient Renewable Energy Targets

[Czechia’s renewable energy targets for 2030](#) could be more ambitious as they fall below the EU average (22% energy consumption from renewables in Czechia by 2030 and EU-wide target of 32%). Additionally, the country is not on track to reach targets for the transport sector. For 2030, Czechia has committed to a 14% share of renewables in transport which is the EU minimum target. Strengthening ambition and addressing barriers to renewable energy deployment will be essential to enhancing alignment with EU objectives.

3) Energy Security and Dependency

The transition from coal and reliance on Russian gas has underscored the urgency of diversifying energy sources. Despite actions that [reduced the dependency of Czechia on the Russian gas supplies](#) after the outbreak of the war in 2022, the share of Russian natural gas on [the Czech market was 95% in the last two months of 2024](#).

4) Delayed Implementation of Adaptation Strategies

Although the Czech Ministry of Environment’s Evaluation Report of the Climate Protection Policy (CPP) considered the [implementation of CPP as successful](#) with 73% of measures being “fulfilled” and 22% being “partly fulfilled,” an independent report by a consortium of Czech NGOs ([Centrum pro dopravu a energetiku](#) and [Klimatická koalice](#)), concluded that only 13% (17% based on the EU methodology) of EU’s [financial resources were used on measures with “clear climate benefits”](#) between 2014–2020 (compared to an EU’s target set to 20%).

Below are listed the [main socioeconomic barriers that hinder](#) and/or delay implementation of adaptation measures as named by the Supreme Audit [Office](#) reports and the [Action Plan of the Interreg project ADAPTRegion](#) AT-CZ to remove barriers of adaptation measures in boundary regions:

- (i) [Limited Knowledge and Engagement](#): Public understanding and support for climate change related measures and policies remain generally low in Czechia, which lowers the demand for adaptation measures at the local level as well as prioritization of climate-related topics at the national level. Many residents, regional and local policy and decision makers, city planners, as well as local stakeholders are [unaware of the specific climate risks](#) facing their communities, such as increased flooding, prolonged droughts, and heat waves, nor effective technological measures to mitigate these impacts. Bridging this gap requires targeted education and outreach

campaigns to raise awareness of climate change impacts as well as examples of good practice.

- (ii) Fragmented Governance: Poor coordination between ministries, regional authorities, and municipalities, as well as between public (stakeholders) and local governments, often leads to inefficiencies and inconsistencies in adaptation efforts.
- (iii) Limited Financial and Human Resources: Especially in small municipalities, the implementation of adaptation projects is significantly hindered by the lack of specialized staff and limited financial resources, which together obstruct the adoption and implementation of measures addressing climate change.
- (iv) Low Motivation of Investors: Among the main technical barriers that limit the motivation of private sector (local businesses, land and building owners, etc.) to implement effective adaptation measures are named:
 - uncertain/slow economic return,
 - lack of well-designed grant programmes,
 - extremely lengthy approval processes due to property disputes, administrative errors, and lengthy negotiations with the relevant state authorities (due to cultural heritage protection, agricultural land preservation, road safety, etc.),
 - large administrative burden related to the granted projects.
- (v) Legislative Barriers: Adaptation strategies and measures are neither legislatively nor substantively reflected in the legal framework – especially the “Building Act” (283/2021) governing urban planning and building regulations.
 For example, blue-green infrastructure is not legally defined in the Building Act. Similarly, investors in road, railway, or residential building projects have been exempt from the obligation to pay the fee for discharging wastewater into the sewer system, thus they are not motivated to invest in rainwater retention, accumulation, or infiltration systems. Consequently, technical standards mostly do not address blue-green infrastructure, which further fosters doubts and a negative perception of adaptation measures by investors.

8.5.3 Recommendations

The IEA Review Report suggests the following key recommendations in terms of mitigation.

“The government of Czechia should:

- (i) Anticipate a faster phase-out of coal than is currently envisaged and prepare to accelerate additional deployments of renewable and nuclear power plants.
- (ii) Together with stakeholders, assess the full economic potential of all available forms of renewable energies and develop road maps to fully exploit them.

- (iii) Place energy efficiency at the centre of energy policy making. Create a dedicated body for the implementation of the energy efficiency policy measures.
- (iv) Introduce a carbon tax gradually in sectors not covered by the EU ETS to stimulate low-carbon investment and reduce fossil fuel consumption by stronger price signals, while increasing public acceptance by channelling back revenues to consumers.”

In terms of adaptation policies, the team of the [ADAPTRegion AT-CZ project](#) provided a [list of recommendations](#) for effective implementation of adaptation measures in regions. The main recommendations are as follows:

- (i) Strengthen the capacity of municipalities to address climate change adaptation, support systematic education for officials, designers, managers of the adaptation projects
- (ii) Create national and regional agencies that will provide municipalities with advisory services in the preparation of investment projects with high potential for adaptation to the impacts of climate change
- (iii) Create subsidy programmes that will motivate local companies and individual property owners for new technological solutions on their buildings and infrastructure
- (iv) Amend the definition of blue-green infrastructure in the Building Act, expand the responsibilities of urban planning, and revise the definitions of city plans
- (v) Eliminate the exemption from fees for discharging rainwater into public sewers for road construction and residential buildings
- (vi) Introduce a system of financial compensation, discounts, or incentives for investors implementing blue-green infrastructure for rainwater retention (e.g., green roofs) or utilization (e.g., rainwater for flushing)
- (vii) Consider (by the law) “adaptation strategy” documents a standardized and binding basis for the preparation of urban planning documents.

9. DENMARK

9.1. Introduction

Denmark has a strong foundation for addressing climate change, with extensive experience in both mitigation and adaptation. The country is a leader in renewable energy and energy efficiency, and its mitigation plans focus on accelerating the transition to a low-carbon society through innovation and technological advancements.

On the other hand, Denmark has a long history of managing water resources and protecting its coastline, which informs climate adaptation planning. Previous assessments and strategies have identified key climate risks and vulnerabilities, which are key components in adaptation plans now. The mapping of climate risks and adaptation plans is by law solely the responsibility of the municipalities in Denmark, and there are no formal reporting requirements to the government. All municipalities however have voluntarily signed up to reporting requirements and policy ambitions set up by the [C40 Covenant of Mayors](#). In addition to the C40 reporting (C40 Cities Climate Leadership Group, 2020) that municipalities are responding to, the EU water framework Directive also is a mandatory legal framework for addressing risks in inland and coastal water system, and to develop response strategies. The Danish Coastal Authority (DCA) is administrating this legal framework and has recently appointed 53 municipalities that have mandatory reporting requirements.

9.2. The strategies of mitigation and adaptation being carried out

Previous climate strategies and plans have laid the foundation for the current plan, which builds on Denmark's successes and lessons learned. Denmark's Climate Act (Klimaloven) aims to accelerate the transition to a low-carbon society by leveraging existing knowledge and expertise while fostering innovation and technological advancements (mitigation); while Climate Adaptation Plan 1 (adaptation) should enhance Denmark's resilience to the impacts of climate change, minimizing risks and damages while maximizing opportunities for adaptation. DK2020, a nationwide commitment to climate action is the overarching national plan for climate action in Denmark, encompassing both mitigation and adaptation efforts

9.2.1 Objectives of the climate policies

a. Klimaloven

Overall Objective: The overarching goal is to achieve a 70% reduction in greenhouse gas emissions by 2030 compared to 1990 levels, paving the way for climate neutrality by 2050. This ambitious target sets the tone for the entire plan, driving action across all sectors and inspiring innovation and collaboration.



Sector-Specific Objectives.

- **Energy:** The energy sector is central to the Plan, with objectives focused on increasing the share of renewable energy in gross final energy consumption, phasing out coal-fired power plants, and improving energy efficiency in buildings and industry. This multifaceted approach aims to transform the energy landscape, ensuring a cleaner, more sustainable energy supply for Denmark. Klimaloven mandates a phase-out of coal by 2030, promotes the expansion of renewable energy sources, energy saving and consumer behaviour. This implicitly sets targets for the energy sector to decarbonize and increase the share of renewables in the energy mix.
- **Transportation:** Recognizing the significant contribution of transportation to emissions, the plan aims to reduce national emissions from road transport, shipping, and aviation. This will be achieved through a combination of electrification, biofuels, and other innovative measures, promoting cleaner and more sustainable modes of transportation. Klimaloven emphasizes the need to reduce emissions from the transport sector, which implies setting targets for electric vehicle adoption, promoting public transportation, and improving fuel efficiency standards.
- **Agriculture:** Klimaloven acknowledges the need to reduce emissions from agriculture, Measures include improving manure management, optimize fertilizer use, and promote sustainable farming practices, ensuring that agriculture contributes to a climate-friendly future. These actions contribute to mitigation efforts and may also have adaptation benefits. [A new deal has been made](#) in Nov 2024 for CO2 levy on livestock.
- **Industry:** The plan acknowledges the need for industrial transformation, aiming to reduce emissions from industrial processes through energy efficiency improvements, CO2 taxation, circular economy initiatives, and the development of new technologies. This sector-specific approach ensures that industry remains competitive while contributing to national emission reduction targets.

The table below provides an overview of the various targets and obligations in the Danish climate policies. The targets, relevant for the Danish climate policies, originate partly in decisions on specific national ambitions and partly in the Danish obligations to comply with a set of international agreements in the energy field within the EU and the UN.

Table 3 – Targets and obligations in the Danish climate policies

Framework	Area	Obligation/target
Government platform 2015	Phase-out of fossil fuels	Denmark is to be climate neutral by 2050
Danish climate law 2020	Low emission society by 2050	Target is not specified
EU: 2020 targets	Greenhouse gas emissions from buildings, agriculture and transportation	To be reduced by 20 % between 2005 and 2020

Framework	Area	Obligation/target
	Fraction of renewable energy in total energy consumption	30 % by 2020
	Fraction of renewable energy in the transport sector	10 % by 2020
EU: 2030-targets	<p>The total emissions from the EU are to be reduced by 40 % between 1990 and 2030. This includes the following targets for the EU as a whole:</p> <ul style="list-style-type: none"> • 43 % reductions from large emitters such as power plants and the oil and gas sectors. • 30 % reductions of emissions from buildings, agriculture and transportation. • At least 27 % renewable energy in total energy consumption by 2030. • At least 27 % increase in energy efficiency by 2030. 	<p>The emission reduction targets for the EU as a whole are to be implemented as national reduction obligations for buildings, agriculture and transportation.</p> <p>The Danish reduction obligations have not yet been negotiated.</p>

Source: Taken from the Danish Energy Agency. (n.d.).

b. Climate Adaptation Plan 1

Overall Objective: The overarching goal is to enhance Denmark's resilience to the impacts of climate change, minimizing risks and damages while maximizing opportunities for adaptation. This broad objective sets the stage for a comprehensive and proactive approach to adaptation, ensuring that Denmark is prepared for the challenges and opportunities of a changing climate.

Specific Objectives.

- **Coastal Protection:** Protect coastal communities and infrastructure from sea-level rise, storm surges, and erosion through a combination of structural measures (e.g., dikes, seawalls) and nature-based solutions (e.g., dune reinforcement, salt marsh restoration).
- **Water Management:** Ensure water availability for human consumption, agriculture, and industry while managing flood risks from increased precipitation and extreme weather events. This includes measures to improve water storage, drainage, and flood protection infrastructure. This emphasizes water management as a key component of the adaptation plan, with measures to improve water storage, drainage, and flood protection infrastructure. This directly addresses climate risks and vulnerabilities related to water resources, enhancing adaptation.
- **Urban Adaptation:** Enhance the resilience of urban areas to heat waves, flooding, and other climate impacts through green infrastructure, sustainable urban planning, and climate-proofing of buildings and infrastructure. This can be interpreted as a policy related to green building, as energy efficiency is a key aspect of green building practices.
- **Infrastructure Resilience:** Adapt critical infrastructure, such as transportation networks, energy systems, and communication systems, to withstand extreme weather events and changing climate conditions.



- **Ecosystem Resilience:** Protect and enhance the resilience of natural ecosystems to climate change, ensuring their continued provision of essential services, such as carbon sequestration, water purification, and biodiversity conservation. This implicitly addresses biodiversity as a key component of ecosystem resilience. Preserving biodiversity aids both adaptation (by maintaining healthy ecosystems that can better withstand climate impacts) and mitigation (by safeguarding carbon sinks and natural processes that regulate greenhouse gases). This implies a strong foundation for environmental conservation in Denmark, reflected in its long history of environmental awareness and action. This supports both adaptation and mitigation efforts.

Note that nature-based solutions also include sustainable forest management. Forests play a crucial role in both adaptation (by regulating water cycles, preventing erosion, and providing cooling) and mitigation (by acting as significant carbon sinks). There is a separate “Green Tripartite Plan” which will seek to establish 250,000 hectares of new forest and convert 140,000 hectares of environmentally damaging low-lying farmland into natural areas, including meadows and wetlands. [The state will buy land from farmers for this purpose.](#)

c. DK2020: A Nationwide Commitment to Climate Action

[DK2020](#) is a groundbreaking initiative in Denmark, where virtually all municipalities (95 out of 98) came together to develop ambitious climate action plans aligned with the Paris Agreement. This nationwide effort, a first of its kind globally, aimed to accelerate local climate action and contribute to Denmark's national goal of reducing greenhouse gas emissions by 70% by 2030.

Key Features of DK2020.

- **Paris Agreement Alignment:** DK2020 ensured that municipal climate plans were compatible with the Paris Agreement's goal of limiting global warming to well below 2 degrees Celsius, aiming for 1.5 degrees. This required municipalities to set ambitious targets for emission reductions and climate adaptation.
- **C40 Framework:** The project utilized the C40 Climate Action Planning Framework, a globally recognized framework developed by the C40 Cities Climate Leadership Group. This ensured a standardized and robust approach to climate planning across municipalities. This marked the first time the C40 framework was implemented in smaller cities, demonstrating its adaptability and effectiveness beyond large metropolitan areas.

9.2.2 Rationale and Timeframe of the climate policies

a. Klimaloven

The Danish Climate Council, Klimarådet, plays a crucial role in shaping Denmark's climate action strategy. They don't simply create a one-time plan; instead, they are continuously engaged in developing and refining recommendations to ensure the country stays on track to meet its ambitious

climate goals. This ongoing process involves monitoring Denmark's progress, analysing the latest scientific data, and providing expert advice to the government on policy adjustments and new initiatives. The plan's timeframe is strategically aligned with both short-term and long-term climate objectives. The immediate focus is on achieving the 70% emission reduction target by 2030, while the goal is to achieve climate neutrality by 2050. This dual focus ensures that Denmark remains on track to meet its international commitments while laying the foundation for a sustainable future. The plan is not static; it is designed to be a living document, subject to periodic reviews and updates to ensure its continued relevance and effectiveness in response to evolving scientific knowledge, technological advancements, and international developments.

b. Climate Adaptation Plan 1

Denmark is very risk prone to flooding from storm surges and cloudbursts and is among the European countries with the highest reported damage costs from flooding events. There is therefore a very extensive risk assessment and adaptation planning going on at municipal level to avoid high flooding damages. The Danish government issued in October 2023 the so-called “Climate Adaptation Plan 1”, which included a few policy options and a very small governmental adaptation fund, which could support 25% of the costs of municipal adaptation projects. The plan acknowledges that Denmark, despite its strong mitigation efforts, is already experiencing the effects of climate change, such as sea-level rise, increased precipitation, and more frequent extreme weather events. It is however criticised for not playing out in relation to critical issues on burden sharing of the very high costs of climate adaptation e.g., on what private property owners, municipalities and the state should play, and this is in practice a very critical barrier for implementing adaptation projects in practice. [The plan has been extensively criticised](#) by both the private and the public sector actors.

Specific actions within the plan are being rolled out, including:

- State assistance to municipalities for coastal protection projects (5 years allocated from 2024 to 2027)
- 150 million DKK allocated to the coastal protection pool for municipalities in 2024
- Pilot project for a comprehensive storm surge protection plan for Copenhagen and surrounding municipalities (already underway)
- 1.1422 billion DKK allocated for sand nourishment on the west coast from 2025 to 2029
- 16.2 million DKK allocated for addressing high groundwater levels in urban areas from 2024 to 2027
- 5.5 million DKK allocated for cross-sectoral collaboration and knowledge sharing from 2024 to 2027
- 3.2 million DKK allocated for improving the framework for municipal coastal projects from 2024 to 2027.



The Adaptation Plan is designed to prepare Denmark for the unavoidable impacts of climate change, such as sea-level rise, storm surge, extreme weather events, and changes in precipitation patterns. It recognizes the need to protect the country's infrastructure, economy, and natural environment from these impacts, ensuring the well-being of Danish citizens in the face of a changing climate. The plan is an integral part of Denmark's comprehensive climate action strategy, complementing the Mitigation Plan by addressing the unavoidable consequences of climate change. The Climate Adaptation Plan 1 covers the period 2023-2027, providing a medium-term framework for adaptation action. Recognizing the limitations of the plan, the government is planning to issue a new Climate Adaptation plan early in 2025.

c. DK2020: A Nationwide Commitment to Climate Action

Table 4 – Timeline

Year	Event
2015	Paris Agreement: 195 countries set a goal to limit global temperature rise.
2016	C40 publishes a report, a roadmap for cities to reduce greenhouse gas emissions.
2017	C40 develops Climate Action Planning Framework (CAPF).
2019	Realdania launches DK2020; 20 municipalities join.
2020	Denmark passes its first climate law.
	All Danish municipalities invited to join DK2020.
	44 more municipalities join DK2020.
2021	31 additional municipalities join DK2020.
2023	96 municipalities participate in DK2020.
	Climate Alliance formed to support implementation of plans.
2024	All 98 municipalities are members of the Climate Alliance.
2050	Goal for all DK2020 municipalities to be climate robust and neutral.

Source: adapted from Realdania (2024)

9.2.3 Mitigation strategy implementation

Denmark's plan (Klimaloven) is a cornerstone of its national commitment to combat climate change by drastically reducing greenhouse gas emissions (Klimarådet 2020). The plan aligns with the Paris Agreement, aiming for a 70% reduction by 2030 (compared to 1990 levels), and ultimately achieving climate neutrality by 2050 which is more ambitious than the Paris agreement. Objectives that are important for Danish climate policy: “The goals that are relevant to Danish climate policy follow both from decisions on specific national goals and from Denmark's commitment to contribute to fulfilling a number of international agreements in the climate area in the EU and the UN” (translated from Klimarådet 2020).

The Plan encompasses a wide range of measures, including promoting renewable energy sources such as wind and solar power, improving energy efficiency in buildings and industries, and supporting the development and implementation of green technologies. It outlines policies and initiatives to reduce emissions from various sectors, such as transport, industry, and

agriculture, through a combination of regulations, incentives, and voluntary agreements. The plan also emphasizes the importance of research and innovation in developing and implementing climate solutions, fostering collaboration between research institutions, businesses, and government agencies.

Key Instruments and Measures. The Plan plans to employ a diverse toolkit of instruments and measures to achieve its ambitious goals. These include the following.

- Carbon pricing mechanisms: Such as CO₂ taxes and emissions trading schemes, to incentivize emission reductions and drive investment in green technologies.
- Support schemes for renewable energy deployment: Including feed-in tariffs and auctions, to accelerate the transition to a renewable energy-based economy.
- Energy efficiency regulations and incentives: Such as building codes and appliance standards, to promote energy conservation and reduce energy consumption.
- Investment in research and development of green technologies: To foster innovation and create new solutions for climate change mitigation.
- Promotion of sustainable transport options: Such as public transport, cycling infrastructure, and electric vehicle incentives, to reduce reliance on fossil fuel-powered vehicles.
- Measures to reduce emissions from agriculture: Such as manure management technologies, optimized fertilizer use, and support for sustainable farming practices.
- Circular economy initiatives: To reduce waste, promote resource efficiency, and minimize the environmental impact of production and consumption patterns. This aligns with both adaptation and mitigation by reducing resource consumption and minimizing the environmental impact of production and consumption patterns.
- Demand side measures: While not explicitly labelled as a demand-side measure, the plan's emphasis on public awareness and education can indirectly influence consumption patterns and lifestyle choices. By informing and engaging citizens about climate change, the plan can encourage more sustainable consumption habits and reduce overall demand for energy and resources.

Just transition plan for Denmark

Denmark has adopted a comprehensive approach to ensure a just transition towards a low-carbon economy. This commitment is enshrined in its 2020 climate neutrality law, which mandates considering the social and economic implications of climate policies. The country recognizes the potential for job losses in certain sectors and emphasizes [the importance of a smooth and just transition for workers and communities](#). *“In December 2020, a broad majority of parliamentary parties passed a binding law for climate-neutrality by 2050, and the planned phase out of its oil and gas sector is central to meeting these commitments. With more than 55 platforms in 19 oil and gas fields in the North*



Sea, Denmark has cancelled all future oil and gas extraction tender rounds. As the agreement notes: “if our children and grandchildren are to live in a world that lives up to the common obligations under the Paris Agreement, fossil fuels must be phased out ... It’s not a choice we face, it is a bound task”. A just transition is central to this transformation. Denmark is committed to helping workers transition to new and well-paying jobs and supporting those regions and communities that are most impacted.”

Denmark's [just transition strategy includes](#) the following elements.

- Strong legal framework: Denmark's commitment to a just transition is embedded in its 2020 climate neutrality law, which legally mandates considering the social and economic impacts of climate policies. This law isn't just symbolic; it sets a concrete foundation for ensuring that the transition is fair and equitable.
- Regional focus: Canadian Climate Institute highlights the importance of a regional focus in Denmark's just transition strategy. This is particularly crucial in areas like Esbjerg, where fossil fuel industries play a significant role in the local economy. In Esbjerg, a hub for oil and gas production, is undergoing a significant shift towards offshore wind energy. This regional approach ensures that communities traditionally reliant on fossil fuels are not left behind in the transition.
- Social dialogue: Denmark actively involves social partners like trade unions (e.g., Fagbevægelsens Hovedorganisation (FH), the Danish Confederation of Trade Unions) and employer organizations (e.g., Dansk Industri (DI), the Confederation of Danish Industry) in climate policy discussions. This collaborative approach ensures that workers' rights and concerns are considered in the transition process. This “Danish Model” of social dialogue is deeply ingrained in the country's policymaking culture and contributes to a more inclusive and equitable transition.
- Reskilling and upskilling: Canadian Climate Institute emphasizes Denmark's efforts to reskill and upskill workers in fossil fuel industries to prepare them for jobs in the renewable energy sector. For example, programs are in place to train oil and gas workers in skills relevant to the offshore wind industry. This proactive approach helps mitigate potential job losses and ensures a smoother transition for workers.
- Community engagement: Denmark recognizes the importance of community engagement and dialogue in ensuring broad support for the transition. This involves actively engaging with local communities, addressing their concerns, and fostering a sense of shared responsibility in the transition process. For instance, the government has established partnerships with local authorities and civil society organizations to facilitate community-level discussions and initiatives related to climate action.

This multifaceted approach aims to ensure that the benefits and burdens of the transition are shared equitably, leaving no one behind.

Cross-sectoral interlinkages

The Mitigation Plan recognizes the interconnectedness of climate action with other policy areas, such as energy, transport, agriculture, spatial planning, and environmental protection. It emphasizes the importance of policy coherence and integrated planning to avoid unintended consequences and maximize synergies between different sectors. For example, policies promoting sustainable transport can have positive impacts on air quality and public health, while measures to reduce emissions from agriculture can benefit biodiversity and water quality.

9.2.4 Adaptation strategy implementation

The Adaptation Plan encompasses a wide range of measures, including infrastructure upgrades to improve resilience to extreme weather events, nature-based solutions to enhance natural defences against climate impacts, and risk management strategies to minimize potential damage and disruption. It outlines specific actions to address climate risks in various sectors, such as water resources, agriculture, and health, ensuring a comprehensive approach to adaptation. The plan also emphasizes the importance of research and innovation in developing and implementing adaptation solutions, fostering collaboration between research institutions, businesses, and government agencies.

Key Instruments and Measures: The plan employs a diverse set of instruments and measures to achieve its objectives, including:

- Risk assessments and vulnerability mapping: To identify areas and sectors most at risk from climate change impacts.
- Planning and zoning regulations: To guide development and land use in a way that minimizes climate risks.
- Investment in climate-resilient infrastructure: To upgrade existing infrastructure and build new infrastructure that can withstand climate impacts.
- Nature-based solutions: To harness the power of nature to provide climate adaptation benefits, such as flood protection, heat reduction, and carbon sequestration.
- Public awareness and education campaigns: To inform and engage citizens about climate risks and adaptation measures.
- Research and innovation: To develop new technologies and approaches for climate adaptation.

Cross-sectoral interlinkages

The Adaptation plan recognizes the interconnectedness of climate adaptation with other policy areas, such as spatial planning, water management, environmental protection, and disaster risk management. It emphasizes the importance of integrated planning and policy coherence to avoid unintended consequences and maximize synergies between different sectors. For example, measures to improve water management can also benefit biodiversity and



reduce flood risks, while green infrastructure in urban areas can contribute to both climate adaptation and air quality improvement.

9.3. Governance framework

National: The plan is guided by Denmark's Climate Act (Klimaloven), which provides a legal framework for climate action. Klimaloven however is only concrete about climate change mitigation targets. It is further supported by national strategies and sectoral plans, such as the Coastal Protection Strategy, ensuring a coordinated and integrated approach to adaptation across different sectors. Actors involved are:

- Government:
 - Ministry of Environment: Leads the coordination and implementation of the adaptation plan.
 - Danish Environmental Protection Agency: Responsible for monitoring and regulating environmental impacts, including those related to climate change.
 - Danish Meteorological Institute: Provides climate data and projections to inform adaptation planning.
 - Ministry of Climate, and Energy: This ministry plays a leading role in developing and implementing climate policies, including the Plan. It oversees the Danish Energy Agency and (this is the Ministry of Environment) which are responsible for specific aspects of climate action.
 - Danish Energy Agency: Focuses on energy efficiency, renewable energy deployment, and the transition to a sustainable energy system. They provide technical expertise, funding, and regulatory oversight.
 - Other relevant ministries: Climate action is integrated across government, with other ministries contributing to the Plan within their respective areas. This includes the Ministry of Finance (economic and fiscal policies), the Ministry of Transport (sustainable transport), the Ministry of Food, Agriculture and Fisheries (agricultural emissions), and the Ministry of Industry, Business and Financial Affairs (industrial decarbonization), Ministry of foreign affairs. Contribute to adaptation efforts within their respective areas, such as the Ministry of Transport (infrastructure), the Ministry of Food, Agriculture and Fisheries (agriculture), and the Ministry of the Interior and Housing (urban planning).
 - Local authorities: Municipalities play the leading role in planning and the implementation adaptation measures at the local level, such as coastal protection, water management, and urban planning.
- EU: Denmark's adaptation plan aligns with the EU Adaptation Strategy, contributing to broader European efforts to build climate resilience. This is not having a large consequence locally, since the responsibility for adaptation planning is only local.
- International: The plan is also informed by international frameworks, such as the UN Sustainable Development Goals (SDGs) and the Sendai



Framework for Disaster Risk Reduction, recognizing that climate adaptation is a global challenge requiring international cooperation and knowledge sharing. This is in practice taken care of by the municipalities reporting to the C40 framework.

Other actors involved:

Businesses: The private sector is involved in developing and implementing adaptation solutions, such as climate-resilient infrastructure and technologies. Example includes:

- **Industry associations:** Representing various sectors, they play a crucial role in disseminating information, promoting best practices, and advocating for policies that support a green transition within their respective industries.
- **Individual companies:** From large corporations to small and medium-sized enterprises (SMEs), businesses are key drivers of innovation and implementation of green technologies and practices. They are responsible for reducing their own emissions and contributing to a circular economy.
- **Investors:** Provide the financial capital necessary for the development and deployment of green technologies and infrastructure. Their investment decisions play a crucial role in shaping the transition to a low-carbon economy.

Civil Society: NGOs and environmental organizations raise awareness, advocate for adaptation policies, and participate in local initiatives. Play a vital role in raising awareness, advocating for ambitious climate policies, and holding the government and businesses accountable for their climate commitments.

Research institutions and universities: Conduct research, develop new technologies, and provide scientific expertise to support adaptation planning. Think tanks and policy analysts contribute to the development and evaluation of climate policies, providing independent analysis and recommendations.

Citizens: Individuals and communities play a role in adapting to climate change by taking measures to protect their homes and properties, participating in local initiatives, and making informed choices. Make daily choices that contribute to emission reductions, such as using public transport, cycling, adopting energy-efficient appliances, and reducing their carbon footprint. Communities also play a role in promoting sustainable practices, supporting local initiatives, and creating a culture of climate awareness.

Finally, it could be useful to highlight the specific governance framework of the “DK2020: A Nationwide Commitment to Climate Action”, which entails the following features:

- **Multi-level Governance:** DK2020 fostered collaboration between municipalities, regions, and the national government. This multi-level governance structure ensured coordination and support for local climate action. The project was a partnership between Realdania, Local Government Denmark (KL), and the five Danish regions, underscoring the collaborative nature of the initiative.

- **Capacity Building:** The project provided extensive support and training to municipalities, equipping them with the knowledge and tools necessary to develop and implement comprehensive climate action plans. This included workshops, expert consultations, and access to a digital knowledge platform, ensuring municipalities had the resources to navigate the complexities of climate planning.

9.4. The main dynamic aspects of the strategies

The adaptation plan involves a combination of regulations, incentives, and public awareness campaigns to promote adaptation and foster a sense of shared responsibility among all stakeholders. It outlines the roles and responsibilities of different actors, including government agencies, municipalities, and private sector stakeholders, ensuring coordinated and effective action.

- **Governance:** The plan's implementation relies on a multi-level governance structure, with clear roles and responsibilities for national government agencies, regional authorities, and municipalities. This collaborative approach ensures coordinated action and effective implementation across all levels of government.
- **Financing:** A combination of public funding, private investment, and innovative financing mechanisms will be utilized to support the plan's implementation. This diversified approach ensures financial sustainability and leverages the resources and expertise of both public and private sectors.
- **Stakeholder Engagement:** The plan recognizes the importance of broad stakeholder engagement, emphasizing the participation of businesses, civil society organizations, and citizens in climate adaptation efforts. This inclusive approach fosters a sense of shared responsibility and encourages collective action towards a climate-resilient Denmark.

The plan also highlights the importance of international cooperation and knowledge sharing in addressing climate change adaptation, recognizing that global challenges require collaborative solutions. There is no monitoring and evaluation framework established, which can track progress towards implementing adaptation measures by municipalities or local property owners including households and business. The municipalities association KL is on an ongoing basis in a dialogue and through surveys measuring the status and success of planned adaptation projects, but this is not a systematic review, but rather an input to a political process supporting a strong demand by municipalities for more government support to adaptation planning. Regular reports on municipal adaptation planning are supplied to the C40 network, which municipalities voluntarily signed up to. This provides some transparency in the progress in adaptation planning and implementation.

The mitigation plan also involves similar dynamic aspects. The plan involves a combination of regulations, incentives, and voluntary agreements to achieve its goals. It clearly outlines the roles and responsibilities of different actors,



including government agencies, businesses, and civil society, fostering a shared responsibility approach to climate action. The plan also highlights the importance of international cooperation and partnerships in addressing climate change, recognizing that collective action is crucial to achieving global emission reduction targets (exactly as we have seen just above for adaptation).

- **Governance:** Like the adaptation plan, the mitigation plan's implementation also relies on a robust multi-level governance structure, with clear roles and responsibilities for national government agencies, regional authorities, and municipalities.
- **Financing:** A combination of public funding, private investment, and innovative financing mechanisms are and will be utilized to support the plan's implementation.
- **Stakeholder Engagement:** Broad stakeholder engagement is emphasised in climate action. This inclusive approach fosters a sense of shared responsibility and encourages collective action.

However, a comprehensive monitoring and evaluation framework will track progress towards the plan's goals, using key indicators such as emission reductions, renewable energy deployment, and energy efficiency improvements. Regular reports and assessments will be conducted to evaluate the effectiveness of policies and measures, allowing for adjustments and improvements based on evidence and data. This adaptive management approach ensures that the plan remains dynamic and responsive to the evolving challenges of climate change mitigation.

9.5. A first assessment of the effectiveness of the strategies

The integration of the latest scientific findings into climate plans is one of the important aspects for ensuring their effectiveness and long-term viability. In Denmark, the collaboration of the municipalities (KL) with academic institutions and researchers provides valuable insights into climate change impacts, mitigation strategies, and adaptation options. This evidence-based approach strengthens the foundation of climate action and increases the likelihood of achieving climate goals.

a. Klimaloven (Climate Act)

Denmark has already made progress in reducing emissions and increasing renewable energy use. These achievements demonstrate that a green transition is not only possible but can also drive economic growth and improve quality of life.

Below, we list the achievements from different reports ([Danmarks Statistik, 2024](#); [Ministry of Environment of Denmark, 2024](#); [The Danish Government, 2020](#); [Danish Energy Agency, 2024](#); [U.S. Department of Commerce, 2025](#)).

- **Emission Reductions:** Denmark had already achieved a 39% reduction in greenhouse gas emissions by 2020 compared to 1990 levels, demonstrating substantial progress towards the 2030 target of a 70% reduction. This



success can be attributed to a combination of policies, including support for renewable energy, energy efficiency improvements, and carbon pricing mechanisms.

- **Renewable Energy:** Denmark is a global leader in renewable energy, particularly wind power. In 2020, 47% of Denmark's electricity consumption came from wind energy, the highest share in the world. This achievement highlights Denmark's commitment to clean energy and its success in harnessing its natural resources to create a sustainable energy system. In 2023, renewable energy consumption in Denmark reached a record high, meeting 45.2% of the nation's total energy needs (excluding transportation fuel). This represents a doubling of the renewable energy share since 2011, primarily driven by increased use of solar cells and biogas. Despite this shift, total energy consumption remained relatively stable, with decreased use of coal, coke, and waste offsetting the rise in renewables. Approximately 64% of Danish households use district heating, contributing to the country's high energy efficiency. Oil-fired burners are being phased out, with only 200,000 homes still relying on them. The installation of new oil-fired burners is prohibited where district heating or natural gas is available. Natural gas, considered the cleanest fossil fuel, accounts for 15% of household heating. While Denmark is a significant wind energy producer, most renewable energy for buildings comes from solar and biomass. Wood pellets, a CO₂-neutral alternative to fossil fuels, are also gaining popularity. Denmark consumes over 1 million tons of wood pellets annually, primarily in private homes and thermal power stations.
- **Energy Efficiency:** Denmark has also made significant strides in improving energy efficiency across various sectors. Through initiatives such as building codes, appliance standards, and industrial energy efficiency programs, Denmark has successfully decoupled economic growth from energy consumption. Denmark's dedication to green building is evident in its comprehensive approach that considers a building's entire lifecycle, from material selection and construction to daily household operations.
- **Coal Phase-Out:** Denmark has completely phased out coal-fired power plants, a major milestone in its transition to a cleaner energy system (this has been delayed due to the Ukraine war). This achievement has significantly reduced emissions from the energy sector and improved air quality.
- **Sustainable Transport:** Denmark has made progress in promoting sustainable transport options, with increasing use of public transport, cycling, and electric vehicles. The country boasts extensive cycling infrastructure and has implemented policies to encourage the adoption of electric vehicles.
- **Agriculture and Industry:** While more challenging, the agricultural and industrial sectors have also contributed to emission reductions. Initiatives to improve manure management, optimize fertilizer use, and promote sustainable farming practices have reduced emissions from agriculture. In the industrial sector, energy efficiency improvements and circular economy initiatives have led to progress.

- **Waste Management:** Encouraging water-efficient fixtures and rainwater harvesting. Danish households consume 34 gallons of water per person daily, and initiatives are in place to reduce this through efficient toilets, taps, showers, and water-free urinals. Recycling rainwater for car washing, garden watering, and even indoor use for toilet flushing and laundry is also promoted. Danes generate 13 million tons of waste annually, with household waste accounting for one-fourth of the total. Recycling plays a crucial role, with a 66% recycling rate. While not required, some households compost organic waste.

The plan builds on these achievements, aiming to accelerate the transition to a low-carbon economy. Lessons learned from previous efforts will be used to improve the implementation of the current plan.

b. Climate Adaptation Plan 1

Several adaptation options have already been implemented, such as coastal protection projects and water management initiatives. These efforts could be strengthened further if they were supported by a comprehensive government plan and a supportive legislative framework within the area.

Lessons learned from previous efforts will be used to improve the implementation of adaptation measures ensuring continuous improvement and a need for speeding up the implementation of projects and policies.

Below, we list the achievements from some Government reports ([Ministry of Environment of Denmark, 2024](#); [Nordic Council of Ministers, 2023](#); [The Danish Government, 2020](#)).

- The local governments and other actors have implemented various coastal protection measures, such as dikes, seawalls, and beach nourishment, to protect coastal communities and infrastructure from flooding and erosion.
- There have also been investments in flood protection infrastructure, such as pumping stations and drainage systems, to manage increasing precipitation and pluvial flooding.
- There is progress in integrating climate adaptation considerations into spatial planning and urban development, promoting green infrastructure and sustainable urban design.

c. DK2020: A Nationwide Commitment to Climate Action

Impact and Outcomes

- **Ambitious Climate Plans:** DK2020 resulted in the development of ambitious climate plans across Denmark, covering a wide range of sectors, including energy, transportation, buildings, and waste management. These plans not only addressed mitigation efforts to reduce emissions but also adaptation strategies to enhance resilience to the impacts of climate change.
- **Increased Climate Action:** The project has spurred significant climate action at the local level, with municipalities implementing various initiatives to reduce emissions and enhance climate resilience. Examples include investments in renewable energy, promotion of sustainable



transportation, energy efficiency retrofits in buildings, and initiatives to reduce waste and promote circular economy.

- Knowledge Sharing and Collaboration: DK2020 fostered a culture of knowledge sharing and collaboration among municipalities, enabling them to learn from each other and accelerate progress. This was facilitated through peer-to-peer learning, workshops, and conferences, where municipalities could exchange best practices and lessons learned.
- International Recognition: Denmark's DK2020 initiative has received international recognition for its innovative approach to local climate action and its contribution to global climate goals. It has been showcased as a model for other countries seeking to engage local governments in ambitious climate action.

Key Success Factors

- Strong Political Will: The commitment of the local authorities to climate action was crucial for the success of DK2020. This commitment was reflected in the national climate law passed in 2020, which provided a supportive policy framework for local climate action.
- Effective Collaboration: The multi-level governance structure and strong partnerships between different actors were essential for coordinated action. The active involvement of Realdania, KL (association and interest group of the 98 Danish municipalities), and the Danish regions ensured that municipalities had the necessary support and guidance throughout the process.
- Capacity Building and Support: Providing municipalities with the necessary resources and expertise was key to enabling them to develop and implement ambitious climate plans. The comprehensive capacity building program ensured that municipalities had the knowledge and skills to navigate the challenges of climate planning.
- Citizen Engagement: Many municipalities actively involved citizens in the development of their climate plans, ensuring local ownership and support for climate action. This participatory approach fostered a sense of shared responsibility and increased the likelihood of successful implementation.

Key Takeaways

- Local Action is Crucial: DK2020 highlights the critical role of local governments in addressing climate change and achieving national and global climate goals. Municipalities are at the forefront of climate action, as they are responsible for implementing many of the policies and measures that directly impact emissions and climate resilience.
- Collaboration is Key: Effective collaboration between different levels of government and stakeholders is essential for successful climate action. DK2020 showcased the power of partnerships between municipalities, regions, national government, and civil society organizations in driving ambitious climate action.
- Capacity Building is Necessary: Providing local governments with the necessary support and resources is crucial for enabling them to develop and implement ambitious climate plans. The comprehensive capacity

building program in DK2020 equipped municipalities with the knowledge, skills, and tools to effectively plan and implement climate action.

- Citizen Engagement is important: Involving citizens in climate planning and action can enhance local ownership and support for climate initiatives. DK2020 demonstrated the value of participatory approaches in fostering a sense of shared responsibility and ensuring that climate plans reflect the needs and priorities of local communities.

DK2020 serves as an inspiration for other countries and regions seeking to accelerate local climate action. Its success demonstrates that ambitious climate goals can be achieved through strong political will, effective collaboration, and a commitment to capacity building and citizen engagement. By empowering local governments to take the lead in climate action, DK2020 has paved the way for a more sustainable and resilient future for Denmark.

9.6. Other important aspects

Potential challenges to the successful implementation of the Adaptation Plan include funding constraints, coordination issues among different actors, and uncertainties in climate projections. The plan identifies strategies to address these barriers, such as securing financial resources through public and private investments, establishing clear governance structures to facilitate coordination, and incorporating adaptive management approaches to account for uncertainties in climate projections

- Funding: Securing adequate funding for adaptation measures can be a challenge, particularly for large-scale infrastructure projects.
- Coordination: Effective coordination among different actors, including government agencies, municipalities, and private stakeholders, is crucial for successful implementation.
- Data and knowledge gaps: Uncertainties in climate projections and the localized impacts of climate change can make it difficult to plan and prioritize adaptation measures.
- Public awareness: Increasing public awareness and understanding of climate risks and adaptation options is essential for building support and encouraging action.

Potential challenges to the successful implementation of the mitigation plan include technological barriers, economic constraints, and public acceptance. Technological barriers can hinder the development and deployment of certain green technologies, particularly in hard-to-abate sectors. Economic constraints can limit the pace of investment in green infrastructure and innovation. Public acceptance of certain climate policies can be a challenge, requiring effective communication and engagement strategies. Uncertainties in future climate projections can make it difficult to plan for long-term adaptation measures. The plan identifies strategies to address these barriers, such as promoting innovation through research and development, providing financial support for green initiatives, and engaging stakeholders to raise awareness and foster collaboration.

10. FRANCE

10.1. Introduction

France's ambitious climate commitment

For several decades, France has distinguished itself through its ambitious commitment to combating climate change, combining strategies for reducing greenhouse gas (GHG) emissions with measures to adapt to climate impacts. These policies are anchored in key frameworks such as the National Low-Carbon Strategy (*Stratégie Nationale Bas-Carbone, SNBC*), the National Climate Change Adaptation Plans (*Plans Nationaux d'Adaptation au Changement Climatique, PNACC*), and the Multiannual Energy Program (*Programmation Pluriannuelle de l'Énergie, PPE*), all aligned with European commitments under the National Integrated Energy and Climate Plan (*PNIEC*).

Global context and national commitments

In 2015, France played a pivotal role in securing the Paris Agreement, committing to achieving carbon neutrality by 2050. This ambitious target addresses pressing challenges such as the intensification of heatwaves, increasing droughts, and rising sea levels, all of which impact ecosystems, infrastructure, and the most vulnerable populations.

To tackle these challenges, France relies on a quinquennial planning system that allows for the revision of priorities and the adjustment of actions. Carbon budgets set by the SNBC, energy targets outlined in the PPE, and monitoring indicators established under the [PNACC](#) provide a comprehensive framework that aligns European commitments with local needs.

A new political context

The dissolution of the National Assembly in June 2024 led to a change in government, with Michel Barnier appointed as Prime Minister. [Early announcements from his administration](#), including revisions to regulations on soil artificialization (*zero artificialisation nette*) and energy performance diagnostics (*diagnostics de performance énergétique, DPE*) have raised concerns about a potential rollback of climate ambitions.²³ On December 4, 2024, Barnier faced a vote of no confidence, leading to his departure from office. François Bayrou was appointed Prime Minister on December 13, 2024. However, the policy direction under his new leadership remains unclear, necessitating close monitoring of forthcoming developments.

²³ Camille Adaoust, Zoé Aucaigne, and Louis San, 'Artificialisation Des Sols, Éolien, DPE... Pourquoi Les Annonces de Michel Barnier Font Craindre Un Recul Sur l'écologie', Franceinfo, October 2024.



Open consultations for a participatory strategy

The PNACC-3 (2023-2027), currently undergoing public consultation until December 2024, reflects France's ongoing effort to involve citizens, local authorities, and organizations in shaping climate policies. Public consultations are mechanisms that allow citizens to provide input on public projects or decisions, particularly those with environmental impacts. Conducted primarily online, these consultations gather feedback on regulatory texts or administrative decisions. The contributions are then analysed, and a summary is published, detailing whether and how the feedback influenced the final decision.

Persistent challenges

Despite these ambitious frameworks, recent evaluations, particularly by the High Council for Climate (*Haut Conseil pour le Climat, HCC*), highlight delays in key sectors such as transportation and buildings. Local actions, critical to achieving national objectives, face challenges due to insufficient coordination and funding. Moreover, the limited implementation of the Citizen's Climate Convention (*Convention Citoyenne pour le Climat, CCC*) proposals – only 10% of which were adopted without modifications – has led to a decline in public trust.

A multisectoral mobilization to address challenges

To tackle these challenges, France is relying on strengthened collaboration between public, private, and citizen stakeholders. Initiatives such as the Territorial Climate-Air-Energy Plans (*Plans Climat-Air-Énergie Territoriaux, PCAET*), climate trajectories outlined in the PNACC-3, and reforms planned under the Multiannual Energy Program (PPE) demonstrate that the ecological transition increasingly depends on close coordination between national and local levels.

10.2. The strategies of mitigation and adaptation being carried out

France's climate strategies are built on two complementary pillars:

- Mitigation, aimed at reducing greenhouse gas (GHG) emissions to minimize the impact of human activities on the climate and the environment
- Adaptation, focused on limiting the impacts of climate change on human societies and ecosystems, while strengthening their resilience.

10.2.1 Objectives

The main objectives of France's climate strategies are:

- Achieving carbon neutrality by 2050, with a 40% reduction in GHG emissions by 2030 compared to 1990 levels. This goal is guided by the SNBC and aligned with the European Union's ambitions

- Strengthening the resilience of territories and populations to climate impacts through the actions outlined in the PNACC²⁴.

The Climate Action Plan, developed by the Ministry of Ecological Transition, translates these objectives into concrete measures, structured around mitigation and adaptation actions.

10.2.2 Rationale and timeframe

France is highly exposed to the impacts of climate change, including heatwaves, prolonged droughts, and rising sea levels. These realities demand a structured and coherent response at both national and local levels.

The SNBC, PPE, and PNIEC form an integrated framework based on a shared energy-climate-air scenario:

- The SNBC outlines emissions reduction pathways with the objective to completely decarbonize energy production by 2050.
- The PPE plans the development of renewable energy and the evolution of the energy mix
- The PNIEC aligns these efforts with European commitments.

The Climate Action Plan, adopted in response to a recommendation from the High Council for Climate (HCC), aims to enhance the coherence of public policies by mobilizing sectoral ministries and local authorities.

The PNACC seeks to anticipate and reduce the impacts of climate change on populations, ecosystems, and infrastructure by defining concrete, sector-specific, and localized actions to strengthen the country's resilience to current and future climate hazards.

10.2.3 Mitigation strategy in France (*Stratégie d'atténuation en France*)

The National Low Carbon Strategy (SNBC)

Adopted for the first time in 2015, the [National Low Carbon Strategy](#) (*Stratégie Nationale Bas-Carbone, SNBC*) serves as the primary framework for mitigation, providing guidance for implementing “the transition to a low-carbon, circular, and sustainable economy” across all sectors. It establishes an integrated approach to ensure that all national public policy decisions – plans, programs, draft laws, legislation, public procurement, and public project financing – align with the orientations and objectives set out in the SNBC.

The SNBC pursues four main objectives:

- Completely decarbonizing energy production by 2050, relying solely on biomass resources (e.g., agricultural and wood product waste, energy wood), environmental heat sources (e.g., geothermal energy, heat pumps), and decarbonized electricity.

²⁴ Gouvernement français, 'PNACC-3 Document de Présentation'. P12

- Halving energy consumption across all sectors (transportation, buildings, etc.) by enhancing energy efficiency, improving equipment performance, fostering more sustainable lifestyles, and promoting a circular economy.
- Reducing non-energy-related emissions, such as those from agriculture and industrial processes.
- Increasing natural carbon sinks (e.g., forests, wetlands) and developing carbon capture and storage technologies to absorb unavoidable residual emissions.

In the short and medium term, the SNBC establishes binding sectoral carbon budgets for five-year cycles. Carbon budgets are defined as “greenhouse gas emission caps that must not be exceeded at the national level over five-year periods.”

The updated version of the SNBC and the carbon budgets for the periods 2019–2023, 2024–2028, and 2029–2033 were adopted by decree on April 21, 2020.

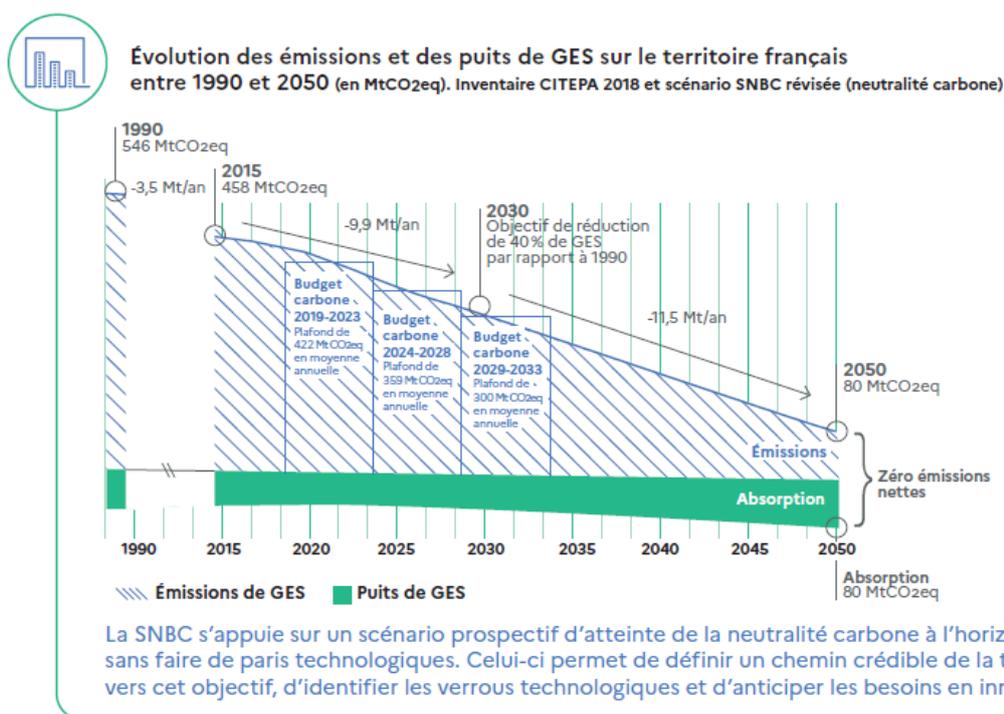


Figure 4 – *Evolution of emissions and GHG sinks on the French territory between 1990 and 2050*

Cross-cutting orientations of the SNBC

- Carbon footprint: Reduce emissions associated with the consumption of goods and services by French citizens.
- Economic policy: Redirect financial flows to support a green and inclusive transition.
- Research and innovation: Advance technical, social, and organizational innovations that contribute to reducing France's emissions.
- Urban planning and land use: Limit soil artificialization and promote resilient, low-carbon urban development.

- Education, awareness, and citizen engagement: Involve citizens in the transition toward a low-carbon culture.
- Employment, skills, qualifications, and professional training: Leverage the low-carbon transition as an opportunity for the economy and employment, while supporting workforce transitions.

Sectoral orientations of the SNBC

Transport

- Improve the energy performance of vehicles (light and heavy), with a target of 4 litres per 100 km for thermal passenger vehicles by 2030.
- Decarbonize energy consumption for vehicles and adapt infrastructure to achieve 35% of new passenger vehicle sales being electric or hydrogen-powered by 2030, and 100% by 2040.
- Manage demand growth for transportation by promoting:
- Teleworking, carpooling, local supply chains, and vehicle usage optimization.
- Encourage modal shifts toward lower-emission passenger and freight transport (public transit, rail) and support active modes (cycling, walking).

Buildings

- Use decarbonized energy sources best suited to building typologies.
- Enhance energy efficiency in buildings (envelopes and equipment) by implementing new environmental regulations for new buildings in 2020 and for renovating tertiary buildings, and targeting 500,000 renovations per year for existing stock, focusing on energy-inefficient homes.
- Encourage behavioural changes for more sustainable usage patterns.
- Promote low-carbon construction and renovation products (circular economy or bio-sourced materials) with high energy and environmental performance across their life cycles.

Agriculture

- Develop agroecology, agroforestry, and precision agriculture, particularly to minimize nitrogen fertilizer surpluses.
- Expand the bioeconomy to supply low-GHG energy and materials to the French economy.
- Adapt food demand to include higher-quality or organic products and reduce food waste, aligning with nutritional recommendations.

Forests, wood, and soil

- Increase carbon storage in agricultural soils through practice changes.
- Promote active and sustainable forest management to adapt forests to climate change and preserve carbon stocks in forest ecosystems.
- Expand afforestation and reduce deforestation.
- Maximize carbon storage in wood products and promote their use in long-term applications like construction.
- Reduce soil artificialization.



Industry

- Support companies in transitioning to low-carbon production systems by developing decarbonization roadmaps and financial tools.
- Foster the emergence of key production technologies in France that are essential for the transition.
- Intensify research and development of low-carbon manufacturing processes.
- Significantly improve energy efficiency and transition to decarbonized energy sources.
- Manage material demand through the circular economy.

Waste

- Prevent waste generation during product design through eco-design and polluter-pays principles.
- Promote the circular economy, reuse, and repair culture among consumers.
- Enhance waste collection and management by developing material and energy recovery processes.
- Increase the efficiency of treatment systems, particularly for wastewater and organic and non-hazardous waste.

Energy production

- Control energy demand through energy efficiency and sobriety.
- Decarbonize and diversify the energy mix, notably by developing renewable energy and phasing out coal for electricity and heat production (by 2022).
- Ensure that the energy mix evolution and efficiency targets are defined within the Multiannual Energy Program (PPE), which is based on the same reference scenario as the SNBC and aligned with its orientations.

The Multiannual Energy Program (PPE)

The PPE was established by the law of August 17, 2015, as a key tool for steering France's energy policy. It sets the government's energy priorities for mainland France over a 10-year period, with updates every 5 years. During each update, the second five-year period is revised, and a new subsequent five-year period is added. The PPE aims to achieve five main objectives:

- Reduce energy consumption
- Increase the production of decarbonized energy
- Adapt energy networks
- Ensure energy supply security
- Protect purchasing power and competitiveness.

10.2.4 Adaptation strategy in France

National Climate Change Adaptation Plans (PNACC)

The PNACC aims to strengthen the resilience of territories and populations to climate change impacts.



PNACC-1 (2011-2015)

The first PNACC implemented 242 measures across 20 thematic areas:

1. Cross-cutting actions
2. Health
3. Water resources
4. Biodiversity
5. Natural hazards
6. Agriculture
7. Forests
8. Fisheries and aquaculture
9. Energy and industry
10. Infrastructure and transport systems
11. Urban planning and the built environment
12. Tourism
13. Information
14. Education and training
15. Research
16. Financing and insurance
17. Coastal zones
18. Mountain regions
19. European and international action
20. Governance

These thematic areas helped identify the most vulnerable sectors and structure the initial strategic and operational responses to the impacts of climate change.

Types of priority measures in PNACC-1

Given the uncertainties surrounding the extent of climate change, PNACC-1 prioritized the implementation of specific types of measures:

1. No-regret measures: Beneficial even in the absence of climate change, such as:
 - Promoting water conservation across all sectors.
 - Adapting the French shellfish industry to climate change through health monitoring and genetic potential assessment of oysters and mussels.
2. Reversible measures: Adaptable to evolving climatic conditions, such as:
 - Integrating climate change considerations into public service contracts.
3. Safety-margin measures: Aimed at reducing long-term risks, such as:
 - Revising maps of areas vulnerable to forest fires to expand vigilance zones.
4. Long-term measures: Requiring gradual implementation, such as:
 - Integrating climate change considerations into regional forest management plans.
5. Adjustable and revisable measures: Designed to evolve with new knowledge, such as:
 - Strengthening summer comfort requirements in building regulations.



These measures enable a dynamic and adaptable approach to climate change, evolving in response to climatic developments and scientific advancements²⁵.

Action domains for classifying adaptation measures

Adaptation measures are categorized into four main action domains.

- Information production and dissemination: Enhancing knowledge and awareness about climate impacts.
- Adjustment of standards and regulations: Revising legislative and regulatory frameworks to incorporate climate risks.
- Institutional adaptation: Strengthening institutional structures to better manage and coordinate adaptation efforts.
- Direct investment: Funding concrete projects to reduce vulnerabilities, such as resilient infrastructure or nature-based solutions.

PNACC-2 (2018–2022)

The second National Climate Change Adaptation Plan (PNACC-2) refocused actions around six strategic priorities.

1. Governance and management:
 - Implementation of enhanced coordination under the National Council for Ecological Transition (Conseil National de la Transition Écologique).
2. Climate risk prevention:
 - Strengthening standards to mitigate the impacts of floods and storms.
3. Economic resilience:
 - Supporting businesses in integrating climate risks into their strategies.
4. Nature-based solutions:
 - Restoring wetlands and promoting sustainable forest management.
5. Health and well-being:
 - Preventing emerging diseases and reducing vulnerabilities related to heatwaves.
6. Research and innovation:
 - Developing adaptive technologies to address climate impacts.

PNACC-3 (2023–2027)

The third National Climate Change Adaptation Plan (PNACC-3), recently adopted, is structured around five strategic axes and emphasizes enhanced territorialization to address regional specificities.

1. Protecting the population:
 - This axis includes measures to reduce health risks, safeguard buildings, and adapt living conditions to climate hazards such as heatwaves, floods, and wildfires.
2. Ensuring the resilience of territories, infrastructure, and essential services:
 - Aims to integrate adaptation into planning documents, public infrastructure, and services like energy, water, and transportation.

²⁵ Ministère de l'Écologie, du Développement durable, des Transports et du Logement.

3. Adapting human activities: Ensuring economic resilience and sovereignty in food, energy, and the economy:
 - Focuses on agriculture, industry, and tourism, supporting their transition to more resilient models.
4. Protecting natural and cultural heritage:
 - Prioritizes measures to preserve ecosystems, species, and cultural and heritage sites from climate impacts.
5. Mobilizing the nation’s strengths to succeed in climate adaptation:
 - Calls for national mobilization, involving citizens, youth, public servants, and businesses to disseminate best practices and strengthen adaptation governance.

These axes reflect increased ambition, with a focus on collective mobilization, social justice, and territorial coherence²⁶.

The Climate Action Plan

The [Climate Action Plan](#) serves as a cross-cutting framework to integrate these actions into a coherent long-term strategy, while ensuring their annual review by the Ecological Defense Council (Conseil de défense écologique).

10.3. The governance framework

The governance of France’s climate strategies relies on an integrated and multi-level structure that mobilizes national institutions, local authorities, economic stakeholders, and civil society. This framework aims to coordinate mitigation and adaptation efforts to achieve the goals set by the National Low Carbon Strategy (SNBC), the National Climate Change Adaptation Plans (PNACC), and the Multiannual Energy Program (PPE).

National institutions

- Ministry of Ecological Transition: The ministry is responsible for developing, implementing, and monitoring climate strategies, including the SNBC and the PNACC. It also coordinates the Climate Action Plan in collaboration with other sectoral ministries, such as those overseeing transportation, agriculture, and the economy.
- High Council for Climate (Haut Conseil pour le Climat, HCC): Established in 2018, the HCC is an independent body tasked with evaluating national climate policies. It publishes an [annual report](#) assessing the alignment of implemented actions with the carbon budgets outlined in the SNBC and provides recommendations for adjusting strategies.
- [National Observatory on the Effects of Climate Change](#) (ONERC): ONERC oversees the monitoring and coordination of adaptation actions. It plays a key role in developing the PNACC and collecting data on climate impacts.
- Ecological Defence Council: Chaired by the Prime Minister, this body conducts an annual review of climate measures, including those in the

²⁶ Gouvernement français, ‘PNACC-3 Document de Présentation’.

Climate Action Plan, and coordinates priorities at the highest level of government.

Local authorities

Local authorities play a central role in territorializing climate strategies. They are responsible for implementing several regulatory and operational tools:

- Territorial Climate-Air-Energy Plans (PCAET): Mandatory for all inter-communalities with over 20,000 inhabitants, PCAETs translate national objectives into local actions. These plans include measures to reduce GHG emissions, improve energy efficiency, and enhance resilience to climate impacts.
- Regional Climate-Air-Energy Schemes (SRCAE): Managed by regional councils, these schemes provide strategic guidance for PCAETs and other local initiatives.
- Local financing: Regions and departments can mobilize funds, often in partnership with the state and the European Union, to support adaptation and energy transition projects²⁷.

Civil society and economic actors

Civil society and businesses play an increasingly important role in climate governance:

- Citizen participation: Initiatives such as the Citizen's Convention for Climate (Convention Citoyenne pour le Climat, CCC), which brought together 150 citizens to formulate climate proposals, highlight the potential of democratic engagement. While only 10% of the proposals were adopted without modifications, this process strengthened the connection between citizens and public policies.
- Role of businesses: Companies are encouraged to incorporate climate risks into their strategies through regulations such as the European taxonomy and fiscal incentives for decarbonization. The private sector is also involved in public-private partnerships to develop resilient infrastructure and support innovation in renewable energy.
- NGOs and associations: Non-governmental organizations actively contribute to raising awareness, monitoring policies, and providing scientific expertise. They also play a critical role in evaluating the ambition and effectiveness of implemented strategies.

European and international interactions

France's climate strategies are part of a broader European and international framework:

²⁷ Gouvernement français, 'PNACC-3 Document de Présentation'.

- European framework: The National Integrated Energy and Climate Plan (PNIEC), mandated by the European Union, aligns French policies with EU objectives, including a 55% reduction in GHG emissions by 2030 and the development of renewable energy. European funds, such as the Just Transition Fund, support local initiatives in France, particularly in coal or industrial regions undergoing reconversion.
- International commitments: France is a key actor in the Paris Agreement and plays an active role in climate negotiations through the COP process. It also supports developing countries in their transitions via the Green Climate Fund and other international mechanisms.

10.4. The main dynamic aspects of the strategies

The main dynamic aspects of these strategies, i.e., their evolution, the implementation period, the monitoring systems adopted, etc.

French climate strategies evolve within a constantly adapting framework, reflecting scientific advancements, lessons learned, and societal priorities. This section examines key dynamics: their evolution, implementation periods, monitoring systems, and the involvement of civil society.

Evolution of strategies

Since the first national strategy in 2006, French climate policies have progressively grown in ambition and complexity:

- 2006: Adoption of the first National Adaptation Strategy, seven years ahead of the European strategy, establishing a general framework for climate actions.
- 2011–2015 (PNACC-1): Introduction of an adaptation plan structured around 20 key thematic areas and 242 measures.
- 2018–2022 (PNACC-2): Streamlining of priorities into six strategic axes covering health, natural hazards, biodiversity, and economic resilience.
- 2023–2027 (PNACC-3): Enhanced territorial focus with 51 measures across five axes, emphasizing local governance and citizen engagement²⁸.

In parallel, the National Low Carbon Strategy (SNBC), adopted in 2015 and updated in 2020, introduced sectoral carbon budgets to strengthen efforts in reducing greenhouse gas emissions.

Implementation periods

French climate policies are designed around planned cycles, allowing for regular evaluation and adjustment:

- PNACC: Developed for 5- to 6-year periods, with mid-term and end-of-cycle evaluations to assess effectiveness.
- SNBC: Based on five-year carbon budgets, with each period accompanied by an ex-post evaluation.

²⁸ Gouvernement français, 'PNACC-3 Document de Présentation'.

- Climate Action Plan: Monitored annually through the Ecological Defense Council, ensuring governance at the highest level of the state.

Monitoring and evaluation systems

- Indicators and dashboards: The SNBC, PNACC, and PPE are supported by indicator systems to track progress. For example, PNACC-3 includes specific indicators for each measure, enabling detailed territorial monitoring.
- Role of the High Council for Climate (HCC): The HCC publishes an annual report on the state of French climate policies, highlighting gaps between objectives and results.
- Local Monitoring: Territorial Climate-Air-Energy Plans (PCAET) enable decentralized tracking of mitigation and adaptation actions.

Challenges and opportunities

- Local and national cooperation: While the territorialization of the PNACC marks progress, disparities persist among regions in terms of resources and capacities.
- European Integration: France must align its policies with the objectives of the European Green Deal while addressing specific local needs.
- Strengthening Local Capacities: PNACC-3 introduces the creation of the “Mission Adaptation,” a one-stop support hub to assist local authorities in implementing their actions²⁹.

10.5. A first assessment of the effectiveness of the strategies

A first assessment of the effectiveness of the strategies (e.g.: are the expected results being achieved and how – it is clear that this specific point will be much more developed for the D4.2 due at M24, also thanks to the interview that should be done in each involved country)

The implementation of France’s climate strategies, through tools such as the National Climate Change Adaptation Plans (PNACC), the National Low Carbon Strategy (SNBC), and the Multiannual Energy Program (PPE), has shown mixed results. This evaluation, based on available reports, highlights successes, challenges, and recommendations to enhance the effectiveness of these policies.

Evaluation of the National Climate Change Adaptation Plans (PNACC)

PNACC-1 (2011–2015)

The first PNACC marked France’s inaugural structured adaptation initiative, encompassing 20 key thematic areas and 84 actions broken down into 230 measures. Its 2015 evaluation reported a completion rate of 80%, despite notable shortcomings.

²⁹ Gouvernement français, ‘PNACC-3 Document de Présentation’.

Key achievements

- Advances in knowledge:
 - Development of the “DRIAS – Les futurs du climat” portal, providing regionally tailored climate scenarios.
 - Strengthened studies on specific topics such as sea-level rise and drought impacts.
- Awareness and integration:
 - Climate issues were incorporated into Regional Climate-Air-Energy Schemes (SRCAE) and Territorial Climate-Energy Plans (PCET).
- Specific progress:
 - Updated infrastructure standards to address climate risks (e.g., transportation and construction).
 - Enhanced surveillance of vector-borne diseases and forest genetic resources.

Identified challenges

- Insufficient coordination:
 - Limited synergy between national and local levels, hindering the implementation of measures.
- Limited engagement:
 - Economic actors and certain local authorities demonstrated low integration of adaptation priorities.
- Lack of clear prioritization:
 - Urgent actions were not always prioritized, diminishing their overall impact.

PNACC-2 (2018–2022)

The second PNACC introduced a more robust framework, structured around six strategic domains, 29 thematic areas, and 389 sub-actions, supported by 100 monitoring indicators.

Achievements

- Structural improvements:
 - Establishment of a specialized commission within the National Council for Ecological Transition (CNTE) to enhance governance.
 - Development of the +2°C Reference Warming Trajectory to guide policy measures.
- Sectoral progress:
 - Emphasis on nature-based solutions (NbS) for ecosystem and natural resource management.
 - Increased training and awareness-raising efforts for local stakeholders.
- Strengthened monitoring:
 - Utilization of indicators to assess annual actions and measure progress against set objectives.

Challenges encountered

- Uneven results: Overseas departments and regions, although identified as vulnerable, did not receive sufficient support.
- Mobilization of the private sector: Companies, aside from large groups, showed low participation.

The evaluation of the first two PNACC programs led to several recommendations, which are included in PNACC-3:

- Strengthening governance: improving coordination between the state, regions, and local authorities; creation of the “Adaptation Mission,” a single point of contact to support territories in their efforts.
- Prioritizing critical actions: focusing on the most vulnerable areas and sectors, especially critical infrastructure and essential services.
- Increased mobilization of stakeholders: encouraging active participation from businesses, farmers, and citizens.
- Nature-based solutions: intensifying actions focused on the preservation and restoration of ecosystems to address climate hazards.³⁰

Evaluation of the National Low-Carbon Strategy (SNBC)

The SNBC is the main framework for mitigation, aiming for carbon neutrality by 2050. Progress made includes:

- The reduction of overall emissions: A 19% reduction in GHG emissions since 1990, but a gap remains compared to intermediate targets.
- Development of renewable energy: renewable energies accounted for 20% of France's energy mix in 2022.

Among the challenges, carbon budgets exceeded in several sectors, particularly in transport and building, and progress in the energy renovation of buildings and the electrification of vehicles has been insufficient.

Social Implications and Public Feedback

- Citizen's Climate Convention (CCC): Although the CCC marked a democratic advancement, only 10% of its proposals have been implemented without modifications, leading to a loss of public trust.
- Tensions around climate projects: Opposition to wind energy projects and resistance to coercive measures, such as the ban on energy-inefficient homes, highlight the need for better communication and increased local dialogue.

10.6. Other aspects that each partners considers important

One of the milestones in the French climate policy is represented by the so-called crisis of the “Gilets Jaunes movement”. This is a movement, which began in 2018, that was initially triggered by a proposed increase in fuel taxes intended to support France's climate objectives. However, the protests quickly grew into

³⁰ Gouvernement français, ‘PNACC-3 Document de Présentation’.



a broader challenge to economic inequality and government policies perceived as unfairly burdening lower-income households.

The movement revealed a critical tension in climate policy: the balance between environmental objectives and social equity. Many protesters, particularly from rural and peri-urban areas, expressed concerns that the fuel tax disproportionately impacted those with limited access to public transportation and relied on personal vehicles.

Research later showed that the Gilets Jaunes were not inherently opposed to environmental action. On the contrary, they often practiced forms of “quiet” sustainability, such as resource conservation and reuse. Their frustration stemmed more from the perceived inequities in how the costs of climate action were distributed, highlighting the need for policies that consider both ecological and social dimensions.

The Gilets Jaunes crisis led to adjustments in government policy, such as freezing the proposed fuel tax and expanding subsidies for energy-efficient renovations. It also spurred the creation of the Citizen’s Climate Convention (*Convention Citoyenne pour le Climat*), which sought to involve citizens in shaping climate action.

Annexes to the chapter

TIMELINE DES DATES CLES DES POLITIQUES CLIMATIQUES FRANÇAISES

Avant 2010 : Début des initiatives climatiques

- **1999** : Lancement du programme de recherche **GICC** (Gestion et Impacts du Changement Climatique), premier cadre scientifique pour analyser les impacts du climat en France.
- **2006** : Adoption de la première **Stratégie Nationale d'Adaptation au Changement Climatique (SNACC)**, parmi les premières en Europe.

2010-2020 : Structuration des stratégies climatiques

- **2011** : Lancement du **1er Plan National d'Adaptation au Changement Climatique (PNACC-1)** (2011-2015), couvrant 20 thématiques et 84 actions.
- **2015** :
 - ✓ **Accord de Paris** : Engagement de la France à atteindre la neutralité carbone d'ici 2050.
 - ✓ Évaluation du **PNACC-1**.
 - ✓ Adoption de la **Stratégie Nationale Bas-Carbone (SNBC-1)**, fixant des budgets carbone sectoriels.
- **2018** : Mise en œuvre du **2e PNACC (PNACC-2)** (2018-2022), structuré autour de 6 axes et 389 sous-actions.

Depuis 2020 : Accélération des engagements climatiques

- **2020** : Mise à jour de la **SNBC-2** avec des objectifs révisés :
 - ✓ Réduction de 40 % des émissions de GES d'ici 2030 (base 1990).
 - ✓ Neutralité carbone d'ici 2050.
- **2021** : Adoption de la **Loi Climat et Résilience**, intégrant plusieurs propositions de la Convention Citoyenne pour le Climat (CCC).
- **2023** :
 - ✓ Adoption du **3e PNACC (PNACC-3)** pour la période 2023-2027, avec 51 mesures réparties sur 5 axes.
 - ✓ Révision des objectifs énergétiques dans la **Programmation Pluriannuelle de l'Énergie (PPE)**.
- **2024** : Consultation publique sur le PNACC-3 en cours jusqu'à décembre.

LISTE DES PRINCIPALES POLITIQUES CLIMATIQUES FRANÇAISES

Stratégies nationales

- **SNACC (2006)** : Première stratégie nationale d'adaptation.
- **PNACC-1 (2011-2015)** : Première phase opérationnelle des actions d'adaptation.
- **PNACC-2 (2018-2022)** : Approfondissement et intégration sectorielle.
- **PNACC-3 (2023-2027)** : Territorialisation renforcée et 51 mesures concrètes.
- **SNBC (2015, mise à jour en 2020)** : Cadre principal de réduction des émissions de GES.

Lois et plans nationaux

- **Loi Grenelle II (2010)** : Intégration des enjeux climatiques dans les politiques publiques.
- **Loi Climat et Résilience (2021)** : Renforcement des ambitions climatiques nationales, avec des mesures sur la rénovation énergétique, la mobilité durable, et la préservation des sols.
- **Plan Climat (2017)** : Stratégie globale pour l'atténuation et l'adaptation, avec des actions ministérielles spécifiques.
- **Programmation Pluriannuelle de l'Énergie (PPE)** : Planification énergétique alignée avec la SNBC.

Initiatives participatives et internationales

- **Convention Citoyenne pour le Climat (2019-2020)** : Démarche participative ayant produit 149 propositions pour renforcer les politiques climatiques.
- **Engagement européen** : Convergence des politiques nationales avec le **Green Deal européen** et les objectifs climatiques de l'Union.

11. GERMANY

11.1. Introduction

Germany's strategic approach to adapting to climate change is known as the “*Deutsche Anpassungsstrategie an den Klimawandel*” (DAS). Initiated by the German government in 2008, the DAS aims to mitigate climate risks and enhance the adaptive capacity of natural, social, and economic systems. The strategy is organized into various clusters, including infrastructure, land, water, health, and economy, each addressing specific areas affected by climate change. The document also details the implementation and continuous development of the DAS through the Action Adaptation Plan (AAP), regular progress reports, and the involvement of federal and state authorities. Additionally, it highlights [the role of the German Climate Preparedness Portal](#) and the interministerial working group led by the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety, and Consumer Protection (BMUV) in coordinating efforts and providing necessary tools and information for effective climate adaptation. In addition, with the new [Climate Adaptation Law](#) KAnG 2024, the federal government wants to provide a binding framework for climate adaptation at the federal level, *Länder* level, and municipal levels. The federal government thereby commits to presenting a proactive climate adaptation strategy with measurable goals, regularly updating it, and continuously implementing it.

11.2. The strategies of mitigation and adaptation being carried out

In 2008, the German government adopted the German Strategy for Adaptation to Climate Change (*Deutsche Anpassungsstrategie – DAS*) under the lead responsibility of the Federal Environment Ministry with assistance from the German Environment Agency. This strategy laid the foundation for Germany to prepare for the impacts of climate change and reduce climate risks in a continuous process.

Climate risk analyses and adaptation action plans are important elements of the adaptation process. As part of the German Adaptation Strategy, the impacts of climate change and adaptation measures undertaken in Germany are regularly monitored. The DAS provides the basis for climate adaptation policy in Germany.

Since 2024, the German focus is on climate adaptation strategies rather than mitigation strategies. The primary emphasis is on developing and implementing a comprehensive climate adaptation strategy to address the impacts of climate change. This includes particularly the items further outlined in the Annex to this report:

Preventive Climate Adaptation Strategy (*Vorsorgende Klimaanpassungsstrategie*): The German government is required to present a preventive climate adaptation strategy with measurable goals by September

30, 2025. This strategy will be updated every four years and will be based on a climate risk analysis. It includes various clusters such as infrastructure, land use, human health, urban development, water, economy, and overarching fields like vulnerable groups and occupational safety

Climate Adaptation Concepts (*Klimaanpassungskonzepte*): The Länder (states) are responsible for developing climate adaptation concepts for municipalities and districts. These concepts aim to create a systematic approach to climate adaptation, considering existing processes and activities, and include measures for extreme heat, drought, and heavy rainfall.

Federal-State Cooperation (*Bund-Länder-Zusammenarbeit*): The federal and state governments collaborate to achieve the goals set in the preventive climate adaptation strategy. The federal government supports adaptation through strategy development, coordination, data provision, scientific research, and information dissemination.

Climate Risk Analysis (*Klimarisikoanalyse*): The federal government conducts a climate risk analysis to identify high-risk areas and inform adaptation measures. This analysis is updated every eight years and serves as a basis for planning and implementing adaptation measures.

Monitoring and Evaluation: The federal government monitors the progress of adaptation and mitigation measures and updates the strategy based on scientific findings and observed climate impacts. A monitoring report is published every four years to inform the public and guide future actions.

With a “holistic” approach, the new KAnG (Bundes-Klimaanpassungsgesetz (KAnG, BGBl. 2023 I Nr. 393 vom 22.12.2023)) is aiming to protect life, health, infrastructure, and ecosystems the like.

11.2.1 Objectives

Objectives of the German strategy are to:

- Protect life and health, society, economy, infrastructure, nature, and ecosystems from the negative impacts of climate change
- Avoid or, where unavoidable, minimize the potential damages caused by climate change
- Increase the resilience of ecological systems and society to ongoing and future climatic changes to maintain equivalent living conditions
- Contribute to national and international efforts in climate adaptation
- Prevent the increase of social inequalities due to the negative impacts of climate change

11.2.2 Rationale and Timeframe

The rationale behind the German adaptation strategy is to protect life and health, society, the economy, infrastructure, nature, and ecosystems from the negative impacts of climate change. The strategy aims to avoid or minimize the potential damages caused by climate change, enhance the resilience of ecological systems and society to ongoing climatic changes, and contribute to national and international climate adaptation efforts. Additionally, it seeks to



prevent the increase of social inequalities due to the adverse effects of climate change.

The time frame for the strategy includes the following key time spans.

- The Federal Government is required to present a proactive climate adaptation strategy with measurable goals by September 30, 2025. This strategy will be updated every four years, taking into account the latest scientific findings.
- The Federal Government will create a climate risk analysis, which will be updated at least every eight years.
- The Länder (states) must submit their own proactive climate adaptation strategies by January 31, 2027, and update them at least every five years.

11.2.3 Mitigation strategy in Germany

Mitigation policies in Germany, particularly in the context of climate change, refer to strategies and measures aimed at reducing greenhouse gas emissions and enhancing carbon sinks to mitigate the impacts of global warming. A short description of some key mitigation policies in Germany follows.

Renewable energy expansion: Germany has been a global leader in promoting renewable energy sources such as wind, solar, and biomass. The country aims to increase the share of renewables in its energy mix through the Renewable Energy Sources Act (EEG).

Energy efficiency: Germany has implemented various measures to improve energy efficiency in buildings, industry, and transportation. This includes stringent building codes, incentives for energy-efficient appliances, and support for industrial energy-saving technologies.

Emissions Trading System (ETS): As part of the European Union, Germany participates in the EU Emissions Trading System, which sets a cap on the total amount of greenhouse gases that can be emitted by covered entities and allows for the trading of emission allowances.

Coal phase-out: Germany has committed to phasing out coal-fired power plants by 2038. This involves transitioning to cleaner energy sources and providing support for affected regions and workers.

Transportation policies: Germany promotes the use of electric vehicles (EVs) through subsidies, tax incentives, and the development of charging infrastructure. Additionally, there are efforts to enhance public transportation and encourage cycling and walking.

Carbon pricing: Germany has introduced a national carbon pricing system for sectors not covered by the EU ETS, such as transportation and heating. This system sets a price on carbon emissions to incentivize reductions.

Research and innovation: The German government supports research and development in climate-friendly technologies and practices, fostering innovation in areas such as renewable energy, energy storage, and sustainable agriculture.

International cooperation: Germany actively participates in international climate negotiations and agreements, such as the Paris Agreement, and provides financial and technical support to developing countries for climate mitigation and adaptation efforts through initiatives like the International Climate Initiative (IKI).

These policies are part of Germany's broader commitment to achieving its climate targets, including reducing greenhouse gas emissions by 55% by 2030 compared to 1990 levels and reaching climate neutrality by 2045.

Mitigation policies in the sixteen German Länder

In Germany, the Länder (federal states) have their own mitigation policies that complement national efforts to reduce greenhouse gas emissions and address climate change. While the specific policies can vary from one Land to another, some common themes and initiatives include:

Renewable energy promotion: Many Länder have their own targets and programs to increase the share of renewable energy in their energy mix. This includes supporting the development of wind farms, solar parks, and biomass facilities.

Energy efficiency programs: Länder often implement regional programs to improve energy efficiency in residential, commercial, and public buildings. This can include subsidies for energy-efficient renovations, grants for energy audits, and incentives for the adoption of energy-saving technologies.

Sustainable transportation: Regional governments promote sustainable transportation options such as public transit, cycling, and walking. This can involve investments in public transportation infrastructure, the development of bike lanes, and initiatives to reduce car dependency.

Building codes and standards: Some Länder have stricter building codes and standards than the national requirements, aimed at improving the energy performance of new and existing buildings.

Climate action plans: Many Länder have developed their own climate action plans, which outline specific measures and targets for reducing greenhouse gas emissions. These plans often include sector-specific strategies for energy, transportation, industry, and agriculture.

Support for local governments: Länder provide support to municipalities and local governments to implement their own climate mitigation projects. This can include financial assistance, technical support, and capacity-building programs.

Public awareness and education: Regional governments often run public awareness campaigns and educational programs to inform citizens about climate change and encourage sustainable behaviours.

Research and innovation: Some Länder invest in research and development of climate-friendly technologies and practices, often in collaboration with local universities and research institutions.

Green infrastructure: Initiatives to enhance green infrastructure, such as urban green spaces, forests, and wetlands, are also common. These efforts help to sequester carbon and improve resilience to climate impacts.

Industry and business initiatives: Länder may offer incentives and support for businesses to adopt more sustainable practices, such as energy efficiency improvements, waste reduction, and the use of renewable energy.

11.2.4 Adaptation strategy in Germany

The 2024 [German Adaptation Strategy](#) is the first strategy to establish measurable targets for climate adaptation in Germany. It contains 34 targets and 53 sub-targets. Most of the targets are to be met in 2030, some in 2050. Target-specific indicators will be used to measure success. It is important that the public and businesses are not burdened with additional bureaucracy or reporting obligations.

The targets are structured in seven clusters that represent the entire range of adaptation and precautionary action:

- Infrastructure
- Land and land use
- Human health and care services
- Urban development, spatial planning and civil protection
- Water
- Businesses
- cross-cluster topics.

Targets under the clusters “water” and “land and land use” that fall within the responsibility of the Federal Environment Ministry include:

- Improving soil resilience to the consequences of climate change
- Strengthening resilience of water infrastructure
- Preserving sufficient, good quality water resources.

One example for the new scheme of measurable targets and corresponding indicators of the Adaptation Strategy is that the strategy sets the target of strengthening resilience of the landscape hydrology. This means, first and foremost, to restore nature’s capacity to retain water. This requires as many unsealed areas of land as possible, which can absorb water, and healthy, loose soils, which can store water for longer periods of time. This is a sub-target of the target to maintain available water resources in the long term.

Indicators will help make progress on this target measurable and transparent. One of these indicators is the recovery of natural flooding areas. Recovering natural flooding areas means that bodies of water will have more room and watercourses will be reconnected to alluvial plains. Two other indicators to make progress measurable are currently being drawn up on rewetted bogs and drained farmland and forests.

To summarise, the implementation and coordination of the DAS are managed by the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) through the Inter-ministerial Working

Group on Adaptation to Climate Change (IMAA). This group involves all federal ministries, which regularly coordinate their activities and set new goals to facilitate climate adaptation in Germany.

Finally, the DAS is supported by the Climate Change and Adaptation Network, led by the Federal Environment Agency, which focuses on the scientific development and coordination of the strategy. The strategy is continuously updated to reflect the expanding knowledge base on climate change and its impacts, with regular progress reports and action plans being published to track and guide adaptation efforts

Examples of specific adaptation initiatives by some Länder

North Rhine-Westphalia: The state has set ambitious targets for reducing greenhouse gas emissions and increasing the share of renewable energy. It also has a comprehensive [climate protection law](#) and a climate protection plan. The purpose of the climate protection law from 2021 is to define climate targets and create the legal basis for the development of a climate adaptation strategy and the implementation, review, reporting and updating of climate adaptation measures.

The aim is to limit the negative effects of climate change, in particular to reduce the threat of damage, increase climate resilience and contribute to national and international efforts to adapt to climate change. Its basis is the obligation under the Paris Agreement based on the United Nations Framework Convention on Climate Change (Federal Law Gazette 2016 II p. 1082, 1083), according to which the contracting parties contribute to sustainable development by improving adaptive capacity, strengthening resilience and reducing vulnerability to climate change.

Monitoring is firmly anchored in the NRW Climate Adaptation Act (2021). The State Agency for Nature, Environment and Consumer Protection NRW (LANUV NRW) is commissioned by the MULNV to carry out the “Climate Impact and Adaptation Monitoring” for the state (KFAM NRW) with the aim of identifying the effects of climate change on nature, the environment and society at an early stage and making the impact of adaptation measures in NRW measurable. KFAM NRW thus provides the necessary basis for tracking trends in the effects of climate change and the progress of adaptation processes and for managing the further development of adaptation policies in a needs-oriented and targeted manner.

Bavaria: Bavaria has its own climate program, which includes measures to promote renewable energy, improve energy efficiency, and support sustainable agriculture. The state government presented the “Bavarian Climate Adaptation Strategy (BayKLAS)” back in 2009. The overarching goal is to motivate all stakeholders to become independently involved in overcoming the challenges of climate change. This is to be achieved through modern and practical instruments such as networking of all stakeholders, dialog and information, targeted research, training and further education as well as financial support. BayKLAS has been updated and further developed in terms of structure and content.

The updated “[Bavarian Climate Adaptation Strategy](#) (BayKLAS 2016)” was published in 2022 and provides an overview of the climatic changes already observed and the changes expected in Bavaria in the future. Based on this, the most important consequences for all climate-sensitive fields of action of BayKLAS are highlighted and existing and possible climate adaptation measures in Bavaria are presented, taking into account their effectiveness, implementation, urgency, responsibility, implementation basis and intersectoral networking between the fields of action. BayKLAS also provides information on funding opportunities for the implementation of climate adaptation measures for companies, municipalities and private individuals.

The focus of Bavarian climate adaptation measures is on:

- Flood protection measures
- Stabilization and safeguarding of the water balance
- Drought and drought preparedness
- Preservation and renaturation of natural or utilized carbon sinks (e.g., moors)
- Protective measures for (mountain) forests
- Stabilization of biodiversity and ecosystems
- Containment of geohazards
- Prevention of threats from new pests and disease vectors
- Reducing the consequences of heat stress
- Creation of sustainable and climate-friendly settlement development, transport infrastructure, energy production and tourism industry
- Protection of the Alps and their natural and semi-natural habitats
- Further development of research and monitoring.

In addition, the [Bavarian Climate Protection Program](#) is based on the three pillars of climate protection, climate research and climate adaptation. It currently comprises almost 150 individual measures from all three areas in five central fields of action. The program is thus dedicated to all the efforts we need to make to limit further global warming, adapt to the consequences of climate change that has already occurred and continuously expand our knowledge of climate change and its consequences.

The Bavarian climate protection measures are evaluated in the report on climate protection 2050.

Berlin: The Berlin Energy Transition Act (EWG Bln) passed by the House of Representatives in 2016 was amended in 2021 as the Climate Protection and Energy Transition Act. This state law on implementing the energy transition and promoting climate protection in the state of Berlin also established adaptation to the consequences of climate change as a task of politics and administration for the first time.

The concept study “[Adaptation to the consequences of climate change in Berlin](#)” (AFOK) was published in 2016. In this study, a vulnerability analysis was carried out on the basis of currently observed changes in weather patterns and weather extremes as well as climate projections. Recommendations for specific adaptation measures were then formulated for the nine fields of action

identified. The measures from the adaptation concept that could be implemented in the short and medium term from an administrative perspective were transferred to the [Berlin Energy and Climate Protection Program \(BEK\) 2030](#) and thus formed the basis for targeted action in the area of climate adaptation in the state of Berlin. In 2018, the BEK 2030 was adopted by the Berlin House of Representatives for the first implementation period until 2021.

In summer 2021, the update process for the climate adaptation part of the BEK 2030 for the implementation period 2022 to 2026 began. In a process lasting a good year, the implementation of measures to date was evaluated with the involvement of the responsible departments of the main administrations, their subordinate authorities and the district administrations as well as other representatives from science and urban society. Based on this and in the context of the existing climate risks and vulnerabilities, a total of around 50 measures were formulated for 10 identified fields of action, with which climate adaptation in the state of Berlin is to be further advanced.

Saxony-Anhalt (Sachsen-Anhalt): The country-specific adaptation measures are included in the country's strategy for adapting to the consequences of climate change and can be found at www.klimawandel.sachsen-anhalt.de. The "[Third Implementation Report 2021 of the State Strategy](#)" summarizes the implementation status of the measures mentioned in the adaptation strategy. In 2007, the state government of Saxony-Anhalt formed an [interdisciplinary and interdepartmental climate working group](#) (AG Klima). The Climate Working Group includes members from the administration, the state's specialist authorities, local authority associations, the state's universities and colleges and national research organizations, e.g., the Leipzig Environmental Research Centre (UFZ) and the German Weather Service. The tasks of the Climate Working Group include climate protection and the state's adaptation to the consequences of climate change. Its main tasks include providing policy advice, initiating research projects and drawing up, updating and monitoring the implementation of adaptation strategies in the state. The office of the Climate Working Group is the State Office for Environmental Protection (LAU).

ReKIS: The [Regional Climate Information System](#) ReKIS, jointly operated by Saxony, Saxony-Anhalt and Thuringia, is an interactive tool for the provision, documentation, evaluation and interpretation of climate data. In addition to the data service, further information on the topic of climate is provided.

As part of the DAS funding program, the Harz and Magdeburg-Stendal universities carried out the project "Soil erosion reduction in mountainous regions using the example of the Mansfeld-Südharz district (BebeR)" from 2016 to 2019.

These regional efforts are crucial in achieving Germany's overall climate goals and ensuring that mitigation actions are tailored to the specific needs and circumstances of each Land.

11.3. The governance framework

The governance framework for climate policies in Germany involves multiple levels of government, including the federal government, the Länder (federal states), and local municipalities. This multi-level governance structure ensures that climate policies are coordinated and implemented effectively across the country. Key components of the governance framework include the following.

Federal Government: The federal government plays a central role in setting national climate targets, developing overarching policies, and ensuring compliance with international agreements. Key federal institutions involved in climate governance include:

- Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV): Responsible for environmental policy, including climate change mitigation and adaptation
- Federal Ministry for Economic Affairs and Climate Action (BMWK): Oversees energy policy, including the transition to renewable energy and energy efficiency measures
- Federal Environment Agency (UBA): Provides scientific support and policy advice on environmental issues, including climate change
- Federal Network Agency (BNetzA): Regulates the electricity and gas markets, ensuring the integration of renewable energy sources

Länder (Federal States): The Länder have significant autonomy in implementing climate policies and often develop their own climate action plans and strategies. They are responsible for areas such as regional planning, building codes, and transportation, which are crucial for climate mitigation and adaptation. Coordination between the federal government and the Länder is facilitated through various mechanisms, including:

- Conference of Environment Ministers (UMK): A platform for the 16 environment ministers of the Länder to coordinate their policies and collaborate with the federal government.
- Joint Federal-Länder Working Groups (between Federal State and the *Länder*): These groups address specific climate-related issues and ensure that policies are aligned across different levels of government.
- Local governments (Municipalities): Local governments play a critical role in implementing climate policies on the ground. They are responsible for urban planning, local transportation, and public services, and they often develop their own climate action plans. Municipalities can also participate in initiatives such as the Covenant of Mayors for Climate and Energy, which promotes local climate action.

Climate cabinet: The Climate Cabinet is a high-level body within the federal government that coordinates climate policy across different ministries. It is chaired by the Chancellor and includes key ministers responsible for environment, economy, finance, transport, and agriculture. The Climate Cabinet ensures that climate policies are integrated and that different sectors contribute to achieving national climate targets.

Citizens participation: Germany places a strong emphasis on involving the public and engaging stakeholders in the development and implementation of climate policies. This includes public consultations, stakeholder dialogues, and the involvement of civil society organizations, businesses, and scientific institutions.

Research and innovation: The German government supports research and innovation in climate-friendly technologies and practices through funding programs and partnerships with research institutions and the private sector. This includes initiatives like the Energy Research Program and the National Hydrogen Strategy.

Overall, Germany's governance framework for climate policies is characterized by a collaborative approach that involves multiple levels of government, a strong legal basis for climate action, and active engagement with stakeholders and the international community.

11.4. The main dynamic aspects of the strategies

Progress reports and their dynamic aspects

The strategies outlined above are connected to regular progress reports and updates to the action plans every 4 to 5 years. [Reckien et al.](#) (2018) show that cities are five times more likely to have adaptation plans if there is a national mandate to do so, but there is not yet evidence of national mandates for state CCA plans and their potential impact on lower levels ([King, 2022](#)). This leads to the question if, within these dynamics, Germany will continue to incentivize and encourage national adaptation policies, leading to regionalized deficits, or if at some point, if the federal government will introduce harder instruments and mandate adaptation policies in the 16 *Länder*. The German Adaptation Strategy (DAS) is designed as a living document, it should be capable of adapting to new information and changing circumstances, but this is also its weakness, as it has no direct legal power. It is continuously developed and updated to incorporate the expanding knowledge base on climate change and its impacts. This ensures that the strategy remains relevant and effective in addressing new challenges and opportunities as they arise.

Regular Monitoring and Reporting

The strategy includes a robust monitoring and reporting mechanism. A monitoring report will be created at least every four years to inform the public about the observed effects of climate change and the progress in achieving the goals. If goals are not met, measures will be adjusted accordingly. The monitoring will provide the scientific basis for evaluating progress and updating the strategy. The report provides an overview of observed climate change impacts, and the adaptation measures already initiated in Germany, updated every four years. Additionally, the climate impact and risk analysis (*Klimawirkungs und Risikoanalyse*) identifies specific climate impacts and

regions requiring action, updated every six years. Finally, the monitoring provides the scientific basis for evaluating progress and updating the strategy.

Evaluation and Feedback

The strategy includes an evaluation process to analyse the effectiveness of the DAS and its implementation. This external evaluation occurs every four years, providing critical feedback to refine and improve the strategy.

Stakeholder Involvement

The DAS involves various stakeholders, including federal states, municipalities, associations, scientists, and citizens, through the “[dialogue for climate adaptation](#)” (“*Dialog KlimaAnpassung*”). The public, along with associations and other stakeholders, will be involved in setting measurable goals, selecting indicators, and choosing measures. This inclusive approach ensures that diverse perspectives and ideas are integrated into the strategy, enhancing its comprehensiveness and acceptance.

11.5. A first assessment of the effectiveness of the strategies

Development and Implementation: The Federal Government is required to present a proactive climate adaptation strategy with measurable goals by September 30, 2025, and update it every four years based on current scientific knowledge. The strategy will be further updated based on climate risk analysis and will include various clusters such as infrastructure, land use, health, urban development, water, economy, and overarching fields like vulnerable groups and occupational safety.

The strategy will set ambitious, measurable goals for each cluster, define indicators to measure goal achievement, and specify federal measures to achieve these goals. It will also recommend measures for the states and establish a mechanism to evaluate progress. Sustainable adaptation measures will be prioritized, especially those with synergies in natural climate protection, biodiversity, resilient water management, and sustainable urban development.

The Federal Government and the states will collaborate to achieve the goals set in the strategy. The states will develop their own climate adaptation strategies, which can be based on the federal strategy and must be updated every five years.

The Federal Government will support the states through strategy development, coordination, data provision, scientific research, and networking. The strategy is supported by a legal framework that includes the establishment of climate adaptation concepts for public entities under federal supervision and the adaptation of federal properties to climate change.

The law on *Klimawandelanpassung* came into effect on July 1, 2024, hence it is too early to draw a first assessment.

Overall, both the Law and the DAS appear to be a well-structured and continuously evolving strategy with mechanisms in place for regular

monitoring, evaluation, and stakeholder involvement, which are crucial for its effectiveness. However, the actual impact and success of the strategy would depend on the implementation of these measures and the tangible outcomes observed over time.

Emissions reduction

When it comes to the progress in emissions reduction in Germany, both the climate adaptation Law (2023) (Klimawandelanpassungsgesetz) and the German Adaptation Strategy (DAS) support emissions reduction. Germany's efforts in emissions reduction are a combination of regulatory measures, technological advancements, and societal shifts towards more sustainable practices. However, challenges remain, particularly in sectors like transportation and industry. Germany has achieved a reduction of approximately 40.8% by 2020 (compared to 1990 level) and has set further targets to reduce emissions by 55% by 2030, 65% by 2040, and to achieve carbon neutrality by 2045. One decisive part of Germany's emissions reduction strategy is the energy transition (*Energiewende*), which focuses on increasing the share of renewable energy in the electricity mix while phasing out nuclear and coal power. For instance, in 2022, renewable energy sources accounted for about 45% of Germany's electricity consumption, up from just 6% in 2000. Finally, it has committed to phasing out coal-fired power plants by 2038. Coal is one of the most carbon-intensive sources of energy and this appears as a crucial step.

The government has provided financial support to coal regions to help them transition to more sustainable economic activities

Effectiveness of CC policies in the German Länder

The effectiveness of climate change (CC) policies in the German Länder (federal states) is closely tied to the collaborative framework established between the federal and *Länder* governments. The [Standing Committee on Adaptation to the Consequences of Climate Change](#) (*Ständige Ausschuss zur Anpassung an die Folgen des Klimawandels*, StA AFK) plays a crucial role in this collaboration, ensuring that the specific strategies and measures of the state administrations are considered in the work related to the (DAS). This committee is part of the broader Bund-Länder-Arbeitsgemeinschaft Klima, Energie, Mobilität und Nachhaltigkeit der Umweltministerkonferenz, which facilitates ongoing dialogue and coordination.

The [German Climate Preparedness Portal](#), launched by the federal government in September 2018, supports municipalities, businesses, and civil society with tailored information and tools to manage the impacts of climate change. This portal is accompanied by a network facilitated by the Umweltbundesamt, where stakeholders can exchange knowledge, receive advice, and learn from each other.

The implementation and continuous development of the DAS are overseen by the Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz (BMUV) through the Interministerielle Arbeitsgruppe Anpassung an den Klimawandel (IMAA). This interministerial working group

ensures that all federal ministries collaborate, regularly align their activities, and set new goals to create the necessary conditions for climate adaptation in Germany. The Behördennetzwerk Klimawandel und Anpassung, led by the Umweltbundesamt, supports the IMAA by focusing on the scientific aspects of the DAS.

In summary, the effectiveness of CC policies in the German Länder is enhanced by a framework of collaboration, continuous development, and rigorous monitoring and evaluation, ensuring that both federal and state-level strategies are aligned in addressing the impacts of climate change.

11.6. Other aspects considered important

There are challenges at certain phases of the policy cycle in Germany (e.g., agenda setting and passing legislation) and thus gaps were identified as common barriers to CCA (Climate Change Adaptation), such as unclear or non-binding goals (King, 2022). In other words: the process of passing legislation for CCA can be difficult due to the varying levels of commitment and attention to detail among the states. This can result in substantial variation in the strategic planning and implementation of CCA policies. These challenges indicate that while there is flexibility in how the sixteen *Länder* can approach CCA, this same flexibility can lead to inconsistencies and gaps in policy implementation and effectiveness. In addition, a lack of financial and human resources slows the implementation of preparation efforts against the impacts of climate change, and a fragmented approach is also considered as a hurdle for Germany. There might be however, a growing awareness that not acting now will result in much greater financial and human costs in the future. Dealing with the effects of extreme weather events caused by climate change has already cost Germany at least 80 billion euros since 2018, according to the last 2022 report commissioned by the economy and climate action ministry (BMWK). On average, extreme heat, drought, and floods have cost the country at least 6.6 billion euros per year in damages over the past two decades. “The numbers sound the alarm for more prevention when it comes to the climate” environment minister Steffi Lemke said in 2022.

This report is based on the policies being implemented based on the former German federal government orientations. New directions can be expected, as Germany will have a new government after the general elections just held a few days ago.

12. ITALY

12.1. Introduction

The policies and measures adopted by Italy to respond to climate change are guided by the international guidelines of the Paris Agreement and the European adaptation strategy. In this direction, the first steps at the national level were taken in 2015, when the National Strategy for Adaptation to Climate Change (SNAC) was proposed and adopted. Subsequently, other strategies and measures have been put in place to manage the energy transition and combat climate change. In a strict chronological sense, these include, among other: the National Integrated Energy and Climate Plan ([PNIEC](#), 2019); the Italian Long-Term Strategy³¹ ([NLTS](#), 2021); the Ecological Transition Plan ([PTE](#), 2021); the National Climate Change Adaptation Plan ([PNACC](#), 2023).

These are complemented by numerous other sectoral action plans³², as well as the [National Recovery and Resilience Plan](#) (PNRR) as the main implementation instrument with its Mission 2 ‘Green Revolution and Ecological Transition’ and with the subsequent Mission 7 ‘REPowerEU’, added in 2024³³.

Although complementary and interrelated, and maturing within the more general framework of European indications, these strategies and measures governing Italian national climate change policies operate with their own specific objectives. Taken as a whole, they are aimed at developing a national vision on the common pathways to be taken to tackle climate change by counteracting and mitigating its impacts, achieving ‘climate neutrality’ by 2050.

12.2. The strategies of M&A being carried out

There is no formal and institutional distinction between mitigation and adaptation measures in the policies and programmes implemented in Italy. Although, as mentioned above, a specific adaptation strategy with a related implementation plan has been formulated, many of the plans contain measures of both types (an illustrative picture of the possible interactions between these measures is briefly outlined in section 4). An attempt has therefore been made to reconstruct a general framework, drawing where necessary on the various reference plans.

The Italian policies in this field refer to some general principles which are: 1. Adopt an approach based on knowledge and awareness; 2. Work in partnership and involve stakeholders and citizens; 3. Work in close coordination with the

³¹ The full title is: Italian long-term strategy on the reduction of greenhouse gas emissions.

³² Among these we can mention: Sustainable Energy Transition Plan Suitable Areas (PiTESAI, 2018); National Air Pollution Control Program (PNCIA, 2020); National Plan for the mitigation of hydrogeological risk, restoration and protection of environmental resources (2019); National Hydrogen Strategy (SNI, 2020).

³³ Mission 7 aims to strengthen energy distribution networks, accelerate the production of renewable sources and increase energy efficiency.

world of research and innovation; 4. Consider the complementarity of adaptation with respect to mitigation; 5. Act according to the precautionary principle in the face of scientific uncertainties; 6. Act according to a flexible approach; 7. Act according to the principle of sustainability and intergenerational equity; 8. Adopt an integrated approach to evaluation; 9. Integrate with existing policies; 10. Carry out regular monitoring and evaluation of progress.

The following figure shows the different measures of the overall framework of initiatives, both adaptation and mitigation, with reference to the three major thematic areas: Climate; Biodiversity; Resources.

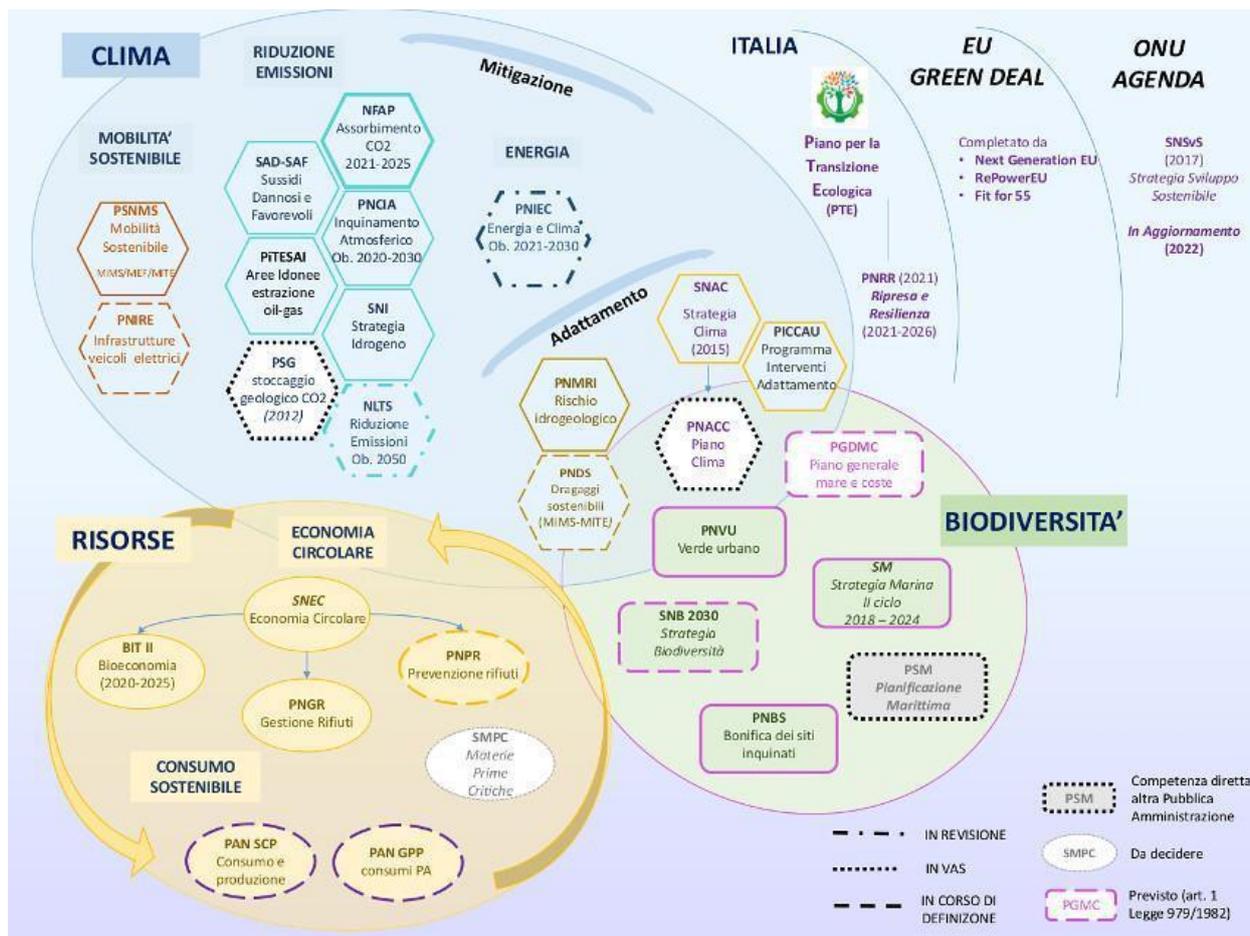


Figure 5 – Adaptation and mitigation measures in Italy, with reference to the three major thematic areas: Climate; Biodiversity; Resources

12.2.1 Objectives

In general, referring to what is stated in Mission 2 of the PNRR³⁴, the objectives of Italian policies are to achieve the green, ecological and inclusive transition of society and the economy, to make the system as a whole sustainable and competitive, and to favour the circular economy, the development of renewable energy sources, and a more sustainable agriculture. Specifically, they aim at:

³⁴ In order not to create confusion, acronyms are given in their original language, while extended titles of strategies, plans and programmes have been translated.

- Climate neutrality: bring forward in forced stages the process of zeroing anthropogenic greenhouse gas emissions to net zero in 2050
- Pollution zeroing: bring pollution below the World Health Organisation's warning thresholds, towards substantial zero
- Climate change adaptation: make operational the various climate change adaptation measures that are already having an impact on land, biodiversity and various economic activities
- Restoration of biodiversity and ecosystems: In connection with the mitigation and adaptation goals, the aim is to enhance the national biodiversity stock with conservation measures (increase of protected areas on land and sea), and to implement nature-based solutions in order to restore more naturalness to urban, degraded areas and key areas such as rivers and coastlines
- Transition to the circular economy and the bioeconomy: moving from a linear to a circular economic model, rethought in function of an additive production model.

12.2.2 Rationale and Timeframe

In Italy, the protection of the environment, ecosystem and agricultural resources is the exclusive competence of the central government. The Ministry of the Environment and Energy Security (MASE) is responsible for implementing mitigation and adaptation policies. The Ministry coordinates activities related to adaptation strategies and plans, and thus all institutional and non-institutional actors at national, regional and local levels.

As mentioned above, the general objective is to achieve “climate neutrality” by 2050. In any case, the various plans and measures that have been implemented or are in the process of being defined have specific deadlines and milestones for monitoring and evaluation.

12.2.3. Mitigation strategy in Italy

The Ecological Transition Plan (PTE) integrates with the National Recovery and Resilience Plan (PNRR) and coordinates the environmental policies that should lead to the transformation of the country system in order to make it capable of achieving the objectives set at international and European level for 2050. The PTE defines some macro-objectives for mitigation and adaptation that are shared at European level. For mitigation, these are essentially the following.

- Climate neutrality: aiming for net zero anthropogenic greenhouse gas emissions by 2050, in particular through the progressive phase-out of fossil fuels and the rapid conversion to renewable sources; the transition to healthy, regenerative and circular agriculture and livestock farming according to the European “farm to fork” strategy; the fight against forest fires; the introduction of measures to regulate animal grazing areas.
- Zero pollution: to reduce pollution below the World Health Organisation's alert thresholds, with a view to achieving substantial zero pollution, and to promote sustainable mobility with a view to decarbonising and reducing road congestion and its multiple implications.

- Biodiversity and ecosystem restoration: The aim is to enhance the national biodiversity heritage through conservation measures (increasing protected terrestrial and marine areas) and the implementation of nature-based solutions to restore urban and degraded areas and key areas such as rivers and coasts to a more natural state.

As can be seen in the figure above, there are three macro areas of intervention for climate change mitigation, namely energy, emissions reduction and sustainable mobility. Within this framework, the plan identifies eight specific areas of intervention, some of which are strictly aimed at mitigating the effects of climate change, others more aimed at managing biodiversity and combining adaptation and mitigation measures, and the last, as can be seen in the figure, aimed at resource management. The eight areas are:

1. Decarbonisation
2. Sustainable mobility
3. Air quality improvement
4. Combating land consumption and hydrogeological instability
5. Improvement of water resources and related infrastructure
6. Restoration and enhancement of biodiversity
7. Protection of the sea
8. Promotion of circular economy, bio-economy and sustainable agriculture.

The areas strictly or predominantly aimed at mitigating climate change are presented below.

Decarbonisation

In line with the Paris Agreement, the objective is to achieve net-zero emissions by 2050 and to stabilise global warming at 1.5-2°C. This target implies a 55% reduction in greenhouse gas emissions by EU countries by 2030 (compared to 1990 levels), which at national level means a reduction of 256 million tons of CO² (compared to 418 million tons in 2019).

To achieve this objective, the plan calls for further efforts in energy saving policies, especially in the transport and construction sectors, the electrification of the primary energy system with a strong introduction of renewable energy sources (up to 72%) and the complete phase-out of coal. The revolution in the energy system will have to be accompanied by a substantial decarbonisation of the industrial sector, maintaining, in the ‘hard to abate’ sectors (steel, glass, ceramics, cement, chemistry) the guiding principle of ‘energy efficiency first’, which finds in efficiency the first lever to be used to obtain economic and environmental benefits in terms of reducing emissions. In this framework, the intention is to resort to a combination of several actions, such as: the transition from fossil fuels to renewable fuels such as hydrogen, bioenergy and synthetic fuels, the increased electrification of consumption and the use of residual CO² capture and storage (CCS - CCU).

Further emission savings can be achieved through material substitution in the construction sector and more generally through the adoption of circular economy practices and Minimum Environmental Criteria (CAM), which already require the use of a certain proportion of recycled materials. There must also be a boost from agriculture, in line with the Farm to Fork strategy, with the gradual replacement of the most polluting farm vehicles and the transition to more sustainable farming and livestock practices – agro-ecology, precision agriculture – which, in addition to reducing ammonia emissions, will allow greater carbon sequestration in the soil and an increase in bioenergy.

Finally, the aim is to control the ongoing phenomenon of energy poverty, which in Italy affects 13% of families, households that for economic and social reasons are unable to adequately heat or cool their homes.

Sustainable mobility

A second area concerns transport, which is responsible for around 26% of emissions in Italy. In general, the Italian plan is in line with the main objectives of the European mobility strategy (2020), which include 30 million electric cars by 2030 (6 million in Italy), zero-emission ships and planes between 2030 and 2035, a doubling of high-speed rail traffic by 2030 and a tripling by 2050, a 50% increase in rail freight traffic by 2030 and a doubling by 2050.

Through various components of the PNRR (Mission 2, Mission 3 and Complementary Fund), actions to achieve this objective have already been identified and launched. These are actions aimed at: strengthening the national railway system and completing certain infrastructures (for over 35 billion); improving regional railway networks for commuters; ecological conversion of local mobility with the creation of 570 km of urban cycle paths and 1200 km of tourist cycle paths; modernising the public transport fleet with the introduction of around 3,000 electric or hybrid buses and the development of a public electric recharging infrastructure network with 7,500 points on motorways and another 13,750 points in cities, in addition to 100 experimental hydrogen recharging stations for cars and trucks.

Other measures concern freight transport. For land transport, a gradual shift from road to rail is planned, as well as the modernisation of rolling stock (locomotives, freight wagons). For maritime transport, the aim is to make hydrogen and alternative fuel engines operational, while work is already underway on a major project to electrify ports (implementation of the national “cold ironing” plan and green ports).

Air quality improvement

The European Commission's Communication “Towards zero pollution for air, water and soil” proposes, as an intermediate step towards zero pollution by 2050, to reduce in this decade the impact on health (premature deaths) by more than 55%; the impact on EU ecosystems, where air pollution threatens biodiversity, by 25%; and the production of urban waste, the treatment of which contributes to air, water and soil pollution, by 50%.

In this context, Italy is paying particular attention to the use of woody biomass, which is climate-neutral but potentially harmful to health, and to the progressive reduction of emissions from the agricultural sector (such as ammonia), implementing a “green” conversion process that has been underway in Italy for years, with good results. The agricultural sector will also be able to contribute by implementing the mandatory measures provided for in the National Indicative Code of Good Agricultural Practice and the Common Agricultural Policy programmes.

The National Air Pollution Control Program (PNCIA) has identified and launched (with results even higher than the intermediate objectives of 2020) a set of measures that will allow the reduction targets of the main pollutants to be achieved by 2030. This is in line with the provisions of the European Commission's Thematic Strategy and the National Emission Ceilings (NEC) Directive, which commit Europe to significant reductions in key pollutants (Sulphur Dioxide, Nitrogen oxides, Ammonia, PM2.5, non-methane volatile organic compounds) by 2020 and 2030.

Promotion of circular economy, bio-economy and sustainable agriculture

The circular economy is an epochal challenge that aims to eco-design durable and repairable products to prevent waste. The first step towards the circular economy taken by the PNRR was to optimize waste management throughout the country (increasing separate waste collection, mechanical and chemical recycling facilities, and minimizing landfill disposal) to meet the European targets for 2030-40 for packaging, plastics, textiles, paper, aluminium, demolition waste, electrical and electronic waste, and to reduce water and food waste.

The new “National Strategy for the Circular Economy”, launched in 2022 and focused on eco-design and eco-efficiency, defines new administrative and fiscal tools to strengthen the market for secondary raw materials, extended producer and consumer responsibility, and the spread of sharing and “product as a service” practices. The goal is to promote an advanced circular economy and, consequently, a strong prevention of waste and refuse (-50%) by 2040.

The plan also aims to strengthen the circular bioeconomy, in particular the valorisation of waste biomass, urban organic waste, non-food crops and second harvest crops for the production of energy, bioproducts and biofuels, with clear production, environmental and climate benefits. Of particular interest in this sense are the “Green Islands” and “Green Communities” projects launched by the PNRR.

12.2.4 Adaptation strategy in Italy

The National Plan for Adaptation to Climate Change (Piano Nazionale Adattamento ai Cambiamenti Climatici - PNACC) was approved on 21 December 2023 with D.M. n.434, after having been subjected to a Social Impact Assessment procedure concluded on 4 August 2023 with D.M. n.256. The Plan was developed to implement the National Strategy for Adaptation to Climate Change (Strategia Nazionale per l'Adattamento ai Cambiamenti climatici -

SNAC), approved with Directorial Decree no. 86 of 16 June 2015 by the Ministry of the Environment and Protection of Land and Sea.

The main objective of the PNACC is to provide a national guiding framework for the implementation of actions aimed at minimising the risks resulting from climate change, improving the adaptive capacity of socio-economic and natural systems, and taking advantage of any opportunities that may arise under new climatic conditions.

In this sense, the following can be considered as specific objectives:

- To put in place a structure that enables knowledge of the phenomena characterising the country's natural vulnerability
- Define an optimal organisational framework
- To foster multi-level and multi-sectoral governance.

To this end, the PNACC provides a common base of data, information and analytical methodologies useful for defining sectoral and/or local adaptation pathways to climate change in order to reduce vulnerability to the impacts of climate change, increase resilience to climate change and improve the exploitation of opportunities.

With a view to providing a national policy framework for the implementation of actions aimed at minimising the risks resulting from climate change, improving the adaptive capacity of socio-economic and natural systems, and taking advantage of any opportunities that may arise from new climatic conditions, the PNACC provides for two levels of intervention: the first 'systemic measures', the second "steering measures".

Systemic measures and action

At the 'systemic' level, the PNACC aims to build an organisational framework focused on the definition of a governance structure and criteria and on knowledge development. Three 'administrative strengthening' and one 'capacity building' action are identified, they are:

- Establishment of the "National Observatory for Adaptation to Climate Change"
- Identification of methods, tools and competent subjects for the introduction of principles, measures and actions for adaptation to climate change in national, regional and local plans and programs
- Definition of sectoral and cross-sectoral methods and tools for the implementation of PNACC measures at different levels of government
- Development of a research program to improve the knowledge framework on climate change impacts, vulnerabilities and risks in Italy.

For each action, the plan identifies (see table below) some fundamental elements such as, among others, objective, measurement indicator, implementation timeframe and actors involved.

Table 5 – Basic elements of the system of measures and actions

N	Measure	Action	Objective	Progress indicator (measurement method)	Implementation Timeframe	Actors involved
1	Administrative Strengthening for Adaptation at the National Level (<i>Governance</i>)	Establishment of the “National Observatory for Adaptation to Climate Change”	Establishment of the National Observatory and constitution of the Technical Secretariat within three months of the ministerial decree approving the PNACC	Issuance of the ministerial decree (Protocol)	Three months from the ministerial decree approving the PNACC	MASE
2	Administrative Strengthening for Adaptation at the National Level (<i>Governance</i>)	Identification of the methods, tools and competent subjects for the introduction of principles, measures and actions for adaptation to climate change in national, regional and local Plans and Programs	Mainstreaming of adaptation in planning at all levels of territorial government	Number of plans and programmes for which methods, tools and competent subjects for mainstreaming have been identified / Number of programmes and/or plans assessed	Six months from the decree approving the PNACC (100%)	Observ.
3	Administrative Strengthening for Adaptation at the National Level (<i>Governance</i>)	Definition of sectoral and intersectoral methods and tools for the implementation of the PNACC measures at different levels of government	Approval of the act defining the methods and tools for implementing the PNACC measures within twelve months of the establishment of the Observatory	Approval of the act defining the methods and tools for implementing the PNACC measures (Protocol)	Twelve months from the establishment of the Observ.	Observ.
4	Technical Capacity Building for Adaptation at the National Level (<i>Information</i>)	Development of a research program for the improvement of the knowledge framework on the impacts of climate change, vulnerability and risks in Italy	Activation of the Agreement/Convention within twelve months of the decree approving the PNACC	Agreement/ Convention (Protocol)	Twelve months from the decree approving the PNACC	MASE

Steering measures

The second level of intervention of the PNACC intends to exercise a ‘steering function’ by identifying a framework within which the planning and implementation of regional and local adaptation actions can take place. This framework is based on two Plan instruments consisting of a ‘framework of adaptation measures’ and ‘guidelines for planning at the regional and local scale’. The PNACC provides an organic framework of ‘possible adaptation options’ (Annex IV - [Database of actions](#)) that will be applied in the various planning instruments, at the national, regional and local scales, in the ways that will be identified by the Observatory.

First, the actions have been divided into two main types: Type A (soft) actions and Type B (non-soft - green or grey) actions. The first (type A) are those that do not require direct structural and material interventions but are still preparatory to their implementation. The non-soft actions (type B) are divided into: Grey actions aimed at improving and adapting structures and infrastructures to climate change, and Green actions, i.e., nature-based solutions, involving the

sustainable use or management of natural “services”. Both type b actions have a material and structural intervention component.

They were also grouped into macro categories and specific categories, which are presented below.

Table 6 – Steering measures

Type	Macro categories	Categories
A. Soft	Information	Research and evaluation; Monitoring, data, models; Dissemination, perception, awareness, and training
	Organizational participatory processes and	Institutions; Organization and Management; Partnership and Participation
	Governance	Legislative and regulatory adjustments; Plans and strategies; Economic and financial instruments; Orientation
B. Grey & Green	Adaptation and improvement of plants and infrastructures	Plants, materials and technologies; Defense systems, networks, storage, distribution and transmission
	Solutions based on ecosystem services	Integrated solutions; Forest and agro-forestry ecosystems; River, coastal and marine ecosystems; Redevelopment of the built

In total, over 350 specific actions were identified and listed in the action database. Most of these are non-structural (soft): 274 or 76% of the total. This is followed by actions based on an ecosystem approach (green), which amount to 46 or 13%. Finally, infrastructure and technology actions (grey), which are 41 or 11% of the total.

In the database the actions are also organized into 19 sectors (see also SNAC): Transport, Energy, Water Resources, Agriculture, Forestry and Maritime Fisheries, Aquaculture, Geological, hydrological and hydraulic instability, Inland and transition water ecosystems, Marine ecosystems and Terrestrial Ecosystems, Urban Settlements, Cultural Heritage, Health, Tourism and Socioeconomic Impacts.

Finally, the Plan provides guidelines for planning at regional and local scales’ represented by two specific documents: the “Methodologies for the definition of regional climate change adaptation strategies and plans” and the “Methodologies for the definition of local climate change adaptation strategies and plans” (Annexes I e II).

As mentioned above, some specific areas included in the Ecological Transition Plan (PTE) are also primarily aimed at adapting to climate change. These areas are briefly presented below.

Restoration and enhancement of biodiversity

Biodiversity is at the heart of the plan and, in line with the European strategy, it provides for a significant increase in protected areas, the adoption of “nature-



based solutions” for the restoration of degraded ecosystems, and a strong push for scientific monitoring of habitats and endangered species. Although this area is also relevant to mitigation policies, it appears to be primarily the responsibility of adaptation policies and is therefore presented in this section.

The extension of protected areas in Italy will be increased from the current 10.5% to 30%, and the rigorous protection of endangered habitats will be increased from 3% to 10% by 2030. National parks and marine protected areas will be digitalized by 2026 to monitor pressures and the status of species, simplify administrative procedures and improve visitor services.

Forests cover 40% of the country's surface and make a crucial contribution to decarbonization and biodiversity. It is therefore essential to promote their active protection through forms of sustainable management, their expansion into remaining and degraded areas and the national valorisation of wood as a long-term carbon store.

Combating land consumption and hydrogeological instability

About 8% of the Italian territory is impermeable and a much larger portion is affected by natural degradation and habitat fragmentation, with considerable economic damage. After a slowdown during the years of economic crisis, land consumption has resumed at a rate of 2 square meters per second.

The goal of the plan is to reach zero net consumption by 2030, both by minimizing artificial interventions and by increasing natural restoration in the most vulnerable areas, such as urban areas and coasts.

Landslides, mudflows and floods affect 90% of the municipalities, with almost a fifth of the territory at medium-high risk. The plan aims to secure the territory by strengthening governance and an advanced monitoring system that will give coherence to a national prevention and mitigation program.

Protection of the sea

The seas and 8,000 km of coastline surrounding Italy are an extraordinary source of biodiversity, but also of economic activities and human pressures. The first essential measures of the PNRR invest in research and observation of the seabed and marine habitats, also through the strengthening of a dedicated fleet. The research objective is to map and monitor 90% of marine and coastal systems and to restore 20%.

Conservation targets include increasing the coverage of marine protected areas to 30% by 2030, including 10% with strict forms of protection. Other measures for 2030 include the fight against illegal fishing, coordinated action with other countries to minimize marine litter, and the promotion of sustainable tourism.

Improvement of water resources and related infrastructure

The water system for civil, industrial and agricultural use can be significantly improved, both in terms of quality, security of supply and reduction of network losses, and in terms of wastewater discharge and treatment, in the light of the Water Framework Directive, specific directives and related sectoral plans, first

and foremost the River Basin District Management Plan and the Water Protection Plan.

Up to 2026, the measures provided for in the PNRR, amounting to 4.3 billion euros, are intended to strengthen primary water supply infrastructures, distribution networks, sewerage systems and treatment plants, particularly in the south; to digitize and district-align distribution networks; to reduce the dispersion of 15,000 km of water networks by 15% (currently 42%); and to optimize irrigation systems in 15% of agricultural areas.

At the same time, reforms are planned to strengthen the National Plan of Interventions in the Water Sector and to make water management more efficient through the formation of public-private consortia at the supra-municipal level.

The works to strengthen, renew and improve the quality and efficiency of the main water infrastructures are expected to be completed by 2040.

12.3. The governance framework

The ecological transition process is implemented by the Ministry of the Environment and Economic Security (MASE) and the Interministerial Committee for Ecological Transition (CITE). In particular, governance is the responsibility of the CITE, which was set up at the Presidency of the Council of Ministers under Article 4 of the so-called ‘ministerial reorganisation decree’ (Decree-Law No. 22 of 1 March 2021, converted, with amendments, by Law No. 55 of 22 April 2021), which introduced Article 57 bis to Legislative Decree No. 152 of 3 April 2006 on environmental matters.

The Committee was set up in response to the need to “provide an initial definition of the governance of the ecological transition, with the task of coordinating national policies for this transition and the related programming”.

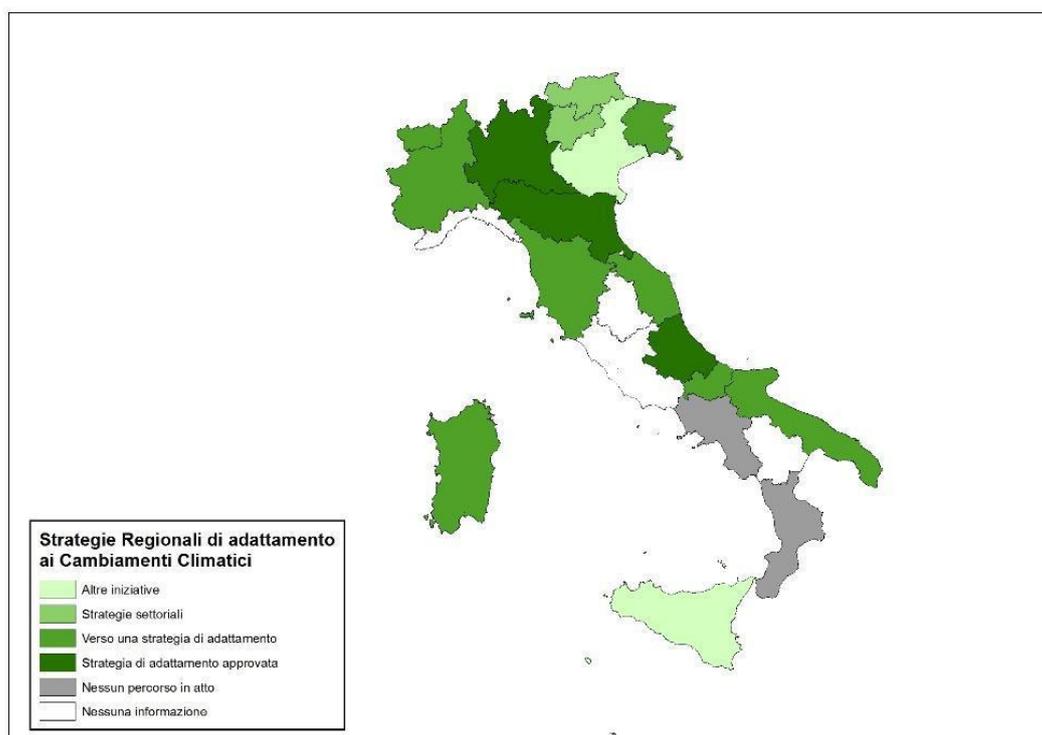
CITE is chaired by the President of the Council of Ministers, who may delegate the Minister for the Environment and Energy Security or, in the case of industrial policy issues, the Minister for Enterprise and Made in Italy. The Committee is composed of the Ministers for the Environment and Energy Security, for Enterprise and Made in Italy, for Economy and Finance, for Infrastructure and Transport, for Labour and Social Policy and for Agriculture, Food Sovereignty and Forestry. The other ministers or their deputies responsible for the matters covered by the provisions and topics on the agenda also participate. Furthermore, as mentioned above, working groups have been set up for the implementation of the plan, with the participation of representatives of various ministries, the Presidency of the Council and other institutions. Finally, it should be remembered that CITE collaborates with bodies and research institutes such as National Statistical Institute (ISTAT) and Higher Institute for Environmental Protection and Research (ISPRA).

For technical and operational management, a Technical Support Committee of the CITE has been established, composed of a representative of the Presidency of the Council of Ministers and a representative of each of the Ministries involved

in the Ecological Transition. The governance of the Ecological Transition implies, on the one hand, decision-making mechanisms based on common scientific criteria and, on the other hand, close cooperation and continuous coordination between the Ministries and between the latter and the Local Authorities, in some cases with the creation of ad hoc control rooms for the period of the intervention in progress, also through the full involvement of the territorial bodies (Regions, Provinces and Municipalities) for the topics of competence, also through the Department of Regional Affairs and Autonomies and the system of Technical Comparative Tables already operational.

Local authorities, and the Regions in particular, play an important role in the operational definition and implementation of the various measures at local level. They are involved in the definition of the main strategies and participate in numerous programmatic tables on the subject, while maintaining their own autonomy, even within the general framework of the national level.

For example, regarding adaptation measures, the definition of regional strategies and plans is foreseen as the main tool for addressing the impacts of climate change and implementing measures to reduce the vulnerability of territories. In Italy, the number of adopted regional strategies and plans is still low and, as shown in the figure below, the situation varies considerably between the 20 regions.



* ISPRA, 2023

Figure 6 – *Regional adaptation strategies in Italy*

With reference to this, the National Platform on Adaptation to Climate Change was promoted on the initiative of the Ministry for the Environment and Energy Security (MASE) and was realised by the Higher Institute for Environmental Protection and Research (ISPRA).

The platform intends to foster the exchange of information between the central administration, local authorities and all stakeholders, starting with citizens, on the issue of adaptation to climate change, thus representing the main information tool in Italy on this topic. The general aim is therefore to inform, raise awareness and make data, indicators, case studies and operational tools available to all citizens, to promote and support Local Authorities in the decision-making and planning processes on the subject of adaptation to climate change, as well as to facilitate access to the documents of the National Plan for Adaptation to Climate Change (PNACC).

A parallel role in the management of the transition process is played by the Department of Civil Protection. The Department is responsible for directing, promoting and coordinating the entire National Civil Protection Service. In close collaboration with the Regions and Autonomous Provinces, it develops and coordinates the National Plans for Risk Scenarios and tests their effectiveness through exercises, coordinates the intervention of the Service in the event of emergencies of national importance, promotes activities aimed at predicting and preventing risks, defines the general criteria for identifying seismic zones and develops the general guidelines for training activities in the field of civil protection.

A further specific instrument for the governance of the transition process is the **National Observatory for Adaptation to Climate Change**. This is a governance structure that is the reference body at national level and involves public administrations, technical bodies and civil society in different capacities and in accordance with their respective roles. Its purpose is to define and ensure the implementation of sectoral and cross-sectoral methods and tools for the implementation of actions at the different levels of government. The Observatory is composed of: a collegial body with direction and coordination functions (Committee); a technical and administrative support structure (Secretariat); a consultative-information body (Forum).

As stated in the Ecological Transition Plan, the governance of the process must be based on the pillars of legality and taxation.

Legality. The need to ensure a fast, as well as fair and equitable, transition process is closely linked to that of having transparent administrative procedures that allow the implementation of plans and programmes by public actors impervious to criminal infiltration. Organised crime has often seen the renewable energy sector as an opportunity to launder the proceeds of illegal activities and to hoard public funds. There is great concern about the results of numerous investigations into illicit waste trafficking, including those with an international dimension and with the presence of affiliates of mafia organisations, which pose a real threat to the virtuous development of the circular economy. Particular attention and awareness must therefore be paid by

the institutions to guard the values of legality and ensure the virtuous development of the transition strategy.

Taxation. Indirect taxation can influence consumer behaviour and must, therefore, be designed and applied in order to support the ecological transition in its various declinations. The application of excise duty on energy products, appropriately modulated also in relation to CO₂ and other greenhouse gas emissions, can be used to correct negative social externalities, related to environmental and human health effects. Since [energy consumption is responsible for 80% of GHG emissions](#) in 2017, an [OECD analysis](#) concludes that an increase in excise duty can reduce the consumption of fossil fuels. This would be even more true if the excise duty itself were such as to incentivise a substitution with alternative fuels ([OECD, 2018](#)).

12.4. The main dynamic aspects of the strategies

The two main strategies of the country system and the various implementation plans directly or indirectly linked to them can be considered as open instruments. The long-term objectives for 2030 and 2050 propose indicators with specific time targets for each macro area or field of intervention. To this end, all the plans considered here have designed and implemented their own monitoring system in order to assess the progress of the transition process and, if necessary, to adjust intervention measures and re-evaluate objectives and indicators.

In this view, the following elements should be borne in mind:

- The SNAC will be reviewed every five years to take into account the results of the monitoring activities and to achieve the overall objective of resilience.
- The PNACC will be updated every six years, also considering the monitoring timeframe, which provides for a three-year report.
- The PNIEC, presented in a preliminary draft in 2019, will be updated in 2024.
- The NLTS aims to extend the objectives of the PNIEC to 2050, which has a target date of 2030.
- The PTE, as stated in the document, is an open plan that will accompany the transition process throughout its duration, with specific targets, monitoring activities and continuous adjustments - also on an annual basis - in relation to the progress of the transformations underway and to scientific and technological progress.

A further dynamic aspect of the strategies considered is the balance between mitigation measures and climate change adaptation measures.

In this respect, of relevance is the analysis that SNAC proposes regarding possible synergies between adaptation, mitigation and sustainable development policies. It assumes that they can interact with each other, both positively and negatively, and depending on local conditions (context).

Some of [these interrelationships are direct](#), involving the resources themselves (e.g., land) or stakeholders, while others are indirect (e.g., effects resulting from

public budget allocations) or even remote (e.g., changes in global trade flows and exchange rates).

The strongest direct synergy potential between adaptation and mitigation is identified firstly in the areas of agriculture, forestry and land use, and secondly in the areas of energy and water management, infrastructure planning and construction, transport, insurance and waste treatment.

Adaptation and mitigation actions must therefore seek to create synergies, not conflicts, with the other dimensions of sustainable development. In this regard, SNAC presents some examples:

- Energy efficiency and renewable energy policies are often cost-effective while improving energy security and decreasing local pollutant emissions
- Measures to reduce natural habitat loss and deforestation can have a multitude of significant benefits in terms of biodiversity, soil and water conservation, and
- Soil and water conservation, and can be implemented in a socially and economically sustainable manner
- Forestation and plantation measures for bioenergy make a positive contribution to restoring degraded soils, managing water runoff, storing carbon in the soil and benefiting rural economies, but they also risk creating competition in land use with food production and may also be detrimental to biodiversity if not properly designed.

The following table shows a series of examples of measures to be applied which, as stated in SNAC, consider the balance between Mitigation and Adaptation.

Table 7 – Balance between mitigation and adaptation measures

ENERGY	
Mitigation	Adaptation
Reduce emissions by expanding the use of renewable energy	Reduce vulnerability to widespread grid outages by favouring distributed generation from multiple renewable sources (solar, wind, biogas, etc.)
Reduce emissions by improving the efficiency of energy and water distribution systems	Reducing the risk of grid overload and failure due to decreased demand

GREEN' BUILDING	
Mitigation	Adaptation
Reducing emissions by reducing energy consumption through greater efficiency	Lower energy use will create less demand on the grid during extreme events such as heat waves, reducing the risk of blackouts
Adopt or encourage 'green' building standards for commercial, residential, retrofit (modernisation) and municipal projects	Building regulations could include increased resistance to high winds, flooding, etc.

FOOD PRODUCTION AND CONSUMPTION	
Mitigation	Adaptation
Reduce emissions by favouring local food production through the encouragement of short supply chains and/or farmer's markets, urban gardens etc. in order to reduce the number of kilometres needed to transport food	Reducing dependence on a centralised food system in which commodity production is concentrated in a few locations that may be vulnerable to climatic disruptions, such as damage

FORESTRY AND NATURAL SPACES	
Mitigation	Adaptation
Increasing carbon sequestration from forests by promoting the development of forests (including urban forestry) and natural spaces	Reducing vulnerability to flooding by promoting functional watersheds, including 'healthy' forests and natural spaces
	Increasing the habitat available to species at risk from climate stress by protecting natural spaces
	Counteracting urban heat island impacts by planting trees to provide shade and cooling

WATER RESOURCES	
Mitigation	Adaptation
Reducing emissions by decreasing water use (less energy needed for water treatment and transport)	Conserving water so that it is available during droughts

12.5. A first assessment of the effectiveness of the strategies

The different plans aimed at climate change mitigation and/or adaptation and energy transition in Italy are all quite recent and their effectiveness has only been partially assessed so far.

Specifically, however, it can be reported that the first PTE implementation status report was presented in May 2022. This report is the result of the activities of eight specific working groups and is intended to present a mapping of the actions of the plans and funding put in place, as well as to allow a comparison with the objectives set at European level, taken up by the PTE itself. This work also made it possible to carry out an update of the values with respect to the initial ones and, if necessary, a redetermination of the targets to be achieved.

In the table below, the results of the technical work on the implementation of some indicators for each of the eight areas considered are shown.

Table 8 – First results of technical work on the implementation of some indicators

Area	Indicator	Unit of measure	Valore Partenza (2019)	Valore aggiornato (2020)	Valore 2030
Decarbonisation	Carbon dioxide emissions	Mt CO ₂ eq	377,7	348,9	-55% over 1990 value (256.000.000)
	Total greenhouse gases according to national air emission accounts	%	18.18% gross final consumption; 35% RES share in electricity generation	20,4% consumi finali lordi 38.1% quota FER nella generazione elettrica	30% gross final consumption* 72% RES share in electricity generation
Sustainable mobility	Share of energy from renewable sources	Unit	357,296 (of which 22,728 electric (BEV) and 334,568 hybrid (MHEV, HEV or PHEV); 5.3% market share (0.5% electric + 4.8% hybrid)**	595.807 (of which 53.079 electric (BEV) e 542.728 hybrid (MHEV, HEV o PHEV)) 16.6% market share (2,1% electric + 14,5% hybrid)**	6 million electric cars 25% market share
	Number of electric cars (BEV), hybrid PIHV	Mt CO ₂ eq	104,4	78,7	
Air quality improvement	SO ₂ , NO _x , NMVOC emissions, NH ₃ , PM _{2.5} - One indicator for each pollutant	kton /a	Current value: SO ₂ 104,6; NO _x 639,3; COVNM 887,7; NH ₃ 349,2; PM _{2.5} 137,8	Current value: SO ₂ 81,9; NO _x 570,6; COVNM 885,4; NH ₃ 362,6; PM _{2.5} 133,2	Reduction from 2005 SO ₂ 71%; NO _x 65%; COVNM 46%; NH ₃ 16% ; PM _{2.5} 40%
Combating land consumption and hydrogeological instability	% Population exposed to landslide risk	Unit	1,281,970 (2.2% of the population - band P4 and P3)		Target: 250.000
	% Population exposed to flood risk	Unit	6,183,364 (10.4%) – Band TR 100-200 years		Securing 1.5 million people
Improvement of water resources and related infrastructure	Dispersion from municipal water network	%		42%	Reducing fragmentation and waste by 15% by 2026
Restoration and enhancement of biodiversity	Protected areas on land (protected areas, Natura 2000, OECM)	%	10.5% surface area 3% strict protection	22% of the national protected area (as of 2022). ND strict protection	30% surface area, 10% strict protection to 2030
Protection of the sea	Marine protected areas (protected areas, Natura 2000, OECM)	%	7,2%	25% protected areas (as of 2022). ND strict protection	30% national waters
Promotion of circular economy, bio-economy and sustainable agriculture	Circular material use rate	%	19%		30%

Furthermore, it can be mentioned that an entire section of the NACC is dedicated to how actions are and will be evaluated. In a nutshell, the evaluation system, following Flörke's proposal³⁵, is based on the 5 criteria, namely: effectiveness, economic efficiency, second-order effects (that is, the evaluation of the “unintended” or indirect, positive or negative, effects of the actions implemented), performance under uncertainty (with which it is intended to evaluate the applicability of a specific action in different climatic and socioeconomic conditions), and considerations for policy implementation (which assesses the legal, economic and social framework in which a specific measure is inserted). Each criterion is in turn made up of one or more sub-criteria as follows.

Table 9 – Assessment criteria

Assessment Criteria	Effectiveness	Reduction of the negative impacts of CC
	Economic efficiency	Maximization of cost-effectiveness indices
	Second-order effects	Win-win
		No-regret
		Negatives
	Performance under uncertainty	Flexibility
		Robustness
	Considerations for policy implementation	Institutional and social viability
		Multidimensionality of measurement
		Urgency

In view of the fact that the Plan was approved at the end of 2023, the first periodic evaluation has not yet been carried out, but only the ‘ex-ante’ evaluation carried out on the 361 actions identified in the database. When the PNACC was prepared, each individual action was given an ex-ante value by a group of experts on a scale of 5: high, medium-high, medium, medium-low, low. Following the experts' assessment, 59% of the actions received an overall rating of high, 29% medium-high and 12% medium, medium-low and low. Crossing the three dimensions - type, time orientation and evaluation judgement - a group of non-structural (soft) actions (124) emerges, distributed over almost all sectors, with a high judgement and achievable in the short term.

³⁵ Florke, M. F., Wimmer, F., Laaser, C., Vidaurre, R., Troltsch, J., Dworak, T., ... & Mysiak, J. (2009). Climate Adaptation-modelling water scenarios and sectoral impacts. CESR-Center for Environmental Systems Research.

13. ROMANIA

13.1. Introduction

As a member of the European Union, Romania has undertaken ambitious revisions of its national targets and policies on climate change mitigation and adaptation to align with EU objectives and vision. These efforts are grounded in commitments under the Paris Agreement and the European Green Deal. The overarching goal is to facilitate a transition to a low-carbon, climate-neutral, and sustainable society by 2050.

The strategic and governance framework for mitigation and adaptation has continuously evolved in the last two decades, with significant changes occurring after 2020. These developments aim to bring new perspectives for future time horizons, specifically 2030 and 2050. However, repeated governmental instability and changes have resulted in policy gaps concerning climate change. Additionally, the COVID-19 pandemic and the ongoing conflict in Ukraine, with serious implications for the national transport and energy systems, have placed considerable pressure on climate efforts.

Presidential Administration, in place since 2014 and active until December 2024, having a semi-executive role, has prioritised climate action, demonstrating significant international engagement in this area.

The following analysis is based on documents valid until November 2024 and presents structural aspects and updated versions of Romania's national climate change policies.

13.2. The Strategies of Mitigation and Adaptation being carried out

13.2.1 Objectives

According to Romania's Long-Term Strategy for Reducing Greenhouse Gas Emissions (LTS) – “Romania Neutral by 2050,” approved by Government Decision on November 29, 2023, and aligned with EU Regulations and Directives on climate neutrality and the governance of the Energy Union and climate action, the government has committed to achieving a 99% reduction in net emissions by 2050 compared to 1990 levels. An intermediate target has been set to reduce emissions by 78% by 2030. By 2019, a net reduction of 62% compared to 1990 levels had already been achieved according to the data provided by LTS.

To meet this objective, decarbonisation targets have been established for high-emission sectors, including energy, transport (which saw a 41% increase in emissions from 1990 to 2019), buildings, industry, agriculture, land use, land-use change, and forestry (LULUCF), and waste management.

The updated Integrated National Energy and Climate Plan (NECP), approved in October 2024 and reported to the European Commission, revises Romania's targets and proposes more ambitious medium- and long-term objectives. This plan sets the goals to reduce net greenhouse gas emissions by 85% by 2030 compared to 1990 levels, achieve a 96% reduction by 2040, and attain a 105% reduction (net zero) by 2050. Additionally, it updates sectoral targets and visions in alignment with recommendations from the European Commission.

The national targets are not solely focused on the decarbonisation of net-emitting sectors but also aim to increase absorption levels in the LULUCF sector, which has experienced a decline compared to the 1990 levels. A steady increase is targeted through 2050. This objective aligns with the provisions of the National Forestry Strategy 2030, which emphasizes improving forest management and expanding afforested areas.

The target set by the government in the updated NECP for increasing the share of renewable energy is to achieve a minimum of 38.3% of gross final energy consumption, complemented by the LTS objective of reaching a share of 86.1% by 2050 under the favourable scenario of a climate-neutral Romania. Additionally, to enhance energy efficiency, the NECP aims to reduce primary energy consumption by 25% and gross final energy consumption by 29% compared to 2022 levels.

Key objectives outlined in the strategic documents include:

- (i) improving and increasing domestic electricity production from sustainable sources,
- (ii) diversifying production sources,
- (iii) enhancing energy infrastructure and interconnectivity with neighbouring countries to reduce dependency on Russia, and
- (iv) developing and implementing innovative and efficient energy storage solutions”.

Furthermore, strengthening research and innovation in line with dedicated policies remains a focus of the government’s strategy.

Romania has integrated both M&A to climate change within the previous Climate Change Strategy 2016-2020. In August 2024, the government adopted the National Climate Change Adaptation Strategy 2030, with a perspective towards 2050 (NSACC). This strategy, accompanied by an action plan, seeks to align with the objectives of the European Green Deal and the EU’s New Adaptation Strategy. Its overarching aim is “to enhance the adaptive capacity of socio-economic and ecological systems, as well as society as a whole, to the effects of climate change in Romania, with a focus on the year 2030 and a perspective toward 2050.”

The strategy focuses on 13 key national sectors (see Para. 2.4), for which impact analyses have been conducted and sectoral adaptation objectives established. According to the document approved by the government decision, “strengthening the resilience of Romanian society and its

adaptation to the effects of climate change is achieved primarily at the local and regional levels, and simultaneously at the national and supranational levels.” The government has committed to a consolidated effort to enhance institutional capacity for improving and implementing adaptation policies. To support these efforts, the strategy was launched alongside the National Adaptation Platform - [RO-ADAPT](#), which provides nationally relevant information on climate change, its sectoral impacts, and the current policy framework.

13.2.2 Rationale and Timeframe

According to the [Report on Limiting Climate Change and Its Impacts: An Integrated Approach for Romania](#), published in 2022 by the Presidential Administration under Klaus Iohannis, “amplifying investments is a necessary condition and a priority for Romania's development within the EU and NATO, as well as in the process of accession to the OECD. However, well-intentioned but misallocated financial resources can create more problems than solutions. As a result, public policies must be based on realities, up-to-date scientific knowledge, competence, and efficient management.”

In this context, a working group of over 40 experts was established to address climate change challenges. Despite governmental changes in recent years, the trends and progress towards national climate targets have not been significantly impacted. Strategies and policies that reflect European and international commitments or serve as prerequisites for funding have been approved. An Interministerial Committee on Climate Change (ICCC) was established at the government level in 2022 to strengthen coordination further. This committee is tasked with defining priorities and providing recommendations for sustainable and climate-neutral development.

The main strategic documents and policies addressing mitigation and adaptation have been updated since 2020 to ensure the integration of the objectives of the European Green Deal and the new European climate strategies, while also adapting to the post-pandemic period and the current conflict in Ukraine. The initial implementation and evaluation deadlines are often set for 2025, followed by 2030 as a key milestone for achieving more ambitious targets. By 2030, at the latest, all mitigation and adaptation policies are expected to be updated.

In the long term, 2040 serves as an intermediate checkpoint for implementation, while 2050 is highlighted in most strategic documents as the target year for achieving national climate neutrality. The established targets are continually updated through various documents. For instance, the updated NECP improves the net emissions reduction target for 2030 by 7% compared to the LTS adopted in 2023.

13.2.3 Mitigation strategy

The first component in Romania focuses on the mitigation of climate change through the decarbonisation of sectors that are net producers of greenhouse gas emissions and improving emissions sinking capacity. The cornerstone of the current approach of Romania's mitigation policy is contained in two main documents:

- Romania's Long-term Strategy to reduce greenhouse gas emissions - Neutral Romania (LTS)
- Integrated National Energy and Climate Change Plan (NECP)

LTS outlines efforts to develop a structured approach to climate change mitigation, aiming to reduce, as already stated, net greenhouse gas emissions by 99% and attain climate neutrality by 2050. This strategy “aligns with Romania's commitment to the EU Green Deal and the Paris Agreement, reflecting its dedication to global climate objectives”.

The strategy focuses on six key emission-source sectors: energy, transport, industry, buildings, agriculture, and waste. Its envisioned pathway, known as “Neutral Romania,” prioritises the integration of renewable energy, sustainable land use practices, and improved energy efficiency. Furthermore, it includes provisions for advancing carbon capture and storage (CCS) technologies, promoting afforestation, and transitioning industrial activities to comply with low-carbon standards. Through these measures, the government aims to establish a sustainable and resilient low-carbon economy.

NECP serves as a roadmap and aims to align the energy and climate policies with the new EU objectives and regulations. It focuses on five key dimensions: (i) decarbonisation, (2) energy efficiency, (iii) energy security, (iv) internal energy market development, and (v) research and innovation. The Plan has been already updated, and the revised form was approved and reported to the European Commission in October 2024. It sets ambitious targets to reduce net emissions by 85% by 2030 compared to 1990 levels and to increase the share of renewable energy to 38.3% of final energy consumption. It also emphasises a just transition, aiming to establish a framework for promoting socially equitable policies, an issue insufficiently covered in the previous forms. These include alleviating energy poverty, ensuring affordability for consumers, and creating new jobs. By investing in sustainable energy projects, NECP seeks to enhance the quality of life and foster a more inclusive and sustainable energy future.

In addition to these, there are sectoral policies with a strong climate-related component and designed to support climate change mitigation:

- National Strategy for the Sustainable Development of Romania
- National Forestry Strategy 2030
- General Transport Master Plan of Romania

- National policy framework for the market development of alternative fuels in the transport sector and the installation of the relevant infrastructure in Romania
- National Strategy for Circular Economy (SNEC)
- National Long-Term Renovation Strategy
- National Strategy for Agriculture and Rural Development
- Strategy for the medium- and long-term development of the agri-food sector 2020 – 2030.

Key policy areas in Romania are linked to mitigation efforts, providing opportunities to reduce GHG emissions while advancing sustainability goals. The circular economy plays a central role in these efforts by promoting resource efficiency and minimising waste-related emissions. The National Circular Economy Strategy aligns with EU directives, encouraging a transition from linear production models to sustainable practices.

Protecting and restoring ecosystems like wetlands and forests enhances carbon sequestration while reducing emissions from land degradation. The National Strategy for Sustainable Development 2030 emphasises the relevance of safeguarding these natural carbon sinks and improving sink capacity, while other sectoral strategies address environmental protection in the context of climate change. Romania's forestry sector, guided by the National Forestry Plan 2030, focuses on sustainable forest management and reforestation as crucial actions in the mitigation process. The National Biodiversity Strategy was approved in 2014 and has not been updated and aligned with the new challenges and strategic context. National policies on protected areas and species as well as territorial policies should ensure the protection of biodiversity and habitats with high carbon storage capacity. Nature-based solutions are also cross-sectoral and improve the mitigation-biodiversity linkages.

The green building sector is guided by the National Long-Term Renovation Strategy (adopted in 2020) and Nearly Zero-Energy Building (NZEB) standards. These regulations seek to improve energy efficiency in the construction and building industries, thereby lowering emissions from heating, cooling, and electricity use. Expanding retrofitting programs and encouraging the use of sustainable materials are the main actions promoted to sustain deeper emission reductions.

Sustainable food production policies aim to reduce agricultural emissions, accounting for a significant share of GHG emissions in Romania. The National Strategy for Agriculture and Rural Development, together with the Medium and Long-Term Development Strategy for the Agri-Food Sector 2020-2030, promotes practices such as agroforestry, organic farming and reduced use of chemicals and pollutants. These practices not only reduce emissions but also improve soil health and resilience. However, aligning agricultural subsidies with sustainable practices remains a

challenge as traditional intensive farming methods continue to receive substantial financial support.

13.2.4 Adaptation strategy

Romania's adaptation action and its approach are outlined in the new Climate Change Adaptation Strategy for 2030, with a perspective towards 2050. Adopted in August 2024 through a government decision, the strategy aligns with Article 7 of the Paris Agreement (2015) concerning the *global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change*, and EU regulations and directives on climate adaptation and environmental protection. Its implementation is expected to be carried out through the dedicated action plan.

The strategy's development was based on a study of observed climate patterns and their projected evolution until 2050. It highlighted rising national temperatures and extreme weather events increasing intensity and frequency. Using sectoral impact analyses, the strategy established adaptation objectives and defined strategic directions for achieving them. The adaptation strategy aligns with key national policies across, as already stated, 13 sectors. These sectors are:

- Water management
- Forest
- Biodiversity
- Public health and air quality
- Education and Awareness
- Cultural Heritage
- Settlements
- Agriculture
- Energy
- Transport
- Tourism
- Industry
- Insurance.

The stated political vision focuses on “improving adaptive capacity and enhancing the resilience of socio-economic and natural systems to the impacts of climate variability and change across various regions and timeframes, facilitating Romania's transition to a sustainable, low-carbon economy.”

The Action Plan outlines specific actions designed to guide the adaptation process across various programs. Of the 327 total actions, 182 (56%) are non-structural or “soft” actions, focusing on policy, awareness, and capacity-building. Another 112 actions (34%) adopt an ecosystem-based or “green” approach, leveraging nature-based solutions to enhance resilience. Finally, 33 actions (10%) are classified as “grey,” involving infrastructural or engineered solutions. The plan includes both local or targeted actions

aimed at improving adaptive capacity in specific areas, as well as broader actions designed for national implementation, addressing sector-specific and cross-sectoral needs.

Among the 13 key sectors (mentioned above), 12 were included in the previous strategy adopted in 2016, with cultural heritage added as a new sector.

Not covered in the comprehensive adaptation strategy, disaster risk reduction related to climate change has been addressed through a dedicated National Disaster Risk Reduction Strategy adopted for 2023–2035. This strategy outlines Romania's vision to ensure disaster resilience through proactive, multisectoral, multi-hazard actions, and a whole-of-society approach, aligning with the Sendai Framework for Disaster Risk Reduction. Four action priorities are set for implementation: (i) improving the knowledge and awareness, (ii) increasing the capacity of public administration authorities to manage risks, (iii) encouraging investments in structural and non-structural measures, (iv) strengthening the preparedness of response forces and all actors involved.

The National Strategy for Sustainable Development (NSSD) adopted in 2018 is the main document encompassing transition efforts on the economic, social and environmental pillars. It defines broad directions for combating the effects of climate change and adapting to its impacts, including ecosystem conservation, wetland restoration, and the rehabilitation of degraded land.

The National Forestry Strategy 2030 emphasises sustainable forest management and reforestation, recognising forests as vital to Romania's adaptation efforts. Expanding riparian forests and integrating forest management with biodiversity and water management policies could significantly improve resilience to climate-related risks such as flash floods and droughts. Biodiversity adaptation is addressed primarily within broader strategies, alongside specific legislation on protected areas and species, aligned with EU directives.

To support regions heavily impacted by decarbonisation actions, such as the coal-dependent area – Valea Jiului situated in the south-west of Romania, Territorial Just Transition Plans and the Social Climate Fund have been introduced in line with EU policies. These measures aim to mitigate socioeconomic challenges while fostering a fair transition. The approval of the National Social Climate Plan is also underway, seeking to ensure a just transition that incorporates adaptation and social inclusion measures.

Agriculture faces increasing threats from rising temperatures and extreme weather events. Two pivotal strategies guide national efforts in this area: the National Strategy for Agriculture and Rural Development 2021–2030 and the Strategy for the Development of the Agri-Food Sector 2020–2030. These strategies promote adaptive practices such as agroforestry, drought-resistant crops, and precision irrigation. To support adaptation policies and

achieve resilience and sustainability objectives, the National Rural Development Program has been established. This is the main financial instrument to promote sustainable agriculture with a budget of € 3.26 billion for the period 2021 - 2027.

For the water management sector, Romania's National Strategy for Flood Risk Management outlines essential measures to enhance resilience. These include upgrading flood monitoring systems, reinforcing defence infrastructure, and reducing the vulnerability of critical assets. Climate Change Adaptation Strategy recognises the growing challenges posed by drought. As the National Strategy on Preventing and Combating Desertification and Land Degradation 2030 is still in the process of approval, drought adaptation measures are addressed at the sectoral level in specific policies (e.g., energy and agriculture). The government has developed instruments to mitigate the negative economic effects of drought through direct grants offered to directly affect actors.

13.3. The Governance Framework

The governance framework of M&A in Romania can be established and reported by identifying and presenting the actors involved in coordinating, implementing, and monitoring policies and the decision-making process. The policy documents and regulations in force directly indicate the institutions and actors involved in these processes.

The main body with a role in climate change policymaking at the national level is the Government, i.e., the relevant ministries, especially the Ministry of Environment, Waters and Forests. The government ensures an overarching perspective on mitigation, adaptation, and sustainable development efforts beyond the sectoral level. In 2017, the Department for Sustainable Development (DSD) was established within the government's working structure and under the authority of the Prime Minister. This department coordinates the implementation of the 17 Sustainable Development Goals (SDGs), with responsibilities for implementing, monitoring, and reporting. It evaluates and intervenes in relevant policies concerning SDG 13 and other adaptation and mitigation actions.

Furthermore, to support climate change policies and establish annual priorities in adaptation, mitigation, and energy transition, the government established the Inter-ministerial Committee on Climate Change (ICCC) in April 2022. This consultative body was operationalised as a milestone within the National Recovery and Resilience Plan (NRRP). Chaired by the Prime Minister, the committee brings together representatives of institutions responsible for designing and implementing climate policies at the national level.

The institutions represented are:

- Presidential Administration (through the Department of Climate and Sustainability)
- Prime Minister's Chancellery
- General Secretariat of the Government
- Department for Sustainable Development
- Line Ministries
- National Meteorological Administration
- National Institute of Statistics
- National Commission for Strategy and Forecasting.

ICCC has the following responsibilities, as outlined in the government decision establishing it:

1. Policy Alignment – analyse and propose solutions to ensure the alignment of sectoral policies that impact climate change, as proposed by the relevant ministries, with national commitments to the European Union, the United Nations, and other international organisations.
2. Annual Climate Policy Priorities – analyse, monitor, and propose annual priority policies in the field of climate change.
3. Implementation Monitoring - analyse, monitor, and evaluate the degree of implementation of climate change measures.
4. Strategic Guidance – propose strategic orientations for climate policies.
5. Policy Oversight – analyse and monitor the process of drafting and implementing climate-relevant policies by the responsible institutions across various sectors.

Under the authority of the Prime Minister, the General Secretariat of the Government (GSG) is led by the Secretary-General with ministerial rank and holds direct responsibilities for the technical and strategic operations related to governance and national policies. According to the government decision regulating its organisation, operation, and responsibilities, the GSG is tasked with monitoring and evaluating the implementation of measures assigned to national authorities and institutions responsible for climate change. The aim is to ensure coherence with the objective of climate neutrality established at the European Union level, under the provisions of Regulation (EU) 1.119/2021, which sets the framework for achieving climate neutrality (the “European Climate Law”). Additionally, as part of its obligations under the National Recovery and Resilience Plan (NRRP), the GSG periodically reports to the European Commission on the progress of implemented measures.

The Ministry of Environment, Waters, and Forests (MEWF) is the primary governmental body responsible for developing national policies on environmental protection and climate change. MEWF plays a crucial role in integrating environmental requirements, including mitigation and adaptation components, into other sectoral policies in alignment with European and international standards. Additionally, MEWF is tasked with

monitoring the implementation and coordinating the updates of national strategies directly focused on mitigation and adaptation, such as the National Adaptation Strategy and the Long-Term Strategy for Emission Reduction. The ministry is required to work closely with the governmental structures mentioned earlier, as well as with sectoral ministries, to ensure effective coordination of climate change efforts.

Under the coordination of the Ministry of Environment, Waters, and Forests (MEWF), the Environmental Fund Administration (EFA) manages programmes financed by the national environmental fund. This public fund is part of the state's consolidated budget, with its sources established by law. EFA supports the financing of 26 categories of national projects and programmes aimed at promoting Romania's sustainable development, including climate action initiatives.

The primary areas eligible for financing from the environmental fund include:

- Reducing greenhouse gas emissions,
- Ecological restoration and sustainable forest management,
- Afforestation of degraded lands,
- Works to prevent, mitigate, or eliminate the effects of hazardous weather events, and
- Increasing renewable energy production.

EFA administers Romania's most extensive national financing mechanism for climate action projects. Eligible beneficiaries of the fund include economic operators, local and national public institutions, private individuals, development associations, research and development institutes, and other sectoral entities.

13.4. The Main Dynamic Aspects of the Strategies

Since the political regime change in 1990, Romania has significantly reduced greenhouse gas emissions, primarily due to the closure of highly polluting communist industries. These reductions have created a favourable national context for addressing upcoming environmental and climate objectives and advancing related efforts (Iorga, 2021). Subsequently, mitigation and adaptation efforts have increasingly been incorporated into national strategies and legislation, with objectives aligning with obligations stemming from the Kyoto Protocol, the Paris Agreement, and accession to the European Union.

Romania's climate change objectives and actions have followed an upward trajectory, particularly since the country's accession to the European Union. After 2020, an acceleration in establishing strategic and political direction at the national level can be observed. The need to align with new European targets, as outlined in the European Green Deal, the European Climate Law,

and the EU Adaptation Strategy, has driven significant changes in national policies.

Additionally, the National Recovery and Resilience Plan (NRRP), which prioritises the green transition and sustainable growth, mandates a series of reforms aimed at improving the capacity to implement these national policies effectively. This alignment underscores Romania's commitment to contributing to the EU's climate objectives while advancing its domestic strategies for a low-carbon and resilient future.

However, an analysis of the barriers and challenges to the implementation of mitigation and adaptation strategies reveals several issues:

- Funding limitations – climate adaptation strategies require substantial funding, yet budget constraints at the national and local levels hinder implementation
- Lack of technical and institutional capacity and expertise gaps
- Public Awareness and Engagement Deficits
- Lack of Cross-Ministerial Accountability
- Complexities and gaps in Policy Coherence
- Lack of political will and frequent governmental changes

13.5. A First Assessment of the Effectiveness of the Strategies

Few studies explicitly analyse the effectiveness of environmental policies ([Sechel & Mariasiu, 2021](#); [Radulescu et al., 2017](#); [Zamfir et al., 2016](#)), and the monitoring and evaluation of policies have largely been inadequate. The main strategies currently in force, addressing mitigation and adaptation, were adopted or updated after 2023 and target 2030, making it too early to evaluate their effectiveness and implementation comprehensively. However, assessing preceding strategies and intermediate data provides a suitable picture of the progress towards achieving these objectives.

The Long-Term Strategy for Reducing Greenhouse Gas Emissions, which aims to achieve climate neutrality by 2050, approved, as stated above, in November 2023, also enabled Romania to resolve an infringement procedure initiated in 2022 by the European Commission for failing to submit its Long-Term Strategy. In the LTS, three scenarios are analysed: the Reference Scenario, the Middle Scenario, and the Climate Neutral Romania Scenario, the latter being selected for implementation by 2050.

According to the Long-Term Strategy background data, “emissions were reduced by 62% in 2019 compared to 1990 levels, and a reduction of 73% is expected by 2025” (LTS, p 12). At the sectoral level, there have been considerable differences in emission trends over the past three decades. “The energy sector recorded a net emissions reduction of 69% in 2019, whereas the transport sector experienced a 52% increase. Additionally, emissions from the buildings and waste sectors rose by 9% and 17%,

respectively, while the industry and agriculture sectors recorded decreases” (LTS, p 13).

However, the pace of emissions reduction has slowed in recent years, reflecting structural challenges and external influences such as the COVID-19 pandemic. Notably, emissions saw an uptick between 2020 and 2021, emphasising the need for sustained and accelerated efforts (World Bank, 2023).

The renewable energy sector has been a cornerstone of Romania’s mitigation strategy. Currently, “64% of the country’s electricity generation comes from renewable and nuclear sources, with only 36% dependent on fossil fuels”. Coal power generation is scheduled to be completely phased out by 2032 but conflict in Ukraine puts additional pressure on the national energy system, and its share in the energy mix had to be stabilised again. In these conditions, diversifying and balancing the energy mix is crucial for replacing coal.

In the building sector, progress has been slower. “Renovation rates for energy efficiency remain low, at only 0.5% of the building stock per year”. However, Romania has plans to scale this up significantly, aiming for a 3.39% annual renovation rate by 2030. This increase aligns with the EU’s strategy to improve building energy performance. Achieving these goals will require an estimated €12.8 billion in investments by 2030, with the funding coming from both public and private sources. To support the energy efficiency of buildings, the “Valul Renovării” (Renovation Wave) component was included in the National Recovery and Resilience Plan, with an allocated budget of €2.2 billion. Green building policies, guided by the National Long-Term Renovation Strategy and NZEB standards, prioritise energy efficiency, often neglecting adaptation measures. Current policies prioritise new construction, leaving older urban infrastructure vulnerable to climate risks. Local programs to retrofit urban buildings are not yet providing resilience improvements on a national scale.

The transport sector represents a major hurdle. Emissions in this sector have risen by “50% since 2005, now accounting for 17% of the country’s total emissions” (STL, p 13). Most of these emissions, 96%, come from road transport. Efforts are underway to address this challenge by promoting rail transport, accelerating the adoption of electric vehicles, and improving the overall transport infrastructure, including charging infrastructure. Although there is positive progress towards decarbonising transport and achieving long-term objectives, the World Bank report highlights the likelihood of continued emissions growth and the need for more substantial investments and policies. There is no integrated transport strategy in place, and the comprehensive transport master plan has yet to be updated and aligned with current needs.

The estimated funding required for climate mitigation amounts to \$356 billion by 2050, with an additional \$160 billion needed for adaptation. While EU funds and public investments are essential, the private sector’s role in

mobilising green finance is equally critical. Creating an enabling environment for private investment remains a pressing challenge for the country. In February 2024, Romania issued a €2 billion sovereign green bond, the largest such bond by an emerging market. This twelve-year bond attracted significant investor interest, with 45% allocated to those with green or ESG (Environmental, Social, and Governance) mandates. It also provided domestic investors an opportunity to engage in green financing, addressing the underrepresentation of green assets in Romania's financial sector, where such assets currently make up just 3% of bank portfolios, far below the euro area average³⁶.

Public awareness and participation also play a significant role in Romania's climate efforts. [Climate change ranks among the top socioeconomic concerns for Romanian citizens](#), with over 40% expressing willingness to financially support climate initiatives and 48% perceiving that climate change will negatively impact their lives. This level of public engagement provides a strong foundation for implementing policies and reforms. Local efforts on climate action do not match the level of public interest, as these issues are often marginal on local agendas. However, national obligations or adherence to the Covenant of Mayors often lead to improvements in the approach.

Despite progress, significant challenges remain in key areas. The energy transition relies on large-scale electrification, particularly in transport and heating currently based on fossil fuels and biomass. Agriculture and water management also face substantial vulnerabilities due to climate variability. The agricultural sector, while economically significant, has shown limited adaptive capacity, and the increasing risks of water scarcity and flooding require urgent implementation of integrated water resource management.

A report published in 2024 by the [think tank Energy Policy Group](#) highlights several gaps in NECP that jeopardise the achievement of its objectives, as follows:

- Lack of detailed implementation plans and mechanisms, and specific sectoral measures
- Inadequate use of renewable energy in industry and buildings
- Insufficient details on the decarbonisation of the transport sector
- Failure to fully comply with the requirements of the Energy Efficiency Directive (EED) and the targets of the Renewable Energy Directive (RED III)
- Lack of ambition in long-term renovation strategies and overall emissions reductions
- Absence of plans to reduce gas consumption and improve energy storage

³⁶ Reuters. (2024, February 15). *Romania starts selling its debut green bond*. Retrieved from <https://www.reuters.com/sustainability/sustainable-finance-reporting/romania-starts-selling-its-debut-green-bond-2024-02-15/>

- Lack of concrete measures to support research and innovation in renewable energy technology and adaptation to climate change.

Protecting ecosystems like wetlands and forests enhances carbon sequestration while reducing flood and drought risks. Despite the demonstrated importance of the protecting ecosystems policies, these policies suffer from weak enforcement and inadequate funding, particularly in biodiversity-rich areas such as Natura 2000 sites. Furthermore, the disconnect between conservation strategies and urban planning reduces their ability to address climate risks in developing regions.

The NECP fails to address adaptation policies across all relevant dimensions of the Energy Union. It lacks a comprehensive analysis of climate vulnerabilities and associated risks that could impact the achievement of national objectives, targets, and contributions. Furthermore, it does not adequately outline policies and measures within the individual dimensions of the Energy Union. [The connection between adaptation policies and specific Energy Union objectives and policies](#), including the support they should provide, is neither specified nor quantified.

A preliminary analysis assessing the outcomes of the National Climate Change Strategy 2016–2020 was conducted under the national project “Strengthening Institutional Capacity to Improve Climate Change Policies and Adaptation to Climate Change Effects”, which finalised with the adoption of the National Climate Change Adaptation Strategy.

The degree of achievement of the strategy’s objectives was found to be unsatisfactory across all key sectors. Only about 16 out of 147 measures can be reported as completed. Some measures were partially implemented, while certain objectives were partially met through unspecified actions outside the original plan. Additionally, the analysis highlighted the lack of clear monitoring mechanisms and the absence of updated data necessary to evaluate the effectiveness of the actions taken.

Initiatives for disaster risk management and urban climate adaptation are underway, including measures to address urban heat island effects. Moreover, economic modelling suggests that the transition to a low-carbon economy will have a minimal impact on GDP, with a projected loss of just 2% by 2050 compared to a business-as-usual scenario. Romania’s external competitiveness is expected to remain stable, supported by its alignment with EU policies.

For evaluating the implementation of the SDGs at the national level, the Department for Sustainable Development in collaboration with the National Institute of Statistics, has developed a set of 98 national indicators [to monitor progress towards the SDGs](#). This framework enables systematic tracking and reporting on the implementation of sustainable development policies. Romania has also participated in Voluntary National Reviews

(VNRs) in 2018 and 2023, presenting its progress and challenges in achieving the SDGs at the United Nations High-Level Political Forum.

According to the 2023 VNR, Romania has made significant advancements in several areas such as poverty reduction, quality education, and economic growth. In line with SDG 7 related to clean energy, the increase of the renewable energy share in the national energy mix, contributing to energy sustainability has already been stressed.

Despite these achievements, ongoing challenges related to SDG 13 Climate Action are faced and the mitigation and adaptation strategies should be strengthened. The government has sought to address this by adopting two key strategies: the long-term emissions reduction strategy and the adaptation strategy.

In March 2024, the Government approved the Romanian Sustainability Code through Decision no. 1.117/2023. This initiative aims to enhance transparency and comparability in sustainability reporting, providing stakeholders with a clearer understanding of sustainability requirements and offering a free-of-charge reporting platform.

Romania has undertaken significant steps to transition from a linear to a circular economic model through the implementation of its National Strategy for the Circular Economy (NSCE). Adopted in September 2022, the NSCE serves as a comprehensive roadmap to accelerate this transition, aligning with the Sustainable Development Goals of the United Nations' 2030 Agenda.

Since the adoption of the NSCE and its accompanying action plan, Romania has initiated [several measures to promote circular practices](#).

- **Deposit Return System (DRS):** Launched in November 2023, the DRS has significantly enhanced recycling efforts. Within its first year, over 3 billion containers were collected, achieving a monthly collection rate of 84% by October 2024 (according to the data provided on the program-dedicated website).
- **Corporate Engagement:** A 2023 study conducted by the European Court of Auditors revealed that “67% of Romanian companies anticipate a substantial increase in the impact of circular economy regulations over the next five years. Additionally, 59% have developed or are in the advanced stages of formulating circular economy strategies, focusing on energy transition, emissions accounting, product lifecycle extension, and resource optimisation”.

Despite the measures already implemented at the national level, progress in sectors such as packaging, waste, textiles, or construction is rather unsatisfactory.

13.6. Other Aspects that each partner considers important

This report is based on policies implemented and in force as of November 2024. Regardless of the general orientations of governments in recent years, no significant differences or deviations can be observed in the approach or stance on climate policies. Consequently, no major changes are expected at the national level in the short term, with political shifts being much more pronounced at the local level.

However, debates remain highly active regarding the decarbonisation of the energy sector, the use of fossil fuels, and the exploitation of coal and of natural gas from the Black Sea. These discussions, alongside securing funding sources and improving the capacity to implement policies and projects, will be critical in the coming years.

14. UNITED KINGDOM

14.1. Introduction

The UK approach to tackling and responding to climate change is based on the Climate Change Act of 2008. This act requires that emissions of carbon dioxide and other greenhouse gases are reduced and that climate change risks are adapted to. The [Act also establishes the framework to deliver on these requirements](#). The Act supports the UK's commitment to urgent international action to tackle climate change. [The text approved in 2008 has been revised](#).

It is worth stressing that the UK government recently changed (July 2024), and, probably – in the next future –, policy orientation on energy matters will change according to the new overall political orientation of the new prime minister and his cabinet. What follows, therefore, is based on the documents available until the end October 2024 and what is reported are the structural aspects of the UK policies on Climate change, i.e., those that are not deemed to change.

14.2. The strategies of mitigation and adaptation being carried out

14.2.1 Objectives

According to the current official communication of the UK government, “The Climate Change Act (CCA) commits the UK government by law to reducing greenhouse gas emissions by at least 100% of 1990 levels (net zero) by 2050. This includes reducing emissions from the devolved administrations (Scotland, Wales and Northern Ireland), which currently account for about 20% of the UK's emissions. The 100% target was based on advice from the Committee on Climate Change (CCC) 2019 report, [‘Net Zero – The UK's contribution to stopping global warming’](#)”.

The [legal definition of net zero](#) in the CCA of 2008 implies that it “(...) can be achieved through reducing emissions as well as offsetting greenhouse gases, such as planting trees or using carbon capture and storage technologies. This would mean that total greenhouse gas emissions produced would be equal to greenhouse gas equivalents removed from the environment.”

As is often the case, there are two strands of Climate Change policy (CCP). “The CCA 2008 is the basis for the UK's approach to tackling and responding to climate change. It requires that emissions of carbon dioxide and other greenhouse gases are reduced and that [climate change risks are adapted to](#).”

The two strands of CCP, Mitigation and Adaptation (M&A), have their specific objectives and their related strategies and actions which cover matters not devolved to national authorities and England. Each devolved administration, in turn, has its own M&A strategies and plans.

As a rule, Mitigation implies the attainment of the above-mentioned objectives in terms of greenhouse gases (GHG) emissions. More, the CCA “requires the government to set legally-binding ‘carbon budgets’ to act as stepping stones towards the 2050 target. A carbon budget is a cap on the amount of GHG emitted in the UK over five years. Budgets must be set at least 12 years in advance to allow policymakers, businesses and individuals enough time to prepare. (...) Once a carbon budget has been set, the CCA places an obligation on the Government to prepare policies to ensure the budget is met.”

Adaptation, on the other hand, is focused on the management of risks generated by Climate Change. “The CCA requires the UK Government to produce a UK Climate Change Risk Assessment (CCRA) every five years. The CCRA assesses current and future risks to and opportunities for the UK from climate change. In response to the CCRA, the CCA also requires the UK government to produce a National Adaptation Programme (NAP). The NAP covers England, while the devolved administrations produce their own programmes and policies. The Act also gives powers to the UK Government to require certain organisations to report on how they are adapting to climate change. This is called the Adaptation Reporting Power.” It is worth stressing here that the NAP “covers England and reserved matters, [it] must set out the UK government’s objectives, proposals and 7 policies for responding to the risks identified in the CCRA”.

14.2.2 Rationale and Timeframe

The UK Government is the actor who has the main responsibility – according to the CCA - of defining and implementing the CCP in the UK. The new UK government will probably change significantly CCP. It is useful, anyhow, to present the main characteristics of the policies currently in force, at least as a benchmark once the new ones are launched.

According to the Research Briefing of the House of Commons Library, “The UK's Plans and Progress to Reach Net Zero by 2050” issued on 14 November 2023, “the UK is committed to reaching net zero by 2050. This means that the total GHG emissions would equal the emissions removed from the atmosphere, aiming to limit global warming and resultant climate change. The UK Government has adopted a suite of policies in order to reach net zero, set out in two strategy publications, the Net Zero Strategy (2021) and Powering Up Britain: The Net Zero Growth Plan (2023)”.

The Boris Johnson government policies, later confirmed by the following cabinets, were based on the idea that Climate Change is a big menace that is already producing damages that are going to increase, that the

challenge it represents can be addressed, and that doing it represents an economic opportunity.

14.2.3. Mitigation strategy in UK

The first strand of UK policy concerns Mitigation. At the moment, the main policy documents presenting this policy are:

1. [Net Zero Strategy](#), October 2021
2. Powering Up Britain - the Net Zero Growth Plan March 2023
3. Powering Up Britain - Energy Security Plan March 2023
4. [Carbon budget Delivery plan](#), March 2023.

The cornerstone of the current approach of UK CCP, especially for what concerns mitigation, is contained in the first document, the Net Zero Strategy (Build Back Greener) which was published on 19 October 2021 and last updated in April 2022. “It sets out policies and proposals for decarbonising all sectors of the UK economy to meet the government’s net zero target by 2050. The Net Zero Strategy builds on wider government policy, such as the ten-point plan for a green industrial revolution which was published on 18 November 2020”³⁷. The others are the important complements defined to keep up with the big challenges to the energy supply system due to recent developments (e.g., Russia-Ukraine war).

The Net Zero Strategy document defines the principles of the Climate change policies, mainly for what concerns mitigation, followed by the UK government in the last years. Even if they will probably be changed in depth by the new government initiatives that will be undertaken soon, it is useful to outline them.

It is recognized the relevance of the IPCC report and, particularly, [the conclusion](#) that “if we fail to limit global warming to 1.5°C above pre-industrial levels, the floods and fires we have seen around the world this year will get more frequent and more fierce, crops will be more likely to fail, and sea levels will rise driving mass migration as millions are forced from their homes. (...) But the good news is that there is, still, a path to avoid catastrophic climate change. The science could not be clearer (...)”

The approach is market friendly. The strategy is based on the recognition that contrasting climate change is worth being done “not just because it is the right thing to do, but because we are determined to seize the unprecedented [economic opportunity](#) it brings”. The idea is that “Removing dirty fossil fuels will require the [transformation of every sector of the global economy](#)” and this implies a reduction of costs in the long run. “(...) We have shown the world that green and growth go hand in hand, and as a result [other countries are already following](#) our lead with their own net zero targets.”

³⁷ Burnett N., Hinson S., Stewart I. (2024), “The UK’s plans and progress to reach net zero by 2050”, Research Briefing 26 September 2024, The House of Commons Library <https://researchbriefings.files.parliament.uk/documents/CBP-9888/CBP-9888.pdf>

The issue becomes how to fund the “costs to the investments needed to make this transition happen”. The approach to action is, therefore, based on the following four principles:

1. Work with the grain of consumer choice: no one will be required to rip out their existing boiler or scrap their current car
2. Ensure the biggest polluters pay the most for the transition through fair carbon pricing
3. Ensure that the most vulnerable are protected through Government support in the form of energy bill discounts, energy efficiency upgrades, and more
4. Work with businesses to continue delivering deep cost reductions in low-carbon tech through support for the latest state-of-the-art kit to bring down costs for consumers and deliver benefits for businesses.

The Net Zero Strategy is based on achieving the objectives stated in the Carbon budgets. How to do this is presented according to the economy’s sectors (in the appendix to this chapter the sectoral policies that were foreseen by the strategy are briefly presented in a dedicated table).

The CCP, in the next future, will change accordingly to the decisions of the new UK government, who announced recently, as for CCP, the launch of five bills which are relevant for the energy sector:

- Great British Energy Bill: “a Bill will be introduced to set up Great British Energy, a publicly owned clean power company headquartered in Scotland, which will help accelerate investment in renewable energy such as offshore wind”
- National Wealth Fund Bill: a bill to establish the National Wealth Fund, which will be capitalised with an “additional” £7.3 billion and make “transformative investments across every part of the country”
- Planning and Infrastructure Bill: a bill to reform the planning system, intended to speed up housebuilding and the delivery of major infrastructure projects, including renewable energy infrastructure projects
- Crown Estate Bill: a bill to modernise the Crown Estate by removing “outdated restrictions” on its activities, giving it the powers to borrow in order to invest at a faster pace. This will include “vital marine investment” needed to accelerate and quadruple offshore wind capacity by 2030
- Sustainable Aviation Fuel Bill: a bill to create a revenue certainty mechanism for building sustainable aviation fuel (SAF) manufacturing plants in the UK.

14.2.4 Mitigation for the devolved administrations

Mitigation policies are implemented differently in the devolved administrations. In the rest of the paragraph, some aspects of the process going on at the local level are briefly described. In this framework, it should be stressed that “policies are partly reserved to the UK government and

partly devolved. Therefore [the above-described Net Zero strategy], presents both [England-specific and UK-wide policies and plans](#), which highlight government’s work to collaborate with devolved administrations to deliver coordinated policy action”.

The Scottish Government has not issued a Climate change plan up to the moment we are writing (it was, anyhow, produced a new version of the Adaptation plan, see below). Anyhow, on 18 April 2024, just after the release of the CCC’s assessment report, it announced an “accelerated [package of new climate action measures](#)“ that totally or partially accepted the 15 recommendations given by the CCC, which criticized the implementation status of the Scottish plan. In terms of the approach to mitigation policy, it is worth stressing the orientation to guarantee that the “climate change framework (...) reflects the reality of long-term climate policymaking” (basically through annual reporting and the introduction of five-yearly carbon budgets). It is important to stress also [the principle of “Just transition”](#) so to address properly the fact the “some people and places in Scotland will be affected by climate change impacts worse than others”.

The CCC published, in June 2023, the “[Progress report: reducing emissions in Wales](#)“. It was the last document available concerning mitigation policies in general in Wales. The overall comment provided by the CCC is that “While the First Carbon Budget (2016-2020) has been achieved, [Wales is not yet on track](#) to meet its targets for the second half of this decade and beyond”. Interestingly, progress is slow as for the aspects of mitigation policies related to “areas where the Welsh Government has policy responsibility”.

In March 2023 the CCC published an “[Advice Report: the Path to a Net Zero Northern Ireland](#)“ consisting of an “advice to Northern Ireland on how the legislated target [on net-zero] might be reached, and on the levels for the 2030 and 2040 interim targets and the First (2023-2027), Second (2028-2032) and Third (2033-2037) [Carbon Budgets on the path to it](#)“. The report holds that resolute actions must be taken to achieve the Net-Zero-related objectives: “With emissions having reduced only an average of 9% per decade since 1990, [a step change in action is needed now](#)“. The CCC developed a “‘Stretch Ambition’ pathway that reaches a 93% reduction in emissions on 1990 levels by 2050” and [requires Northern Ireland to take stretching actions](#) to bolster the contribution of GHG removals and therefore balance some of the residual emissions from agriculture.”

14.2.5 Adaptation strategy in UK

The UK adaptation strategy is presented in the Third National Adaptation Programme (NAP3). In general, the NAPs set out how the government will address the risks identified in the CCRA and “[covers England and reserved matters](#)“. The UK government is currently in its [third statutory cycle](#) of national risk assessment and adaptation planning under the CCA 2008.

The “[UK] Government published the third National Adaptation Programme – NAP3 (Defra, 2023a) on 17th July 2023, which sets the actions that the Government and others will take to adapt to the impacts of climate change in the UK for the period 2023-2028. The actions in NAP3 seek to address the risks highlighted in the UK’s third Climate Change Risk Assessment – CCRA3 (Defra, 2022), which was informed by an independent assessment of UK climate risk (CCC, 2021a) and a supporting technical report and research projects (UK Climate Risk, 2021)”.

As for the Mitigation and climate change policies in general, also in this case changes are expected because of the different vision of the overall issue characterizing the new UK Government.

The UK government’s vision on adaptation that informs the current NAP3 “is for a country that effectively plans for and is fully adapted to the changing climate, with resilience against each of the identified climate risks.” It acknowledges “the need to take adaptation action”. The approach is defined as “comprehensive” since it responds “to every risk and opportunity in the Climate Change Risk Assessment” and its scope has widened to “responding to international risks impacting the UK” [the third Climate Change Risk Assessment (CCRA3)”]. The programme is focused on 3 main themes: “action”, “information” and “coordination”. These – according to the former UK government - combine to ensure a better-informed, more closely coordinated across government]t, and more action-focused delivery over the 5-year NAP period. It is also based on the assumption “the UK’s national and local government bodies continue to work closely together to tackle climate change at both national and local levels“. The actions are summarized in the NAP3 presentation document and concern the following domains:

- Infrastructure (including water, energy, transport, data, telecoms and ‘cascading risks’)
- Natural environment (including terrestrial and freshwater habitats and species, coastal and marine habitats and species, forests and peatlands, agriculture and soils)
- Health, communities and the built environment
- Business and industry (including people, physical assets and business operations)
- International impacts (including trade, food human mobility and violent conflict, law and governance, international financial and international health)
- Adaptation Reporting Power
- Supporting evidence.

It is stated in the presentation document, that “the NAP3 programme will continue to develop over the 5-year period. It will be underpinned by a programme of capability building and strong governance which will drive effective join-up across government and with our delivery partners, working together to realise our vision”.

14.2.6 Adaptation policies in devolved administrations

Scotland

In order to comply with its legal obligations and the substantive responsibility connected to adaptation, the Government of Scotland has recently released a “[Scottish National Adaptation Plan](#)”, after consultation with stakeholders according to a participatory approach (the public engagement principle). The plan foresees the implementation of a set of actions in order [to reach 5 general outcomes](#), each having its own objectives. Another important principle inspiring the plan is “[Just transition](#)” (see above).”. The plan foresees the implementation of a set of actions in order to reach 5 general outcomes, each having its own objectives. The [actions and policies foreseen in the next five years](#) are, among others (as listed in the presentation of the Scottish Adaptation Plan):

- Ensuring all parts of Scotland are building climate resilience through regional partnerships, local action and climate-resilient economies
- Improving flood warnings for businesses and communities across Scotland, and building rainwater networks in urban areas to manage flash flooding
- Encouraging behaviour change to help households and communities cope with both too much and too little water
- Strengthening our new national network of Climate Action Hubs and ensuring that the Hubs are supporting vulnerable communities to adapt
- Shifting half of all agricultural funding to be conditional on delivering for climate and nature, including climate adaptation
- Increasing Scotland’s railway resilience through investing approximately £400 million over the next five years, with multiple benefits for passengers
- Developing an investment plan that connects nature finance and adaptation outcomes, including a suite of actions to mobilise public, and responsible private and philanthropic finance supported by an expert taskforce
- Strengthening the skills and capacity of businesses, communities and organisations to adapt through the Adaptation Scotland programme
- Establishing the adaptation Scot online hub to help people access tools, resources and advice on adaptation action
- Delivering a suite of new tools and advice tailored for businesses, including a guide for Small and Medium-sized Enterprises (SMEs) and sector-specific tools to support entities most exposed to climate change impacts
- Leading the way in climate adaptation monitoring, publishing an adaptation monitoring and evaluation framework, supporting annual reporting to the Scottish Parliament and best practice both nationally and internationally in this emerging work

- Supporting connectivity and resilience of our island populations through fleet renewal of ferry services, with reducing weather-related disruption as a priority
- Delivering for international communities disproportionately affected by climate impacts through our £36 million Climate Justice Fund
- Delivering comprehensive climate resilience actions across NHS Scotland, including greening the NHS estate
- Working to improve long-term health outcomes for people, including Public Health Scotland delivering the Adverse Weather and Health Plan
- Protecting our cultural and historic heritage through improved adaptation actions for historic buildings
- Building the Public Sector Climate Adaptation Network, led by Adaptation Scotland, which provides opportunities for learning and best practice.

Wales

The last document presenting the adaptation situation in Wales was issued by the CCC in September 2023 and is titled “[Adapting to climate change. Progress in Wales](#)”. It holds that “there is a clear need for a more effective response to climate change in Wales” because of the recent and repeated damages produced such as flooding, heat wave, etc. 61 risks and opportunities have been identified for Wales concerning climate change that ask urgent actions. In 2024, a new adaptation plan is expected.

Northern Ireland

In 2024, the Northern Ireland Executive is expected to publish the new Northern Ireland Climate Change Adaptation Programme (NICCAP3). At the moment we are writing, NICCAP3 has not been published yet. What is available is the [CCC first adaptation progress report for Northern Ireland](#). The document provided a list of recommendations relative to the areas in which the adaptation policy must be implemented.

14.3. The governance framework

The governance framework of CCP in the UK can be presented through the description of the actors that are entitled to intervene in the policy making process, and with the related tools established by the CCA of 2008 (see above).

The main body that has a role in Climate Change policy making is the Government that acts through its departments. At the UK and national levels, it is important to highlight the role of the CCC. There are also the devolved administrations. Among the challenges that this governance framework addresses there is the overarching and not sectoral character of CCP. In this regard, it is stated, [as reported in official communications](#), that:

“Tackling the causes of climate change, and adapting to its impacts, touches on all aspects of the economy. The Government has created a Cabinet Committee on Climate Change chaired by the Prime Minister. This is supported by subcommittees to ensure climate change decision-making is across Government. It is for all government departments to include climate change within their thinking when making policy decisions”.

Within the administration, the two main UK government departments responsible for climate change are:

- Department for Energy Security and Net Zero (DESNZ) – leading on policy for reducing emissions (mitigation). DESNZ is responsible for ensuring secure energy and promoting action on climate change in the UK and internationally
- Department for Environment and Rural Affairs (Defra) – leading on domestic adaptation policy (adaptation). Defra is responsible for developing the National Adaptation Programme to address the risks set out in the most recent UK Climate Change Risk Assessment.

As stated in some official communication documents, “the governments and assemblies of the devolved administrations (Scotland, Wales and Northern Ireland) have the following duties:

- Create climate change policy for their devolved area
- Help to implement UK-wide policies.

As well as being covered by the Climate Change Act, Scotland, Wales and Northern Ireland have separate climate change policies.”

Climate change policies, therefore, need strong cooperation. It was, stressed, in relation to the achievement of Net-zero strategy, that “The powers needed (...) sit with the UK government (reserved powers) and the governments of Northern Ireland, Scotland and Wales (devolved powers)”. An example of what it means the territorialized governance of Climate Change policy can be done for what concerns mitigation and the reduction of emissions, one of the two strands of CCP. The diverse actors involved in implementing these policies interact in a complex way. As for what concerns emissions, such complexity is also because “the four nations [England, Scotland, Wales, and Northern Ireland] have different emissions profiles”. “This has led to different approaches in each nation, which will likely continue as the UK makes progress towards its net zero target. This means that each nation will contribute in different ways to reducing UK-wide emissions. It is important to ensure that the choices made by each nation, when considered collectively, provide an efficient path to achieving the UK net zero target, while at the same time achieving relevant targets for Northern Ireland, Scotland and Wales”.

Indeed “UK nations have set different targets for tackling climate change; the UK, Northern Ireland and Wales have set a target to achieve ‘net zero’ GHG emissions by 2050, whereas Scotland has a target to achieve this by 2045. Each nation has established a slightly different approach, including

differing combinations of budgets, targets and policies. In addition, each nation has different sector-specific arrangements underpinning its overall climate change goals“.

In this framework, it is stressed that “Achieving net zero in any one nation depends on UK-level action, and vice versa: The balance of reserved and devolved powers varies across the different sectors covered in the emission reduction targets. For example, UK-wide policy decisions will be critical in defining pathways towards decarbonising heating in buildings, such as on whether to pursue hydrogen or electrification (or both) as a fuel source, but this will need to be supplemented by action at a devolved level on issues such as planning and improving energy efficiency. Interdependencies also arise through financial decisions by the UK government affecting budgets of the devolved governments”. Consequently, it is stressed that “Effective working relationships and close engagement between the UK and devolved governments will be vital to achieving the overall aim of net zero“.

The Governance structure of UK Climate policy and implementation is hinged on the Committee on Climate Change (CCC) an independent expert body with an annual average budget whose members do not represent particular interest groups, but are chosen for their technical expertise).

The CCC is an example of how it is possible to pursue long-term policy objectives by strengthening evidence-based policymaking. The CCC applies the provisions of the CCA through counselling the UK government and devolved authorities. Averchenkova et al. (2018) list in the following way the roles and responsibilities of the CCC (including also statutory duties):

- “Recommend to Parliament appropriate emissions reduction targets (...) [recommended by the CCC and set by Parliament].
- Advise the Government on the risks and opportunities from climate change and evaluate its National Adaptation Programme.
- Monitor and assess progress on reducing emissions and on climate resilience. The CCC produces an annual progress report to Parliament, to which the Government has a statutory obligation to respond.
- Provide on-demand advice to the UK Government and the devolved administrations of Northern Ireland, Scotland and Wales on specific questions of climate policy. (...)”

The mechanism of CCC effectiveness as an actor in the policy-making process is described in the following way:

“The CCC does not have any formal powers to change the Government’s approach to climate policy. Instead, it relies on the political embarrassment that its assessments may cause and the threat of a judicial review brought about by environmental pressure groups if it fails to meet its statutory obligations under the CCA.”

CCC's achievements are the following.

- The CCC's statutory advice on carbon targets has generally been followed, albeit not always to the letter.
- The CCC has had more difficulty getting its broader policy recommendations accepted (many recommendations have not been taken up, but the CCC has had the possibility to stress the variances, creating a debate over policies' implementation).
- CCC analysis is used in Parliament to push for greater ambition.
- The CCC's advice reaches beyond carbon targets.

Another important actor of the governance structure of CCP in the UK is the judiciary. The documents "*Powering Up Britain - the Net Zero Growth Plan March 2023*", "*Powering Up Britain - the Net Zero Growth Plan March 2023*" and "*Carbon budget Delivery plan, March 2023*" have been released after a High Court judgment on the Net Zero Strategy on 18 July 2022 that determined that "the 2021 Net Zero Strategy to be 'unlawful' and 'inadequate' in meeting the 2050 net zero target and that it breached the requirements set out by the CCA 2008". The English High Court followed a claim brought by some [British environmentalist association Friends of the Earth, Client Earth and the Good Law Project](#).

The Judiciary's role, in this case, has been connected to that of civil society. Civil society actors, anyhow, are diverse and not only environmentalists. They are consulted for the definition of policies. It happened, for example, in the case of the Scottish adaptation plan, which was released after a participatory process (see below). Also, the UK plan for Net Zero strategy foresaw [various forms of consultation of stakeholders](#).

14.4. The main dynamic aspects of the strategies

The policies implemented at the UK and the devolved administration levels have changed in the last years based on the interaction among the various actors composing the Governance Framework briefly described above.

We could say that there are at least three basic sources of this dynamic: civil society, whose impact was evident in the case of the claim, that has a say also in the various consultation activities carried out by the government; politics, e.g., the change of government because of the political rotation connected to the electoral process and "tech-scientific source", as in the cases of intervention of the CCC.

At the moment we are writing, there have not been yet significant changes in the philosophy underlying CC policy, apart from those indicated above that concerned mainly specific objectives.

Finally, a monitoring system framework has been set up by the CCC for M&A policies. [They were released](#), respectively, in June 2022 and March 2023. The approach to monitoring adaptation is presented in this way: "(...) adaptation action in the UK needs to extend beyond risk assessment and planning to

include a stronger focus on delivery and implementation of adaptation actions. This requires an approach which centres on the desired adaptation outcomes, and a theory of change for how to achieve those outcomes through the policy levers available to Government”. “[Theory of Change](#)” is defined as “How we expect change to happen through a causal chain of actions and results. This maps out the expected outcomes of the intervention”. A theory of change is also used for monitoring Mitigation. In this case it is stated that:

“For the major sectors [of Mitigation policy], we have mapped the relationships and interdependencies between the policies, enablers and outcomes required to meet the UK’s climate targets. These monitoring maps demonstrate our theory of change for each sector, following the structure below.

- Contextual factors. This row captures aspects that are largely (but often not entirely) independent of Government climate policy, but important for the transition. This includes global and societal shifts, and geopolitical circumstances.
- Policies. Building on the contextual factors, this row lays out what good policy should look like. This will include existing Government strategy where this is sufficient but also shows other policy interventions that the CCC considers necessary – regardless of whether the Government has committed to them. While we focus on policy given our statutory remit, this should not be taken to imply that other actors are not important – all parts of society and the economy have a role in delivering Net Zero.
- Enablers. Good policy will only succeed if the enablers are in place and the barriers removed. Enablers vary for each sector, but include themes such as private finance, business action, innovation, governance, public engagement, and a fair distribution of costs and benefits.
- Required Outcomes. The Government’s overall sectoral ambitions depend on delivery of numerous specific measures. [These are captured here.](#)”

14.5. A first assessment of the effectiveness of the strategies

As it was said above CC policies changed. Part of the dynamic is due to the specific assessment of results being obtained. In general, they were not satisfactory both at the UK and the devolved administrations levels.

Just after the new government took office, the CCC, on 18 July 2024, published the result of its statutory assessment of UK energy policy.

“The [CCC](#) has set out 10 priority actions for the remainder of 2024, designed to ‘course-correct’ the UK’s climate policy progress towards 2030 targets and 2050 net zero.

1. Make electricity cheaper. Removing policy costs from electricity prices will support industrial electrification and support lower running costs of heat pumps etc.
2. Reverse recent policy rollbacks. [e.g., the exemption of households from the 2035 fossil-fuel boiler installation phase-out, the gap left by removing obligations on landlords to improve energy efficiency] (...)
3. Remove planning barriers for heat pumps, electrical vehicle charge points and onshore wind.
4. Introduce a comprehensive programme for decarbonisation of public sector buildings.
5. Effectively design and implement the upcoming renewable Contracts for Difference (CfD) auctions so that they can deliver at least 50GW of offshore wind by 2030.
6. Accelerate electrification of industrial heat. Strengthen the UK Emissions Trading Scheme (ETS) to ensure that its price is sufficient to incentivise decarbonisation, and that support is available for a rapid transition to electric heat across much of the industry.
7. Increase tree planting and peatland restoration. (...)
8. Finalise business models for large-scale deployment of engineered removals of carbon dioxide.
9. Publish a strategy to train people and give them the skills needed in green industries.
10. Strengthen the third National Adaptation Plan (NAP3). The CCC advocates for clearer objectives and targets. It said that [climate adaptation must become a fundamental part of policymaking](#) in all government departments and should be integrated into other national policy objectives.”

Also the NAP3, the National Adaptation Programme 3 (see above) was assessed by the CCC in March 2024. The CCC suggests that the UK Parliament (the next at the time the report was drafted) strengthen the UK’s adaptation plan, because “the NAP does not go far enough to ensure that the UK is adequately prepared for climate change. This is true for the climate change already being experienced in the UK today, [the climate changes expected over the programme’s lifetime](#) (out to the late 2020s), and the range of further changes possible over decades ahead”. [The issues that the CCC suggests to consider](#) when reforming the NAP are the following:

“The current approach to coordinating adaptation is not working. Adaptation policy is currently coordinated across government by the Department for Environment, Food and Rural Affairs (Defra). However, many of the risks that need to be addressed sit with other government departments and local authorities. (...) the machinery of government has been ill-suited to ensure that adaptation reaches the top of other departments’ priority lists and is sufficiently well understood and resourced in local government.

Adaptation in the UK is inadequately funded, and private sector adaptation is poorly understood. (...) the most recent spending review cycle (...) limited the ability for ambitious new policy commitments in NAP3 that were not already planned for at the time of the spending review, as well as limiting the potential for large-scale cross-cutting funding of transformative adaptation (...) Existing spending commitments on climate resilience are also being eroded by higher levels of inflation, (...) many barriers to private sector adaptation remain that are not effectively tackled by the programme.

The frameworks needed to track adaptation and climate risk effectively in the UK have not been put in place. (...) lack of data collection on relevant adaptation indicators is a regular barrier highlighted by the Climate Change Committee’s adaptation progress reports”.

According to the CCC, there are “[three key priorities](#) that would help address the major issues and ensure that NAP3 can drive action across government, and beyond, more effectively.

- Reforming governance to put adaptation at the centre of government
- Aligning further developments of NAP3 with the next spending review.
- Creating accountability with targets and monitoring.

Effectiveness of CC policies in the Devolved administrations

As for the CC policies of the Devolved administrations, it is worth focusing on the assessment carried out by the CCC.

The CCC published, in March 2024, a report on the “Progress in reducing emissions in Scotland. [2023 Report to the Parliament](#)” in which it is stated that “The Scottish Government is failing to achieve Scotland’s ambitious climate goals. Annual emissions targets have repeatedly been missed, and the publication of Scotland’s draft Climate Change Plan has been delayed” (p. 10).

The Scottish government accepted the 15 recommendations of the CCC and announced (in September 2024) an “accelerated package of new climate action measures” whose [main commitments are the following](#):

- Deliver approximately 24,000 additional electric vehicle charging points by 2030
- Develop a new integrated ticketing system that people can use across all public transport
- Continue implementation of the Agricultural Reform Programme, increasing conditions on payments over the next two years to better balance our commitments on food security, climate mitigation and biodiversity support
- Publish our route map for 20% car km reduction by Autumn 2024, with a timeline for implementing demand management (this will include

consideration of how local government action can further incentivise the switch to EVs in addition to reducing overall car km)

- Consult on proposals to introduce a carbon land tax as part of considering fiscal and regulatory measures to incentivise peatland restoration, afforestation and renewable energy generation.

As for the Adaptation policy in Scotland, the Scottish Government has released, in September 2024 a “Scottish National Adaptation Plan 2024-2029” (see above).

For what concerns Welsh Mitigation policy, the CCC stated in 2023 that “Wales is not yet on track to meet its targets for the second half of this decade and beyond” and progress is slow as for the aspects of mitigation policies related to “areas where the Welsh Government has policy responsibility”. In this regard, the further key messages provided by the CCC were the following.

- Many areas that are dependent on Welsh Government policy powers recorded insufficient progress. Tree-planting, peatland restoration, development of the charging infrastructure. More progress has been seen in the waste sector and recycling but improvements have stalled in recent years”.
- Welsh Government is not using its policy powers to full effect“.
- Policy action in all sectors across the economy is now needed, including:
 - Addressing the funding gap in 2024 for agri-environment financial support and overcoming non-financial barriers related to woodland creation, through capacity building and skills development.
 - Delivering a widespread, reliable, and high-quality electric vehicle charging network and developing a full delivery plan for achieving Wales’s target of a 10% reduction in car-km per person compared to 2019 levels by 2030.
 - Improving recycling policies to increase the currently stalled rates in Wales to ensure future recycling targets are met.
 - Developing a detailed plan for delivering energy efficiency measures and low-carbon heat.”

As for Welsh Adaptation policies, the CCC assessment provided the following key messages.

- The last national Adaptation Plan for Wales, Prosperity for All: A Climate Conscious Wales - PfACCW provides good coverage of required research and potential actions across priority climate risk areas.
- There is insufficient progress in delivery and implementation of adaptation and monitoring is limited.
- There are some positive examples of good plans in place, although this is not consistent across sectors. The variability “reflects a lack of clarity

in responsibilities for responding to climate risks across the public sector”.

- The next national adaptation plan for Wales must go further to drive delivery across the public sector and more widely. To support clear decision-making and urgent action, there is a need for greater clarity on risk owners and where responsibility for delivering adaptation action sits. The plan should also be accompanied by a strengthened monitoring and evaluation framework to enable assessment of progress against managing climate risks and delivering adaptation outcomes.
- Welsh Government should embed adaptation into its plans for Net Zero, future well-being and increasing biodiversity. Without consideration of climate risks, these other societal goals will not be achieved. The next adaptation plan, as well as plans for other government objectives should recognise the overlaps, maximising co-benefits and minimising negative impacts where possible.

In relation to Northern Ireland’s Mitigation policies, the CCC assessment of March 2023 states that [resolute actions must be taken to achieve the Net-Zero-related objectives](#): “With emissions having reduced only an average of 9% per decade since 1990, a step change in action is needed now”. The CCC provides some suggestions about the action to be undertaken, concerning the following domain:

- Agriculture
- Transport
- Buildings
- Business and industry
- Energy
- Land use
- Engineered removals of CO₂
- [Plan for closing the gap to Net Zero](#).

As for the adaptation policy of Northern Ireland, it is worth mentioning the overall comments provided by the CCC for the NICCAP3. The [key messages of the report are the following](#).

- “NICCAP2 [i.e., the previous programme] has some of the elements required for a vision of a well-adapted Northern Ireland. Further development of the programme structure is needed to make this vision operational and to drive policy creation and delivery.
- Planning for climate change in Northern Ireland remains at an early stage.
- Despite the critical importance of adapting to climate change, there is only limited evidence of delivery, and data gaps in key areas are unacceptably large.
- The next NICCAP must go much further than its predecessor and it must increase its scope to include the full range of sectors and policy areas.

14.6. Other aspects that each partner considers important

This brief report is based on the policies being implemented based on the former UK government orientations. Relevant CCP acts are also expected from the devolved administrations. New directions are expected very soon. Changes to this chapter will be necessary once the expected policy acts will be released. From the anticipation regarding the new CCP of the UK government, it seems that the Governance structure of CCP described above should not be changed significantly.

Appendix to the chapter

Sector	Objective	Key policies
Power	The net zero economy will be underpinned by cheap clean electricity, made in Britain. Fully decarbonise UK power system by 2035, subject to security of supply	<ul style="list-style-type: none"> • large-scale nuclear plant • launch a new £120 million Future Nuclear Enabling Fund, retaining options for future nuclear technologies • 40GW of offshore wind by 2030, with more onshore, solar, and other renewables • incorporate new low carbon generation and demand in the most efficient manner • Moving towards 1GW of floating offshore wind by 2030 (backed by £380 million overall funding) • flexibility measures including storage to help smooth out future price spikes
Fuel Supply and Hydrogen	Significantly reduce emissions from traditional oil and gas fuel supplies, while scaling-up the production of low carbon alternatives such as hydrogen and biofuels.	<ul style="list-style-type: none"> • Set up of the Industrial Decarbonisation and Hydrogen Revenue Support (IDHRS) scheme to fund new hydrogen and industrial carbon capture business models (up to £140 million to establish the scheme) • minimises greenhouse gases through the revised Oil and Gas Authority strategy
Industry	Decarbonise industry whilst simultaneously transforming industry by attracting inward investment. The levers will be support to industry to switch to cleaner fuels; improve resource and energy efficiency; fair carbon pricing	<ul style="list-style-type: none"> • accelerating decarbonisation in ‘clusters’, which account for approximately half of the UK’s industrial emissions • Industrial Energy Transformation Fund (IETF), • Incentivise cost-effective abatement in industry at the pace and scale required to deliver net zero, through the UK ETS by consulting on a net zero consistent UK ETS cap
Heat & Buildings	The ambition is that by 2035, no new gas boilers will be sold. Such a transition will be gradual one that “works with the grain of consumer choice”, promoting the lowering the costs of low carbon technologies by working with the industry.	<ul style="list-style-type: none"> • Boiler Upgrade Scheme will see households offered grants for low-carbon heating systems so they cost the same as a gas boiler now • Heat Pump Ready programme that will provide funding for pioneering heat pump technologies and will support the government’s target of 600,000 installations a year by 2028 • Delivering cheaper electricity by rebalancing policy costs from electricity bills to gas bills this decade • Social Housing Decarbonisation Scheme and Home Upgrade Grants • Additional funding for Public Sector Decarbonisation • Launching a Hydrogen Village trial to inform a decision on the role of hydrogen in the heating system by 2026
Transport	Accelerating decarbonization of transport sector transform cities and towns with greener, faster and more efficient transport; promote Zero emission vehicles, including by giving a clear signal to investors; increase the share of journeys taken by public transport, cycling and walking, electrifying more railway. Decarbonisation will involve also the maritime sector.	<ul style="list-style-type: none"> • Further funding for zero emission vehicle grants and EV Infrastructure, including further funding for local EV Infrastructure, with a focus on local on street residential charging • Allocating further funds to Automotive Transformation Fund (ATF) to support the electrification of UK vehicles and their supply chains. • expand trial three zero emission HGV technologies at scale on UK roads • Investment which will help enable half of journeys in towns and cities to be cycled or walked by 2030

Sector	Objective	Key policies
		<ul style="list-style-type: none"> • create integrated bus networks, more frequent services and bus lanes to speed journeys • Transformation of local tr systems, with 4,000 new zero emission buses and the infrastructure to support them, and a net zero rail network by 2050 • extending delivering real-world demonstrations and technology trials of clean maritime vessels and infrastructure to decarbonise the maritime sector • investment in rail electrification and city rapid transit systems • supporting UK industry with funding for the development of Sustainable aviation fuel (SAF) plants
<p>Natural Resources, Waste & Fluorinate-Gases</p>	<p>Supporting low-carbon farming and agricultural innovation by investing in equipment, technology, and infrastructure to improve profitability, benefit the environment and support emissions reductions</p>	<ul style="list-style-type: none"> • Boosting the existing Nature for Climate Fund with extra funds, for peat restoration, woodland creation and management • Funding net zero related R&D across Natural Resources, Waste & F-gases, to inform development pathway • Funds to improve food waste collection for all households
<p>Greenhouse Gas Removals</p>	<p>Greenhouse gas removals (GGRs) will play a critical role in balancing residual emissions from the hardest to decarbonise sectors such as aviation, agriculture, and heavy industry. Government intervention in the short term will support early commercial deployment of GGRs, with an ambition to move towards a market-based framework for GGRs.</p>	<ul style="list-style-type: none"> • Implement investment in GGR innovation could enable further deployment of GGRs, which in turn will leverage private investment • Explore options for regulatory oversight to provide robust monitoring, reporting and verification (MRV) of GGRs
<p>Cross-cutting</p>	<p>Supporting the transition with cross-cutting action Promote private investments to provide the finance needed for the transition. Consumers’ choice will be at the centre of the strategy to manage the transition so that green choices are easier, cheaper and more rewarding. Training of workers in the renewed low carbon sectors will be supported. Local communities will be involved in Climate change policies. Central government will mainstream climate change related issues in all its policies favouring increasing transparency and providing funds for</p>	<ul style="list-style-type: none"> • Funding to support net zero innovation projects • Use the UK Infrastructure Bank (UKIB) to crowd in private finance and pull through low carbon technologies and sectors to maturity and scale • Introduce a new Sustainability Disclosures Regime, including mandatory climate related financial disclosures and a UK green taxonomy • Reform the skills system so that training providers, employers and learners are incentivised and equipped to play their part in delivering the transition to net zero • Publish an annual progress update against a set of key indicators for achieving our climate goals

PART Three - General results

The third section of this document is devoted to a comparative and cumulative analysis of the findings of the previous section, followed by a presentation of the way forward (i.e., how the implementation of the task is progressing towards its final results).

15. OVERALL ANALYSIS

This chapter includes a transversal and comparative analysis of the mitigation and adaptation policies in Austria, Czech Republic, Denmark, France, Germany, Italy, Romania, and the United Kingdom, having in mind the European level. The sources used in this chapter are the texts of the previous chapters of this document. It is therefore a second-degree analysis of documentary sources with all the limitations that this implies. As already mentioned, and as will be explained in more detail in the next chapter, the documentary research will be complemented in the coming months with interviews with key persons aimed not only at a deeper evaluation of those carried out so far of the various policies but also at a more direct comparison regarding the concreteness of their implementation.

15.1. Comparing Mitigation and adaptation policies (M&A)

We can now focus our attention on some common and divergent aspects of the Mitigation and Adaptation policies (M&A) being implemented in the eight European countries covered by the CROSSEU project (Romania, Italy, Czech Republic, Germany, Austria, Denmark, France, and the United Kingdom).

This analysis is the first step of a wider research effort (as already stated, this very Deliverable is the first version of a definitive one that will be presented in some months, after having used, among others, some living sources such as key persons). This comparative work cannot be considered exhaustive because it was based on a documentary analysis including the reports and documents available on the internet.

Nevertheless, the value of this exercise is that it provides a general overview of what is being done to mitigate and adapt to climate change. On this basis, it is possible to figure out the issues to be further investigated in the successive phase. Among the advantages of this comparison is that it makes it possible to single out different approaches to M&A policies.

This general overview is summarised in the table below where the 12 CROSSEU sectors (see figure 1 in the first chapter) are “crossed” with the 8 European countries considered in this Report (+EU). Our aim is to try to visualize if and where each one of the 12 socio-economic CROSSEU sectors is taken into account by their present climate (M&A) policies, as it results from the documentary analysis implemented so far.

Table 10 – CROSSEU sectors in the eight countries considered (+EU)

	EU	AT	CZ	DK	FR	DE	IT	RO	UK
Health	X	X	X	X	X	X	X	X	X
Social justice	X	X			X	X			X
Migration									X
Finance	X	X	X	X	X	X		X	X
Insurance	X				X		X	X	
Energy	X	X	X	X	X	X	X	X	X
Tourism	X	X	X		X	X	X	X	
Transport	X	X	X	X	X	X	X	X	X
Biodiversity and ecosystem services	X	X	X	X	X	X	X	X	X
Forestry	X	X	X		X	X	X	X	X
Agriculture and food security	X	X	X	X	X	X	X	X	X
Water management	X	X	X	X	X	X	X	X	X

As might be expected, most of the 12 sectors are targeted by the climate policies of both the EU and the eight countries surveyed. These are, notably:

- Health
- Energy
- Transport
- Biodiversity and ecosystem services
- Agriculture and food security
- Water management.

List to which two other sectors may be added that are not only highlighted just in one country (and this could depend either on contingent factors or on the shortcomings of our analysis, which for now is only documentary):

- Forestry (elsewhere, less in Denmark)
- Finance (elsewhere, less in Italy).

Tourism, then, is taken as a focus of climate policies everywhere, except for Denmark and UK, both, countries where tourism has a certain importance

and is prone to natural hazards (e.g., heat waves in UK urban areas and coastal floods in Denmark).

A more in-depth discussion seems necessary in this regard, and the same applies to the subject of insurances (explicitly mentioned just in France, Italy and Romania, as well as at the EU level). The direct impact in the form of acute natural hazards is the destruction in value of the physical assets of a population due to extreme weather events and the insured losses from extreme weather events, that have increased astronomically by as much as 250% in the last 30 years, set the tone of the direct impact of acute climate risk for the insurance sector. Despite this increased responsiveness, most insurance sector segments remain vulnerable to climate change, including property and casualty, life, surety, accident and health, hospital and medical, and agents. This vulnerability is compounded since the historical distributions of climate risk exposure under which insurance contracts were defined are markedly different from the prevailing profile for these risks. This creates the tension between affordability of insurance for the consumers and the solvency of the insurers. [Innovation in insurance products](#) is likely to be central to insurers' ability to ease this tension. There is, therefore, still a situation of profound indeterminacy and it may therefore not be surprising that climate public policies have not yet, in some countries, focused on this issue.

Finally, it seems quite unequivocal that the focus on disadvantaged people (or those at risk of becoming disadvantaged in connection with certain climate policies) is still rather limited. The connections between climate change and migration seem to be of concern only in the UK. This may not be the case, but attention remains somewhat restricted. Broadening the field, the more general theme of 'social justice' in relation to climate change appears to be a strong concern at the EU level but has so far encountered limited consideration in the countries surveyed (apparently only in Austria, France, Germany and UK).

15.1.1 Mitigation in the selected countries

Going now more in depth, we can look at the main pillars of Mitigation policies in the eight countries. There is a certain convergence on what Mitigation policies consist of in practice, which includes promoting:

- Development of renewable energy
- Energy efficiency in various sectors, mainly industry and buildings
- Decarbonization of transport, mainly through Electric Vehicles (EV), recharging infrastructure, walking and cycling, enhancing public transport
- Reduction of emissions from agriculture, for example through carbon farming practices and the practice of forestry
- Emission trading systems (ETS) and carbon pricing are not exactly activities aimed at reducing emissions but mostly at creating

incentives for reductions. Such practices are widespread in the considered countries, also because ETS is an official European policy.

These five types of activities (among which there are, obviously, interdependencies and overlaps; for example, the decarbonisation of transport is also based on the development of renewable energy) are the backbone of what is generally meant for mitigation policies and in most of the countries we considered there are provisions for them.

Other types of activities are also considered part of mitigation policies, even if they are not SO directly connected with emissions reduction, or if they are connected to mitigation objectives according to different approaches. It is the case of:

- Forestry, which is sometimes distinguished from agricultural policies; forestry, anyhow, sometimes is considered part of more general policies concerning land use
- Policies on water resources are sometimes mentioned as part of mitigation policies (but, in general, are more the object of adaptation policies)
- Green financing. This is a very general label that includes various types of activities, potentially also activities connected to carbon pricing. In general, the idea is to promote the use of private capital to favour private investments in decarbonization technologies and initiatives
- Waste management and circular economy initiatives. Not all countries support this kind of initiative, and, in any case, they do not seem to be the backbone of mitigation (probably because their effects are delayed in time and not easily predictable)
- Research and innovation (R&I). They are always mentioned as part of mitigation policies (and adaptation as well, see below). R&I are “transversal” and impact other activities (typically, energy efficiency in industry, or the promotion of renewable energy).
- Public engagement and information. Initiatives aimed at informing the public and stakeholders in general about the objective of mitigating climate change.

Some countries include the international dimension of mitigation policies openly (e.g., the UK and France), while others consider it as the context in which policies are implemented, also for abiding with international treaties and regulations (typically, European regulations).

Comments are possible about how these various types of mitigation activities are being promoted in the eight countries considered.

Development of renewable energy

The first set of mitigation policies is related to the adoption of renewable energy.

In Italy it is foreseen the introduction of renewable sources, up to 72%, and the complete phase-out of coal (renewables means solar, wind, biogas, and in the framework hydrogen, bioenergy and synthetic fuels are included). It is also stressed that the generation of energy from renewable can happen from distributed sources.

Similar approaches are being followed in Romania, where the objective is to increase the share of renewable energy to achieve a minimum of 38.3% of gross final energy consumption while, in general, arriving at a diminution of 85% of GHG emissions. Coal should be phased out by 2032.

Czechia is also committed to increase the share of renewables to 23%, 26%, and 41% of the Typical Energy Consumption by 2030, 2040, and 2050, respectively. Key initiatives include solar and wind energy development and biomass utilization. Renewables are thought also as a diffused tools for mitigation, i.e., meant to be practiced by a large number of actors (as in the case of house-heating or new farmers' practices). Difficulties are being met in increasing the share of renewables in the transport sector, while the preference is for biofuel as renewable source of energy. The issue of promoting renewables was first launched in National Renewable Energy Action Plan of 2010 and in the various versions of the National Energy and Climate Plan (NECP).

Also, in Germany the aim is to support the development and increase of the share of renewable sources, also by promoting research in this sector. It is to stress that each lander has its own programmes and objectives, and this makes clear the institutional complexity of this policy, especially for a big country, where the regional dimension is key. Another factor of complexity, mostly technical in nature, is the issue of the integration of renewable sources in the distribution grid.

Austria has ambitious objectives since electricity should be 100% renewable by 2030. The country will rely on hydroelectric power, wind, solar, and biomass energy to replace fossil fuels. Up to now, there have been some positive results, especially concerning electricity generation, with a substantial reliance on hydropower and growing investments in wind and solar energy. Problems are being met in other sectors, for example in transport.

In Denmark the objectives are increasing the share of renewable energy in gross final energy consumption and phasing out coal-fired power plants by 2030. Among the tools to deploy this strategy, there are feed-in tariffs and auctions. Monitoring with indicators is foreseen. Results achieved up to now are important, for example, the country's leadership in wind energy production, which doubled between 2011 and 2023. Results are being obtained also for building heating. Renewables deployment is a policy led by a specialized agency (Danish Energy Agency). Interestingly, workers in

the fossil fuel sector are being re-skilled and retrained to be employed in the wind offshore industry.

Also in France, decarbonization and diversification of the energy mix, notably by developing renewable energy and phasing out coal for electricity and heat production, are foreseen.

For the UK's policies, renewable energy is crucial and new policies are expected to foster investments in this area, including for infrastructures. Sectors focused by the former government were offshore wind by 2030, with more onshore, and solar. It was requested by the independent committee CCC a deployment of new renewable electricity generation is required at scale, with appropriate energy storage and decarbonised back-up solutions, subject to ensuring security of supply.

Some observations can be made. The policies being carried out by the eight countries are not, at least in general, that different. Phase out from coal and making use of renewable sources is a common feature. There are differences concerning the pace, the strategy, and sometimes the ambition (see Denmark aiming at maintaining a leadership role). Sometimes research is stressed as a facilitating tool. In some cases, what emerges is the complexity of the implementation, which implies the involvement of National Agencies, and/or the cooperation of various government levels (e.g., regional government in Germany). In general, promoting renewable energy sources implies a huge innovation process, which is not just – and even primarily – economic but also social, if not cultural. The issue is that of passing from a source of energy (carbon) to diverse sources, more dispersed and whose availability and usability changes depending on the location (hydropower, for example, is practical in mountainous territories). This is going to change massively how crucial activities - producing energy - are done. When talking of renewables, transport is not an option as it is for oil or gas through pipelines, and the types of infrastructures needed change accordingly. Furthermore, the fact that a progressive limitation of old energy sources (and emissions) is being practiced, implies that promoting renewables means that the idea of abundance in energy sources should be abandoned.

Energy efficiency

As a matter of fact, what is at stake is how the overall energy sector works and, in this framework, the issue is being dealt with also under the lens of the promotion of Energy Efficiency. In general, it is to stress that energy efficiency is inherently cross-sectoral and concerns various aspects of social and economic life. A crucial aspect of energy efficiency is energy saving (particularly carbon energy). How the latter is achieved depends on the approach adopted. While the promotion of renewable has to do with the production of energy, energy efficiency has to do with energy use, given the objective of reducing emissions. In France, for example, one of the

pillars of energy efficiency is the management of energy demand. In Romania, there are ambitious objectives in terms of reduction of primary energy consumption by 25% and gross final energy consumption by 29% compared to 2022. The sectors mostly entailed by the policies of Energy efficiency are Industry, building and transport. In Denmark, through diverse actions concerning building codes, appliance standards, and industrial energy efficiency programs, there was a significant decoupling of economic growth from energy consumption. Life cycle approach to building industry was promoted. Industry has contributed significantly to reduction of emissions. A similar approach is also implemented in Germany where measures to improve energy efficiency were taken concerning buildings, industry, and transportation.

Efficiency strategies imply the implementation of “diffused” actions, e.g., for improving buildings’ energy efficiency (see in Austria). The building sector is crucial for mitigation in many countries: in Germany measures to improve energy efficiency were taken concerning buildings, which include stringent building codes and a national carbon pricing system for sectors not covered by the EU ETS, among which heating. The same applies in Italy, where policies entail building standards and regulations (that include increased resistance to high winds, flooding, and therefore something relevant to adaptation). In France too, energy efficiency is particularly focused on buildings. In Romania emissions from the buildings and waste sectors rose by 9% and there is a general difficulty in fully complying with the requirements of the EU Energy Efficiency Directive. In Czechia, programmes are aimed at diminishing local pollution caused by boilers, thus impacting the residential sector. Relevant results have been achieved also using incentives for the replacement of old equipment, as well as legal and regulatory measures like bans to polluting devices. In Denmark too, energy efficiency is pursued through regulations and incentives such as building codes and appliance standards aimed at promoting energy conservation and reducing energy consumption. It should be noted that the forms of energy efficiency could be very complex, such as district heating which serves 64% of Danish households.

The issue of Energy efficiency is particularly relevant in the so-called ‘hard-to-abate’ sectors (steel, glass, ceramics, cement, chemistry) and active actions are being undertaken. In Italy, the guiding principle is ‘energy efficiency first’, which finds in efficiency the first lever to be used to obtain economic and environmental benefits in terms of reducing emissions. Energy efficiency is considered crucial in a “high energy intensity” country like Czechia, which has large energy-intensive industry sectors. Industries were allowed tax incentives and grants to favour the adoption of more efficient machinery and processes via subsidy programmes. In this way, industry is having good results in terms of emissions’ decrease. Romania registered a decrease in emissions of the industrial sector. In Germany, energy efficiency in industry implies support for industrial energy-saving technologies. Lenders may offer incentives and support for businesses to

adopt more sustainable practices, such as energy efficiency improvements, waste reduction, and the use of renewable energy. Austria supports the development and implementation of energy-efficient technologies in industries. This is being done also through financial incentives. In various industrialized areas, there have been many advancements in industrial technology transformation. In the UK the objective is to decarbonise industry whilst simultaneously transforming it by attracting inward investment through support to the industry to switch to cleaner fuels, improve resource and energy efficiency through dedicated funds, the use of UK ETS and fair carbon pricing.

Decarbonization of transport

Another relevant sector of mitigation policies is transport, and all the countries intervene in it. Italy's policy includes promoting EVs, zero-emission ships and planes, trains also for freight, cycling with dedicated lanes, recharging structures for electricity and hydrogen, and electrification of ports.

In Romania, the strategy focuses on strengthening rail transport and increasing electric vehicles. Efforts are underway but authoritative observers say that they should be intensified.

In Czechia, there is a plan for promoting electric vehicles, through recharging points and a new law that establishes new standards and regulations for vehicles. Urban policies are promoting public transportation and other measures to favour cycling and walking.

As for other countries, Germany promotes the use of electric vehicles through subsidies, tax incentives, and the development of charging infrastructure. Additionally, there are efforts to enhance public transportation and encourage cycling and walking. Germany has introduced a national carbon pricing system for sectors not covered by the EU ETS, which includes transport. This system sets a price on carbon to incentivize emission reductions. Regional governments promote sustainable transportation options such as public transit, cycling, and walking. This can involve investments in public transport infrastructure, the development of bike lanes, and initiatives to reduce car dependency. Local governments implement these activities in practice.

Also in Austria, transport policies foresee the adoption of EVs and the related charging infrastructure, expanding public transport, and promoting sustainable mobility practices to offer low-emission alternatives to private car use (as in other countries, various levels of government are involved in these policies).

The Danish transport plan aims to reduce national emissions from road transport, shipping, and aviation. This objective will be achieved through a combination of electrification, biofuels, and other innovative measures, promoting cleaner and more sustainable modes of transportation, which

implies setting targets for electric vehicle adoption, promoting public transportation, and improving fuel efficiency standards. Infrastructures are relevant also for the promotion of cycling. EVs are promoted via incentives.

In the UK the objectives of transport policies are similar to those of other countries: accelerating decarbonization of transport sector, transforming cities and towns with greener, faster, and more efficient transport; promoting Zero-emission vehicles, including by giving a clear signal to investors; increasing the share of journeys taken by public transport, cycling and walking, electrifying more railway. Decarbonisation will also involve the maritime sector. The tools for doing this are funding of various forms of support and grants for EVs and for recharge infrastructures, promoting the updating of public transport.

The pillars of France's strategy are the Improvement of the energy performance of vehicles (light and heavy), the decarbonization of energy consumption for vehicles, and adapting infrastructure. A distinctive aspect of the French plan is the Management of demand for transportation through teleworking, carpooling, local supply chains, and vehicle usage optimization, encouragement of modal shifts toward lower-emission passenger and freight transport (public transit, rail), and support active modes (cycling, walking).

What is crucial to consider is that the impacts of these policies – maybe because they are diffuse and involve a plethora of individual actors- are below the expectations and needs. In Romania emissions have risen by 50% since 2005, now accounting for 17% of the country's total emissions. Czechia is not reaching the targets, and an extra effort is being promoted. In Germany, the transport sector is considered one in which the challenges are the hardest, and in Austria too there are problems since the high emissions in the transport sector have undermined the overall effort to diminish GHG emissions. In France, transport policies have not been as successful as hoped. One exception seems to be Denmark, which had significant progress in sustainable transport with the increase in the use of public transport, cycling, and electric vehicles.

Reduction of emissions from agriculture

Agriculture is one of the sectors that contribute to the overall GHG emission level. It is crucial for climate change policies also because mitigation policies in this sector overlap with those of adaptation (and the correct coordination between them is necessary). In Austria and Denmark there is a special focus on the need to increase the use of renewable energy in agriculture. In Italy, Romania, Czechia, Austria, Denmark and France it is recognized that the emissions produced by agricultural activities have to decrease. The tools promoted are various: for example, regenerative agriculture, carbon farming and livestock practices improvement is mentioned in Italy, Denmark and Austria also resorting to the use of ETS (the promotion of carbon farming is, nevertheless, a wider European

policy). The results reported are mixed: in Romania diminution of emissions are registered, but in Czechia the results were not so big.

Emission trading systems (ETS)

In almost all the countries considered, the participation in the European Emission Trading System. ETS are a financial tool for funding innovation conducive to a reduction of emission. Relevant results seem to have been reached in Czechia: while GHG emissions from facilities covered by EU ETS decreased by 33.7% in the period 2005–2020, emissions outside EU-ETS (i.e., especially waste management, agriculture, transport, and households) decreased only by 8.4% in the same period. Based on this, the International Energy Agency's (IEA) Energy Policy Review (2021) recommends to “introduce a carbon tax in sectors not covered by the EU ETS to stimulate further low-carbon investment and reduce fossil fuel consumption in Czechia. Successes of this type have not been reported in the other countries that, nevertheless, practice ETS and, evidently, consider ETS – a market-friendly approach - promising. In Germany, as stressed above, a national carbon pricing system has been introduced for sectors not covered by the EU ETS, such as transportation and heating. The UK considers this approach promising as well and has established a UK based ETS.

As stressed above, mitigation is not limited to these core sectors but also to others: forestry, water management, green financing, waste management, research and innovation, and information to stakeholders. How countries implement policies concerning them vary significantly.

Forestry

Forestry is very often considered as an autonomous aspect of mitigation policies, being forest carbon sinks that could be used to offset emissions and, therefore, contribute to the desired emissions targets. This is stressed in Romania, Czechia, Austria, Germany, France, and Italy. There is, anyhow, a significant overlapping with adaptation, as it is stressed by the Italian authorities (forestry is not only a way to sequester carbon but also a nature-based approach to control flooding, contrast urban heat waves, etc.). In Denmark and the UK, the role of forestry for adaptation is more emphasized.

Water resources management

In general, water management is considered part of the adaptation policies, and this emerges clearly from the countries' chapters. The exception is Italy where it is stressed that a more rational water management can help in reducing emissions by decreasing water use (because of less energy needed for water treatment and transport).

Green Financing

One of the problems of the mitigation policies is connected to how funding the planned activities. As mentioned above, ETS is one of the approaches being practiced. In general, the issue is the mobilization of the needed funds and, in this framework, the involvement of the private sector and engagement in investing in economic activities in line with the objectives of mitigating climate change. In the various countries considered here there are diverse approaches. In Romania there are specific funding facilities for financing mitigation and adaptation. EU funds and public investments are considered essential, but the private sector's role in mobilising green finance is equally critical. Creating an enabling environment for private investment remains a pressing challenge for the country. In Czechia, beyond the already mentioned experience with ETS, resources for funding mitigation initiatives are expected mainly from the EU and, in this framework, there is a national agency for managing the administration of the relevant funds. In general, the issue of how to fund transition seems to be more focused on adaptation. In Germany too, it seems that public funds are crucial for financing mitigation (where the government, for example, has provided financial support to coal regions to help them in the transition to more sustainable economic activities). In Austria, beyond the ETS, for funding mitigation national funds and EU climate funding programs are available. These funds are used to finance projects related to climate mitigation and adaptation, with a focus on innovation, renewable energy, and sustainable infrastructure. The Austrian government also engages with the private sector and civil society to foster climate-friendly practices through incentives, subsidies, and public-private partnerships. The country uses a mix of public and private investment, including EU funding programs, to support climate action initiatives. Also, for Denmark is reported attention to promoting a combination of public funding, private investment, and innovative financing mechanisms to support the country's plan implementation. This diversified approach is aimed at ensuring financial sustainability and leveraging the resources and expertise of both public and private sectors. A similar approach is that of the UK, where an effort is being done to promote private investments to provide the finance needed for the transition. Consumer choice is at the centre of the strategy to manage the transition so that green choices are easier, cheaper and more rewarding. The new government is expected to innovate, at least partly, this approach. In France the issue of funds is considered a persistent challenge. French policies are being implemented also using European funds such as the Just Transition Fund.

Waste management and circular economy initiatives

Waste is among the causes of GHG emissions and, as part of the circular economy, sometimes enter the domain of mitigation policies. It could be

noted that actions for waste management require a diffuse action of different actors (final consumers, firms, local and regional authorities, etc.).

The Italian plan foresees preventing waste and/or promoting its reuse. The concept is the valorisation of waste biomass, urban organic waste, non-food crops, and second-harvest crops to produce energy, bioproducts and biofuels, with clear production, environmental, and climate benefits. In the framework of the PNRR projects have been launched on “Green Islands” and “Green Communities”.

In Romania, waste management is considered crucial also because emissions from this sector grew (together with emissions from buildings while diminished emissions from industry and agriculture). Progress in sectors such as packaging, waste, textiles, or construction is rather unsatisfactory. In Czechia, the management of waste is particularly relevant for urban climate transition policies. In Denmark circular economy initiatives are promoted to reduce waste, increase resource efficiency, and minimize the environmental impact of production and consumption patterns. This aligns with both adaptation and mitigation by reducing resource consumption and minimizing the environmental impact of production and consumption patterns. Waste management is a way to reduce newly generated energy. In France the valorisation of biomass to reduce the consumption of carbon implies the use of waste.

In the UK, Natural Resources, Waste & Fluorinate-Gases is one of the policy sectors of mitigation. Actions include funding net zero related research and development across Natural Resources, Waste & F-gases, to inform development pathway. Public funds to improve food waste collection for all households are also foreseen. It is interesting what happens at the regional level: in Wales progress has been seen in the waste sector since recycling rates remain higher than in the rest of the UK, but improvements have stalled in recent years.

Research and innovation

Research is considered one of the tools of mitigation policies in most of the countries considered. In Romania funds of the Environmental Fund Administration (EFA) are allocated explicitly for research but a recent evaluation stated that there is a lack of concrete measures to support research and innovation in renewable energy technology and adaptation to climate change.

The German government supports research and innovation in climate-friendly technologies and practices to support the development of climate-friendly technologies and practices, to foster innovation in areas such as renewable energy, energy storage, and sustainable agriculture. This includes initiatives like the Energy Research Program and the National Hydrogen Strategy, Some Lenders invest in research and development of

climate-friendly technologies and practices, often in collaboration with local universities and research institutions. Interestingly, the German government funds research programs and partnerships with research institutions and the private sector. Cooperation between diverse actors in research, in the spirit of the so-called Quadruple helix approach, is practiced also in other countries.

In Austria, the government works closely with researchers, businesses, local authorities, and civil society organizations to ensure that climate action is informed by the latest data and that policies are inclusive and widely supported.

In Denmark, research on environmental issues and climate change is promoted to develop and implement climate solutions by fostering collaboration between research institutions, businesses, and government agencies.

This cooperative approach is interesting since it could help addressing the problem of implementing diffuse innovation by involving in technology development the potential users as early as possible.

Public engagement and information

In general, public awareness and engagement are considered crucial and, at least in principle, all the countries consider important to implement them. Nevertheless, there are sometimes inconsistencies that highlight how the issue is complex. In Romania, for example, Public Awareness and Engagement Deficits have been singled out by recent studies as a barrier to M&A. Nevertheless, a good percentage of Romanian people say that they are concerned with environmental issues. In Czechia it is reported that many residents, regional and local policy and decision makers, city planners, as well as local stakeholders are unaware of the specific climate risks facing their communities (especially for what concerns adaptation). Nevertheless, it seems that even if low, awareness is raised.

More interventions are needed in Czechia, as it happens in other countries. In Germany, regional governments often run public awareness campaigns and educational programs to inform citizens about climate change and encourage sustainable behaviours.

In Austria, public engagement and awareness campaigns also play a vital role in fostering climate responsibility at the community level. To raise awareness of the consequences of climate change among stakeholders at regional level, regular dialogue events have been held since 2013 to transfer knowledge and highlight a wide range of options for action in cooperation between the BMK, the Climate and Energy Fund, the federal states and the Federal Environment Agency.

There are differences in the approaches. On the one hand there are countries who consider it important just promoting a general awareness of the mitigation and climate change issues. In other cases, it is stressed that public awareness and engagement is necessary for demand management. The second approach is that of Denmark, where public awareness is considered crucial since it helps in demand management: the country plan emphasizes that public awareness and education can indirectly influence consumption patterns and lifestyle choices. By informing and engaging citizens about climate change, more sustainable consumption habits and reduction of overall demand for energy and resources can be encouraged. In this framework, NGOs and environmental organizations have a pivotal role for raising awareness, advocating for ambitious climate policies, and holding the government and businesses accountable for their climate commitments. Communities, in their turn, can play a role in promoting sustainable practices, supporting local initiatives, and creating a culture of climate awareness.

The French case should be mentioned. As it was stressed above, “demand management” is considered an important aspect of mitigation policies and training and awareness raising are considered important, as well as involving citizens in the transition toward a low-carbon culture. Nevertheless, it should be stressed that the participation promoted after the Gilets Jaunes crises did not bring about a big consideration of citizens’ suggestions. This suggests that dialogue is a political endeavour that has its difficulties, hence the potentially positive role of NGOs and citizen organizations in facilitating the dialogue.

15.1.2 Adaptation in the selected countries

Adaptation Policies are more diverse in the various countries (and this should come as no surprise, given that the problems connected to mitigation should be addressed with reference to the global sphere, while the problems of adaptation are much more specific to each specific local context) and, in general, seem to have a wider scope than Mitigation policies.

An interesting and good example can be taken from the list of sectors that were included in the French five-year adaptation plan of 2011-2015 (the list was later adapted according to the needs that emerged from implementation). To introduce this issue effectively, it is helpful to present it here, as it illustrates the wide range of diverse sectors that can be included in adaptation policies.

Table 11 – List of climate change policy sectors

1. Health
2. Biodiversity
3. Natural hazards
4. Fisheries and aquaculture
5. Tourism
6. Coastal zones
7. Mountain regions
8. Water resources
9. Agriculture
10. Forests
11. Energy and industry
12. Infrastructure and transport systems
13. Urban planning and the built environment
14. Financing and insurance
15. Cross-cutting actions
16. Information
17. Education and training
18. Research
19. Governance
20. European and international action

As it is well known, there are some overlaps among climate policies between mitigation and adaptation. It concerns, in different ways, all the entries highlighted in yellow or in blue in the table above.

So, in comparing, as we did in the previous paragraph, countries policies will be compared in relation to the white entries (+ two segment of the yellow entries where what is done on the adaptation side is quite different from what is done in the mitigation one.

Ultimately, we'll look at:

- Natural hazards
- Infrastructures and urban planning
- Biodiversity, nature-based solutions, fisheries and aquaculture
- Health
- Coastal zones
- Mountain regions
- Tourism.

Among the set of activities under these entries, there are, of course, some overlaps: for instance, the natural hazards' management is also of interest of coastal zones and mountain zones. Nevertheless, adaptation policies in these zones go beyond natural hazards' management *strictu sensu*.

Natural hazards' management

In general, climate change brings about risks that often produce natural disasters. Adaptation, therefore, means also dealing with the prevention and/or mitigation of the effects of such disasters.

The current approaches are diverse in the various countries considered here also because the contexts are different, and, consequently, also the major natural hazards.

Sometimes, forms of coordination are foreseen with already existing civil protection mechanisms. Notwithstanding this, emphasis is put in the various countries on the novel situation being brought about by climate change. In Czechia, funds have been allocated at the national level for supporting and developing early warning systems for emergency events but, in Romania, the National Disaster Risk Reduction Strategy is not included in the climate change adaptation policies. In Denmark, Disaster risk management is recognized as one of the sectors of adaptation policy, and it is interlinked with others.

The point is that Climate change implies also disasters that cannot be considered rare events but a new normality. In some cases, disaster risk management is implemented at the local level, where the effects of disastrous events occur and are mainly felt, as it is, for example, in Germany or the UK cases. In Czechia, responsibility for management of risks and disasters connected to climate change is considered, among others, at the urban level, in the Climate Change Adaptation Strategy of the Capital City of Prague. In Denmark the adaptation plan foresees, as for “natural hazard”, initiatives such as a pilot project for a comprehensive storm surge protection plan for Copenhagen and surrounding municipalities (already underway), or for addressing high groundwater levels in urban areas. Cross-sectoral collaboration and knowledge sharing is also being promoted on this matter. Beyond the immediate relief, in general, interventions are being implemented aimed at avoiding disasters, such as the construction of new infrastructures.

Infrastructures and urban planning

Infrastructures are a crucial aspect of the adaptation strategies considered. In some cases – as in Italy, for example – they are mostly connected to water management and the change in hydrological systems brought about by climate change. The focus is maintaining the functionality of critical infrastructures at risk, including energy transmission networks (e.g., in the Czechia chapter, also concerning the integration of imported energy sources) and communication networks (as in the UK case, where infrastructures should also be resilient to the so-called “cascading risks”). Adaptation of infrastructures – as stressed in the Czechian case - has not to do only with the physical renewal of existing infrastructures but also with the optimization of activities that are served by those infrastructures: for example, the use of water in manufacturing.

A further aspect concerns regulations, that should be in line with the new technical standards that may be required by updated infrastructures. This is stressed, particularly in Czechia with a reference to the blue-green infrastructures. This aspect is also relevant to address the negative perception of adaptation measures by various stakeholders, including investors. This type of regulatory change has been also the object of adaptation initiatives in France, where the focus was – among other things – on updating infrastructure standards to address climate risks (e.g., transport and construction sectors). In the UK there is specific attention to changing standards for promoting infrastructure resilience as part of the expected change in the overall system for the provision of infrastructures.

In general, changing infrastructures considering promoting adaptation has wide-scoping impacts on territories and society. Renewed infrastructures must withstand the changing climate, mainly (but not exclusively) by upgrading flood protection systems, improving water management, and making buildings more resilient to heat waves. This very wide scope of infrastructural policies for adaptation is clear in Austria, which is upgrading its flood protection systems, and this implies the construction of new dams, retention basins, and flood barriers, as well as restoring natural floodplains to mitigate the risk of flooding. This is happening both in rural and urban areas (in different ways). In Germany and the UK, adaptation measures impact transport infrastructures. In Denmark, beyond those serving energy and communication systems, cycling infrastructures are also included. In this framework, the overall urban design is going to be impacted.

Infrastructure updates involve, in general, a wide array of actors, particularly local and regional authorities. The involvement of the private sector is relevant too, as it is stressed in the cases of France, Czechia, and the UK.

Biodiversity, nature-based solutions, fisheries and aquaculture

Biodiversity is an important aspect of the adaptation policies in all eight countries. It can be seen as a “hybrid” issue because it serves both as a guiding principle that shapes actions across different areas of adaptation policy and as a subject of specific initiatives and activities. In Italy and Denmark, it is explicitly a guiding principle for both adaptation and mitigation that, for example, leads to considering nature-based solutions in policy implementation. This approach is also shared by Romania and Czechia.

In general, biodiversity means paying attention to preserving native species and ecosystems that can better withstand climate impacts when intervening to promote adaptation. The idea is to make the ecosystems continue providing their services when promoting climate change mitigation and adaptation and leveraging nature-based solutions to enhance resilience. In this framework, attention must be paid to how to restore biodiversity and/or how to preserve it when doing other interventions.

Restoring biodiversity implies actions such as preserving various forms of fisheries and aquaculture in Italy; In France, adaptation effort meant also implementing the so-called “No-regret measures” to avoid permanent damages such as the destruction of certain marine species. In Austria, adaptation implied reforesting areas and protecting wetlands, adapting farming practices to changing weather patterns (which involves promoting drought-resistant crops, improving soil management techniques, and providing farmers with climate data and guidance on sustainable practices). Peat restoration and woodland creation and management are among the actions considered in the UK, where, more in general, the Natural environment is one of the sectors of activity of the most recent (the third) National Adaptation Plan, which foresees Nature Recovery Projects focused on terrestrial, freshwater, coastal, and marine habitats and species, forests and peatlands, agriculture, and soils.

Biodiversity is also important if considered as a principle of action. As such, it potentially has a strong impact on other adaptation (and mitigation) activities. In very general terms, as it is in the case of France, it means the objective of preserving and restoring ecosystems to address climate hazards (it is one of the suggestions received from a review and adopted in the current plan of action for adaptation). In Czechia, respecting biodiversity means limiting landscape interventions that fragment ecosystems (defending biodiversity includes also watercourses). In the city of Prague, the strategy focuses on reducing the negative impacts of climate change by using nature-based solutions to preserve water, soil, and biological components of the landscape. In Italy, Romania, and Denmark it means that nature-based solutions have to be searched for.

In general, promoting biodiversity in Adaptation (but the same could be said for Mitigation), has some relevant implications.

Firstly, it implies long-term planning (the same of infrastructures or even longer, as in the case of peatland restoration).

Secondly, it requires the interaction of policymakers with those who take care of landscapes.

Thirdly, and more generally, it implies multi-actors’ cooperation (in agriculture, infrastructure building, forestry, fisheries, land management, e.g., in wetlands, and urban planning) which, in turn, requires sharing visions concerning biodiversity and how to defend and promote it.

Last but not least, as it is suggested in the UK, there is a need for dedicated funding for Adaptation that allows for the consideration of biodiversity objectives.

Health

Health is a further sector of adaptation policies. Its inclusion in this category of policies represents well the wide scope of the impacts being produced by climate change on our societies and how comprehensive the policies have to be to address effectively this challenge. Adapting means dealing

with the consequences of global warming not only directly on the environment, on the infrastructures or the economy, but also the social body and people.

The issues to deal with, therefore, are inherently social and not merely technical. This is clearly stated in some countries, as long as the inequality issues emerge as related to the promotion of public health. How the problem is approached in the various countries, inevitably, depends on the characteristics of the respective national health care systems and reflects the principles and structures they are based on. Interestingly, Scotland adaptation plan, being based on the principles of “Just transition”, is focused also on supporting people and communities most vulnerable to climate impacts and building resilient, healthy, and equitable places.

In Austria the focus is on strengthening the healthcare system’s capacity to deal with heat-related health risks, such as heatstroke and vector-borne diseases. This includes improving early warning systems, developing heat action plans, and ensuring that vulnerable groups, such as the elderly, have access to necessary support. In the UK attention is paid to alerting health care systems so that lives can be protected.

The Adaptation Strategy in Czechia emphasizes preventing infectious and non-infectious diseases, ensuring adequate healthcare infrastructure, and informing the public about risks and preventive measures.

In Romania, Germany and in Denmark, Public health is one of the sectors of the respective Adaptation plans.

Various forms of coordination with other adaptation policies are also foreseen, as it is in France where the focus is, in general, on the reduction of health risks and the adaptation of the living conditions to the increasing temperatures. In Italy, the protection of health is one of the criteria for defining and evaluating adaptation strategies.

Coastal zones

Some of the countries considered pay special attention to the preservation of the coasts. In France, coasts have been an object of interest for many years. In Italy, they are an area of particular concern especially for preserving biodiversity and promoting ecosystem restoration. Mapping and monitoring of marine and coastal systems and their restoration are being implemented. In Denmark Coast protection is a traditional sector of public action. The adaptation plan includes state assistance to municipalities for coastal protection also through pilot projects focused on storm surge protection and sand nourishment. The complexity of the issue is acknowledged too, and cross-sectoral collaboration, knowledge sharing, and the improvement of the framework for municipal coastal projects are promoted. In the UK investments in coastal erosion schemes have also been promoted.

Mountain regions

Mountain regions received a special mention in the case of Germany (for the southern lenders) and, particularly, in Austria where, in mountainous provinces such as Tyrol and Vorarlberg, the adaptation policies emphasize the protection of landscapes from the impacts of landslides, avalanches, and glacial retreat due to rising temperatures. These regions have invested in infrastructure improvements such as stabilizing slopes, enhancing early warning systems, and restoring natural barriers.

Tourism

Tourism is an economic sector particularly impacted by climate change. The attention seems not so much on how to preserve the tourism sector which is at risk because of climate change, as to avoid the promotion of tourism hampers the adaptation effort. On this basis, there are some differences between countries. In Italy, sustainable tourism is seen as a tool to preserve sea and coasts. In Czechia, it is stressed the need to educate all participants in the tourism sector on the issues of climate and each stakeholder should be encouraged to consider the consequences of their actions. In Germany, the creation of a sustainable and climate-friendly tourism industry is an objective of adaptation policies in Southern lenders. Austria has focused on leveraging its alpine geography to develop hydropower and promote eco-tourism as a sustainable economic model. In France, it is stressed the need to support the transition of various sectors, including tourism, to more resilient models. In Romania, tourism is one of the sectors of the Climate Change Adaptation Strategy for 2030.

15.1.3 Overlaps of Mitigation and Adaptation

Structural and non-structural measures

The entries stressed in blue in Table 11 above indicate those that could be defined as “soft aspects”, or “non-structural”, of climate change policies, while the yellow ones represent the “harder aspects”, or “structural”, i.e., mostly dedicated to infrastructural interventions or their preparation (entry is 19 transversals to all the other ones is special and is in red). In general, structural measures are any physical construction to reduce or avoid possible impacts of hazards, or the application of engineering techniques or technology to achieve hazard resistance and resilience in structures or systems. Common structural measures for disaster risk reduction include dams, flood levies, ocean wave barriers, earthquake-resistant construction and evacuation shelters. In other words, structural measures involve the construction of artificial structures that, through a combination of science, technology and a bit of brute force, prevent, for instance, a river from flooding. However, structural measures are not always an adequate and sufficient response, as they cannot completely eliminate the risk as well as it can involve huge financial investments and lead to various social and environmental impacts.

Softer, or non-structural measures are those not involving physical construction that use knowledge, information, or agreement to reduce disaster risks and impacts. Common non-structural measures include building codes, land-use planning laws and their enforcement, research and assessment, information resources, public awareness programmes, training, and education³⁸.

This list is very useful as an example to guide our reasoning also for what is lacking in it. For example, the issue of pursuing social justice while implementing such a wide array of adaptation sub-policies is not mentioned. It would be incorrect to say that the social dimension is completely absent: it could easily enter many of the listed topics and surely it does. The same could be said about citizens' participation. Anyhow, the list was defined for the 2010s and, in implementing Climate Change policies in the following years, all over Europe a bigger sensitivity towards societal issues implied by transition policies has emerged.

Adaptation and change of risk regimes

In general, as emerged from the preceding chapters, some relevant characteristics of the Adaptation policies are, among the others, those listed below.

Adaptation implies handling the “forces of nature” directly but differently than in the past. In almost all cases, policies imply mapping the new risks (the mechanism based on mapping is clearly presented for the UK case) and defining actions consequently. The risks are those caused by GHG emissions due to climate change (and to be contrasted with appropriate measures), therefore – for example - the rising of the sea level and the consequent damages to coasts, floods, droughts, wildfires, etc. This emerges in many country chapters (the defence of the coasts is an issue in Denmark, France, and Italy; defence against floods is widespread in all the chapters; etc.). With climate change, a new way to approach the management of such forces is requested, which deeply impacts modern societies (e.g., how we use the sea or the mountains, how we use precipitations for our human activities such as agriculture or electricity generation, etc.; see Latour “We have never been modern”). This is a very big challenge: let's think about how landscapes are shaped by how human activities are distributed on the territory. Adaptation activities imply changing landscapes, as this is implied, for example, by peatland restoration (e.g., in the UK), control of floods (e.g., in Italy), restoration of natural floodplains (e.g., in Germany and Austria), retention basin or dams (e.g., in Austria).

³⁸ Note that in civil and structural engineering the term “structural” is used in a more restricted sense to mean just the load-bearing structure, and other parts such as wall cladding and interior fittings are termed “non-structural”.

Based on the above, but perhaps also because of this centrality of “forces of nature”, Adaptation actions are significantly based on intervention in infrastructures.

This is evident if control of floods and sea levels are concerned but emerges in general. Agriculture, for example, is a crucial sector of Adaptation actions and the management of risks requires a renewal of infrastructures for the management of water scarcity. Water scarcity, of course, concerns also other uses beyond agriculture, including the construction of new water reservoirs (see Czech Republic). Infrastructure renewal is implied also in relation to Adaptation action concerning the building stock, roads, and public transport. The same can be said for urban adaptation initiatives (see Denmark). In the UK and Denmark, mention is provided to the protection of other civil infrastructures, such as those concerning telecommunication or distribution of electricity. The centrality of infrastructure implies the complexity of this type of investment: not only do they normally imply long-term programming (see below), but they also require special intervention and responsibility of public actors and specific rules they must follow to operate (concerning the release of funds, the management of contracts, the ownership of infrastructure works, etc.).

One of the consequences of this important “infrastructural” aspect (but not exclusively for this) is that Adaptation policies tend to have a long-term character (both for objective reasons as some works functional to the adaptation require considerable time to be carried out, and for bureaucratic pathologies in the decision-making processes and other reasons or for delays in finding the necessary funding), even if they are aimed at obtaining concrete results (in terms of risk reduction immediately, or in any case in the short term (when mitigation measures can, unfortunately, generate effects only in the longer term). The time needed to decide, design and implement many of the activities labelled under Adaptation could go beyond the three to five years that, normally, define the long period. This does not hold for all the types of Adaptation activities, but it should be recognized as a typical aspect to consider. Also “softer” initiatives, such as those on regulations and even education normally require various years of deployment to produce the expected effects.

M&A policies, in general, require the cooperation of many diverse actors. This is particularly true for Adaptation. The list of sectors proposed above (as stressed as just an example of Adaptation policies) implies that the actors called to action are not only those concerned with the economy or with energy provision. Some are those involved in the management of the territory, urban management and planning, coastal management; disaster prevention and management (e.g., as explicitly mentioned in Germany and in Romania); management of cultural heritage (e.g., in France); and healthcare. Adaptation requires more types of actors than those involved in Mitigation policies.

This diversity of these actors is relevant also because it has to do with their typical professional and cultural backgrounds. Climate policies end up involving – sometimes significantly – also actors that are not used to working on issues connected to energy-related policies or energy management. This is particularly true for the already mentioned health sector, tourism or cultural heritage (e.g., in some cities, the management of cultural heritage traditionally prevents planting new trees (by direct request of the superintendencies of fine arts and historical and architectural heritage).

In general, all climate change policies have important societal implications and, implementing them implies managing social aspects through dedicated actions. This point is particularly relevant for Adaptation policies: as already noted above, adapting to climate change requires re-framing how traditional human activities are carried out. This includes also sectors that one could expect to be less touched by climate change, like management of cultural heritage, tourism, or health. Other sectors, such as the management of natural hazards – that are obviously connected to climate-related catastrophic events – are affected by the change in frequency and scope of disasters, and actors are called to intervene in emergency situations that are becoming the new normality. In this context, they must change how they engage populations and professionals, collect and use resources, and so on.

“Soft aspects” of M&A policies and complexity

One remarkable aspect of M&A policies – emerging from the various national cases – concerns what we termed “soft aspects” (which are typical also of Mitigation, see above).

We define them “soft” since they do not consist of actions aimed at intervening physically to mitigate or adapt to climate change (we consider soft and non-structural actions as synonymous, see above), but to set the conditions for correct and smooth implementation of such interventions. In all the countries, these aspects have become relevant aspects of climate policies.

Even if we have highlighted the differences in approaches to M&A, it is notable that soft aspects are foreseen everywhere, even if they are defined and managed differently. They are justified by the huge complexity of the effort that is being made to address the climate change challenges. Such complexity seems to be acknowledged in the different countries considered. The sources of such complexity could be listed in the following way:

- Climate change and its impact on society is an unfolding process, the knowledge of which is partially uncertain and always in the making
- Diversity and number of actors, each having specific points of view, interests, capabilities, and power

- Climate change is a process systemically impacting society; it can be tackled only if approached holistically and considering the interactions between different phenomena and trends
- Climate change affects various technological paradigms on which our modern world is shaped (e.g., the use of energy and natural resources retro-act on the environment). The regime through which the (social, economic and environmental) risks have been traditionally handled is not working anymore and new regimes should be established
- Climate change produces an overall transition to a new regime (which we do not know yet if it will be successful or not). A transition can be imagined as the result of a trend (in this case how the environment is being changed by current uses) and the policies to handle this trend. How policies address the development of the trend is a matter of research and, possibly, successive adjustments.

A comparison between the different countries makes it possible to highlight some criticalities of M&A policies that can be better understood, at least *prima facie*, by considering these sources of complexity. It is to be noted that most of them are social in nature or are generated by social interaction implied by their implementation.

15.2. Suggestions for a further reflection on M&A policies

15.2.1 Diffuse character of M&A policies

M&A policies have a multidimensional character: as stressed above, they both do not only have an economic or technical character, but they also involve various sectors, diverse actors, etc. Apart from the different levels of multidimensionality of the two strands of policies, it can be stressed that they imply both very centralized actions (e.g., adoption of new technologies in large production plants) and “diffused” actions whose main result is the behavioural change of a large number of actors whose decisions are decentralized (e.g., families that change some consumption routines). The point is that some of these policies must achieve diffused results to be effective. A very relevant phenomenon, which occurred in many countries among those considered here, is that while good results are being achieved in the promotion of diversified sources of energy production, more diffuse sectors lag, as in the case of construction or the diffusion of electric vehicles. This occurred, for example, in Romania and the Czech Republic or in France, where the Carbon Budgets were not complied with in some years because of the transport and construction sectors. In the Czech Republic, some successes were achieved for ETS diffusion but not in other sectors. This observation has important consequences.

One of the challenges of climate M&A policies is that the actions undertaken should “penetrate” all the societal and economic sectors. The needed changes must be diffused and occur as quickly as possible. This is more difficult when the decision processes are diffuse, as in the cases of

consumption, transportation, or the practice of circularity. What stands out is that the “diffused decision process” necessary for promoting both Mitigation and Adaptation should not be viewed simply as the sum of individual choices. Instead, it is primarily the result of broader social interactions. There is scientific literature that explores the connection between consumption models and individual choices; it highlights – for example - how consumers are not completely free to decide how to practice recycling of waste

This is a general stance that should be considered when considering the possible difficulties being faced in promoting effective M&A policies. Of course, the nature of these “broader social interactions” changes according to the sectors being considered. For example, the circular economy involves many actors, many of whom are individuals or small organizations, such as common citizens, families, and SMEs. The common challenge is changing diffused routines but, it goes without saying that the routines to be changed are different (for example, consumption habits are very different from the production practices of small businesses). Consequently, the tools to be used change according to the sectors, for example, for communicating or producing effective incentives for producers (not just small entrepreneurs but also farmers). Different are also: the “actors of the context” (e.g., producers associations), the context where interventions are needed (e.g., urban vs rural); relevant laws and regulations, etc. For sure, M&A activities must be managed in a tailored way and a one-size-fits-all approach cannot work.

The problem is that all these huge sets of activities must be implemented soon, and the relevant policymakers are called to engage in massive and novel actions that add up to those they are already responsible for. This is the general issue that can help understand why certain sectors produce more results in terms of contributing to mitigation and adaptation. Probably, among the factors that explain such a different “elasticity” in results are the plethoric-ness of certain sectors (abundance of diverse actors), their widespread integration within the social fabric, and, consequently, the different levels of “social complexity” they have compared to others.

15.2.2 Multilevel governance and coordination

One relevant issue that emerges in many national reports is that M&A policies require sophisticated multilevel governance approaches. This is due to their complex nature. Two different aspects of multilevel governance are worth being stressed here: the need of coordination between the various actors being involved in M&A and the support that has to be given to local governments (i.e., mainly municipalities) to implement these policies.

The first issue that emerges in many countries as important is the coordination among different ministries and administrative actors overseeing one or more aspects of M&A policies. This aspect could seem

trivial, something that could be taken for granted - but it is important since there is significant work to do to distribute funds, and control the implementation of the activities, through monitoring, etc. Additionally, many aspects of M&A policies are based on European regulations, and compliance with them should be carefully assessed. Moreover, each ministry and local administration has its specific mandate to follow that is, at least in part, independent from M&A policies; therefore, coordination is necessary.

The coordination of M&A policies is often assigned to specific administrative bodies, as it is in almost all the cases considered. In general, the practical guidance of policies-related activities is attributed to these administrative bodies under the responsibility of the Government who supervises the activities carried out by other administrative branches, typically the ministries. Various forms of monitoring are put in place. They have not necessarily been as adequate as expected but, as in the case of Romania, strong efforts are being made to improve them. An advanced approach to monitoring has been developed in the UK, thanks to the cooperation between the administrations and the consultative body called Climate Change Committee (CCC). As for what concerns adaptation in the UK, the approach to monitoring “extend(s) beyond risk assessment and planning to include a stronger focus on delivery and implementation of adaptation actions”. What is interesting is that this implies also “a theory of change for how to achieve those outcomes through the policy levers available to Government” (see chapter on UK). A similar arrangement is practiced in France, where a High Council for Climate (HCC) has been established, is independent, and is charged with evaluating national climate policies on an annual basis and providing recommendations for adjusting the strategies based on the results obtained.

Governance arrangements are often very complex since they must include regional administrations (as in the case of federal states as in Germany, or strongly regionalized states like Italy, or plurinational as the UK). In general, the source of complexity – beyond the very nature of the policies – depends on the fact that central administrations adopt regional/decentralized plans concerning M&A policies. This fact, of course, could imply negotiations so that regional solutions are consistent with national objectives. The challenge of multilevel governance does not come only from the regionalization of many European member states’ administrations, but it is intrinsic to the very nature of M&A policies: they have to affect local areas with new ways of producing and using energy and adapting the territory to a changing climate through different behaviours of citizens and businesses and renewed infrastructures. All this is made possible if actions at the local level are effective and this requires a strong intervention of local authorities (and not just regional authorities). An issue raised in most of the national reports is the correct provision of support to local governments. This support could entail the provision of adequate funds for local initiatives as well as of training, skills and expertise to implement innovative activities

at the local level. In France, for example, a specific office for supporting local authorities has been established. In Denmark, a specific initiative has been launched aimed at facilitating all the country's municipalities in defining and implementing action plans aligned with the Paris Agreement. The DK2020 – this is the name of this initiative – includes activities to foster cooperation of municipalities with the national government and the regions as well as capacity building for municipalities. In France, the importance of these issues emerged from the evaluation of the experience with Climate Change M&A policies. The suggestions were to improve the coordination between different levels of government and support local governments. Among the open issues, emerged in other countries, there was also the lack of funds for local authorities.

15.2.3 Multidisciplinarity

Connected to this “social complexity” issue of M&A policies, there is what we could term the issue of “multidisciplinarity”. These policies require interventions whose components are very diverse. From the national chapters emerges, for example, that all the policies imply communication activities. While this is a very general (and not questioned) tenet of many policies, nevertheless it implies a wide array of subordinated activities. Communicating with small communities – or relatively small – of sector players (e.g., electricity producers) or professionals is very different from communicating with larger audiences or with dispersed actors in the so-called “marginal regions”. The skills and capacities required are different and must be coordinated with those of the existing policymakers. M&A, as just stated above, policies require new connections between various sectors of public administrations and the related technical expertise (and related professional patterns). Furthermore, M&A policies entail more and more sectors that previously were not connected to energy-related policies. The examples are many: agriculture, biodiversity, waste management (that now is more and more seen in the framework of the circular economy), natural hazards, management of coasts and mountains, etc. These sectors are increasingly becoming relevant to energy-related policies, differently from the past. This means that the entire set of policy tools must be updated, including the professional approaches. We could expect that this “multidisciplinary” aspect of climate change policy is relatively more relevant for adaptation that – as explained above – has a wider scope and, therefore, requires a wider set of expertise for being implemented.

Last but not least, energy-related policies are more and more connected to research and innovation. Such a connection is not new, but what has changed is the role that research is playing nowadays. In a certain sense, policy priorities are not dictated primarily by political choices anymore, as was usual before the climate change emergency, but they are – if not indicated – at least highlighted by scientists. The novelty, therefore, is not so much the existence of a strong relationship between the research sector

and Academia on the one hand, and politics and policymaking on the other. Rather, what is new is that research has taken a leading role in this kind of policy. In some cases, this novelty has been institutionalized. An important example of this is the role that a technical advisory body as in climate policy in the UK.

15.2.4 Social impacts of M&A policies

The issue of social justice in pursuing climate change M&A objectives is important and mentioned in most of the national chapters. It was mentioned, for example, in the 2020 climate neutrality law of Denmark, which mandates considering the social and economic implications of climate policies. In France, the issue is considered in the last climate mitigation policies and became a point for reflection after the so-called “Gilet Jaunes” crisis, when all over the country protests (and even riots) took place against the carbon law that charged taxes on the consumption of carbon fuel. The issue is raised also in Romania and Germany, where, among the damages indicated there are also the possible social inequalities caused by Climate Change. In the Czech Republic case, reference is made to the provisions contained on the matter in EU programmes and policies (e.g., the Just Transition Fund). Also, the Italian policies highlight the risk of social damages caused both by climate change and actions undertaken to handle it (the risk of “energy poverty” is indicated). The same holds for the UK. In the UK, at the general level, the issue is not presented as a strategic issue, since the approach is openly market-friendly and initiatives to handle climate change are considered as potential economic opportunities that have to be managed based on the “grain of consumer choice”. Specific mention is made, however, to protect the vulnerable through dedicated assistance from the government. In Scotland – one of the four nations of the UK – specific mention is made to the issue of “just transition”. In the case of Austria, the social dimension of transition is dealt with by mentioning actions to take into consideration the vulnerable groups. The attention dedicated to the social aspects of Mitigation and Adaptation often seems too vague. Nevertheless, this does not mean that the possible social problems are not a practical concern of policymakers. Also considering the complexity of such policies, which are articulated in regional and local actions, the focus on social problems is devolved to regional and local policymakers who have the responsibility to implement M&A policies and cope with the practical problems they could bring about at the grassroots level.

We could say, in general, that a specific approach to how handling the social dimension of transition and M&A policies does not emerge clearly. Apart from the case of the UK (which is openly market-friendly), such approaches could consist of a clearer definition of action principles and priorities, or the identification of specific sets of tools (e.g., for tax policies) and actions aimed at promoting social justice when managing climate change. Probably, this is not the case not because the social dimension is

overlooked as a cause of possible problems, since it is always mentioned, and provisions have been set by different political authorities. Rather, this may depend on the fact that these problems are relatively new, and new approaches still must be figured out. Interestingly, it is worth observing that in France – where the social dimension of transition first emerged as a political problem – there are funds for research on the social implications of climate change.

15.2.5 Public awareness and exchange with the public

The social impacts of climate change and M&A policies are connected to another important societal issue, i.e., public awareness of M&A policies and their motivations. In almost all the countries considered, attention is paid to informing the public, promoting awareness of climate-related risks and policies, and therefore engagement (see above, the so-called “soft aspects” of M&A policies).

In general, it is acknowledged that climate change is impacting our individual and social lives, but it cannot be taken for granted that citizens and stakeholders agree and, even more, that they agree with the policies to be implemented on the subject. Based on this, in all the countries it is foreseen that civil society, stakeholders, etc. are given special attention in the communication concerning M&A policies. The emphasis, of course, changes. In the French case, a specific role is given to dialogue with citizens (even if the problem was that after a wide citizens’ consultation, just 10% of the proposals were adopted in the final plans); in other cases, mention is made to campaigns aimed at informing citizens (see Germany and Wales). In Scotland, the concept of Public Engagement is mentioned, therefore not just the provision of information to citizens but also their active involvement. As a matter of fact, the recent Scottish plan for Adaptation was completed after an open consultation.

It is to be noted that – as the French case teaches us – involving citizens and stakeholders is not an easy task. What should be clarified is the extent to which civil society’s actors have a say on policies’ contents and implementation. The risk is that of adopting a paternalistic stance, i.e., trying to involve actors external to the M&A policy realm to instruct them on what is good or bad for addressing the climate crisis. This could generate another risk, i.e., people could understand the problem of the social impacts of M&A policies just in terms of being properly informed, assuming implicitly that the negative impacts of such policies cannot be softened. This could lead to a lack of trust in the policy process, as it seems to be the case in France, or to the insufficient consensus that is generally recognized as a problem.

When considering the role of the public, it should be stressed that climate change policies are an area of public life where conflicts occur. Beyond the already quoted case of the French movement named “Gilet Jaunes”, it is worth reminding that some civil society organizations in the UK mobilized

the judiciary to state that the government actions were not in line with the UK laws on climate change. After the court's ruling, Actions were taken by the UK government to comply with the decisions of the court. This is to say that considering the social aspects of M&A policies also implies managing the social dialogue with diverse actors and taking into account the emerging conflicting positions and interests.

The problem of policymakers, therefore, is not just that of overcoming the negationist bent of some sectors of public opinion (through public understanding initiatives) but also dealing with the emerging opinions of the public about specific aspects of M&A policies, also considering that the context is ever-changing: public opinion changes for many reasons, including because of the very implementation of policies.

15.2.6 Scientific approach to M&A

As explained above, the role of scientific research in M&A policies is crucial and recognized as such in many of the countries we are considering here. The issue has been commented on (see above) but some consequences of research centrality are worth being further discussed. First of all, science enters the policymaking concerning climate change thoroughly. The most important example is monitoring, which plays a crucial role in climate policies' fine-tuning. The choice of indicators, the collection of data, and their interpretation depend heavily on the contribution of scientists (from a diverse array of disciplines, by the way). In Italy, an Observatory has been established, in the UK a scientific committee is called to provide advice including on monitoring, and the same happens in France where the Haut Conseil pour le Climat (HCC), an independent committee, carries out policy evaluation.

The point is that the scientific community is being challenged and the trust it enjoyed in the is not granted anymore by the public. The low socialization of science – which emerged, for example, during the COVID pandemic – is something that undermines this important pillar of climate change policies. The problem is not so much the grip negationism has – somehow unexpectedly – on the public, as the consequences it has on policies: they have to be deployed in the long run, act upon phenomena whose consequences are heavy but the causes are almost invisible, at least initially (the increase of temperature changes the climate but can be felt by humans only when it is too late to intervene or to avoid hard consequences). Policy arenas nowadays are affected by the so-called “short-termism” and polarization whereas the need is to implement policies that require a long-lasting consensus among policymakers, citizens, and stakeholders. In this framework, scarce trust in science and a wrong connection between science and policymaking is a problem – of a social nature – that must be tackled appropriately.

15.2.7 Improved timeframe and coordination

Complexity and novelty are characteristics of M&A policies that emerge in, different ways, in the various countries considered. In this framework, the following aspects are particularly relevant. First, the temporal dimension of policies: effects need to be produced as soon as possible, but the timeframe for implementation and realization of results is often long. This characteristic creates the problem of maintaining consistency in implementing actions, consensus and coordination among the various actors (who are diverse) over time. The time dimension is controlled, at least in part, through tools such as monitoring, dynamic policy planning and the multi-year budgeting procedure (so that the operational objectives are reframed based on the results and on new data). Such procedures, anyhow, address just a part of the problem.

Secondly, the complexity of M&A policies implies also a strong effort of coordination between them. This is something that emerges clearly in the Danish and the Italian cases, where specific attention is paid to how considering the interconnectedness of M&A and maintaining coherence between the two. This is relevant not just to policy design, but also to implementation and monitoring. The issue affects the research sector (for devising and updating appropriate monitoring tools), but also the range of activities aimed at engaging citizens and stakeholders (These actors must be properly listened to and their advice considered).

16. THE WAY FORWARD (CONCLUSION)

As stated in the introduction, the present Deliverable D4.1 is the first one submitted in WP4, and it includes just the results of the work carried out in the task 4.1 up to the month M14. This work will be complemented with the work, currently in progress, that will be completed in the coming months. The outputs of this supplementary work will be contained in the Deliverable D4.2 (planned for M24).

In the next months of 2025, this work will consist, first, of an update of the framework of the requested policies and their description. In fact, new and very relevant developments are underway considering the changes in the political framework. Without any claim to exhaustiveness, we point out the following:

- In the chapters concerning Austria and Romania, we have already underlined that the framework presented is relevant to the end of 2024 and that changes, even important ones, are expected in relation to the new government groups, which have very different orientations compared to the past
- Perhaps more gradually, the same is happening in the UK and could happen in Germany too
- The international framework also risks changing considerably given the United States' withdrawal from the UN-COP Paris Agreement and

the many consequences that this could have on the actual practicability of the objectives of this agreement.

The “institutional” or “governance” frameworks themselves are undergoing changes.

Secondly, and perhaps more important than the update, will be the in-depth analysis of the M&A policies that will be done. Specifically, this analysis will be focused on the elements listed below.

- The actual status of advancement of the implementation of policies/measures.
- A check on the apparent missing of specific policies/measures in certain countries (e.g., apparently not all countries support Waste management and circular economy initiatives; is it true?).
- The actual interlinkages, and synergies and contradictions between policies (including overlapping and trade-offs between mitigation and adaptation measures).
- The interconnection among sectors’ policies (having in mind the 12 CROSSEU sectors; and also further as, e.g., cultural heritage).
- The assessment of the policies/measures on the basis of available documents and in-depth interviews with national and European stakeholders (their effectiveness with a specific focus on possible bottlenecks and barriers; their impacts with also a focus on societal transformation; their relevance considering the specific contexts, etc.).
- The actual functioning of governance, beyond what is established by the legislation/by the rules (e.g., evidence of policy dynamics and institutional set-ups for policy formulation and implementation).
- The actual trade-offs and overlaps among mitigation, adaptation and sustainable development.

All these insights will be made, obviously, starting from the knowledge base presented in this document about the mitigation and adaptation policies and the state of their implementation, the governance frameworks as they are designed by the present regulations and practices; from what is already known about their effectiveness (starting from the achieved results) and their impact (see the various chapters of this deliverable) and, also starting from the considerations proposed in the previous chapter. For example, it could be interesting, among other, to delve into the following aspects:

- The interlinkage among structural and non-structural measures
- How cooperation between many diverse actors happens (including possible conflicts; interests, capabilities, and power; negotiation processes; etc.)
 - level: European, national, regional, and local levels
 - kind: public authorities, scientific community, business, NGOs/CSOs, citizens
 - inside public administration (e.g., specific administrative bodies)

- professional and disciplinary backgrounds
- ...
- Societal implications of the M&A policies/measures (e.g., policies effects on behaviours; “penetration” of societal and economic sectors; social impacts)
- Policies/measures as a transition to a new regime
- Functions and issues on “Soft aspects” of M&A policies (actions aimed at intervening for mitigating or adapting to climate change, but to set the conditions for correct and smooth implementation of such interventions)
 - sharing information,
 - promoting education and training,
 - organizing the governance of the overall policies effort,
 - managing transversal or cross-cutting issues.
 - research and Innovation
- Approaches to monitoring

In this second step of implementation of the T4.1, as already stated, further documentary sources will be consulted and in particular all the recent ones in order to update the current framework. However, the main source of information will be the consultation of key-informants at the European and national level in the 8 countries “represented” in the CROSSEU consortium, and sub-national level where devolution is particularly significant (as it is f.i., in the UK or in Germany). Key-informants at the local level (hotspots in the 8 CROSSEU case-studies) will be deeply consulted in respect to the implementation of T4.2 and T4.3.

The Grant Agreement does not specify the number or the quality of key-informants to be interviewed. Regarding the number, we suggest interviewing about 3/5 in each of the 8 countries and about 8/10 at the European level.

At the country level, they should mainly be managers or representatives of the main bodies mentioned in each of the “governance frameworks” presented for each of the 8 countries. Therefore, it will mostly be managers/representatives of public bodies. However, at least one interview should be done with a representative of one of the main non-governmental bodies involved in the environmental field.

At the European level we aim to interview:

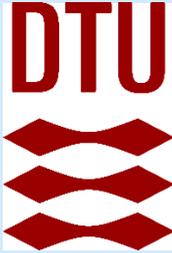
- 4/5 representatives of the European Commission (DG CLIMA, DG Environment, DG ECHO, DG MOVE, DG RTD)
- 1 representative of the European Environment Agency
- 1/2 representatives off the European Parliament
- 1 representative of the European Investment Bank
- 1 representative of the European Central Bank.

These will always be open, semi-structured interviews, tailored to each of the interlocutors. Although it would be desirable to organize focus (or

discussion) groups (much could be learned from the interaction of several people), it is believed that given the considerable commitments of the people to be interviewed, this will be impossible. With a few praiseworthy (and in any case desirable) exceptions, these will therefore be one-to-one interviews. The interviews will be conducted in the national language by the partners in the respective countries (however BOKU will conduct the interviews in Germany as well as Austria; and K&I will conduct the interviews in the UK as well as Italy). The interviews at the European level will be conducted by K&I.

The interviews are expected to be carried out between mid-August and mid-October 2025, based on a guide that will be prepared by K&I by May 2025 (which will also inform the methods of analysis of the information and the Table of Contents of D4.2) and discussed and validated with the interested CROSSEU partners the following month. The submission of D4.2 is expected for December 2025.

CROSSEU Partners

 <p>Meteo Romania</p>		
 <p>NORWICH BUSINESS SCHOOL</p>		
		
		
	