REPUBLIC OF ALBANIA
MINISTRY OF ENVIRONMENT

FIRST BIENNIAL TRANSPARENCY REPORT OF THE REPUBLIC OF ALBANIA UNDER THE PARIS AGREEMENT

October, 2025

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List of Abbreviations

ACE	Action for Climate Empowerment
AD	Activity Data
AEZ	Agro-Ecological Zone
AFOLU	Agriculture, Forestry, and Other Land Uses
AKBN	National Agency of Natural Resources
AKTI	Agency of Research, Technology and Innovation
BAU	Business-as-Usual
BTR	Biennial transparency report
BUR	Biennial Update Report
CCA	Climate Change Adaptation
CEC	Central Election Commission
CEFTA	Central European Free Trade Agreement
CMA	Conference of the Parties (Paris Agreement)
CRF	Common reporting format
CRT	Common Reporting Tables
CTF	Common Tabular Format
DRM	Disaster Risk Management
EDEN	Environmental Center for Development Education and Networking
EE	Energy Efficiency
EEA	European Environment Agency
EF	Emission Factors
EFFIS	European Forest Fire Information System
EIT	Economies In Transition
EMEP	European Monitoring and Evaluation Programme
ERE	Energy Regulatory Entity
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO Statistics Division
FDI	Foreign Direct Investment
FOD	First Order Decay
FOLU	Forest and Other Land Use
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GNP	General National Spatial Plan
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
HWP	Harvested wood products
ICA	International Consultation and Analysis
IEA	International Energy Agency
IGEO	Institute of Geo-sciences
IMWGCC	Inter-Ministerial Working Group on Climate Change
INC	Initial National Communication
INDC	Intended Nationally Determined Contribution
INSTAT	Institute of Statistics
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
IPS	Integrated Planning System

KCA	Key Categories
LCA	Life Cycle Assessment
LDC	Least Developed Countries
LEAP	Low Emissions Analysis Platform
LEDS	Low Emission Development Strategies
LULUCF	Land Use, Land Use Change and Forestry
MIE	Ministry of Infrastructure and Energy
MoE	Ministry of Environment
MRV	Monitoring, Reporting, and Verification
MTBP	Medium-Term Budget Programme
NAP	National Adaptation Plan
NCCS	National Climate Change Strategy
NDC	Nationally Determined Contribution
NEA	National Environment Agency
NECP	National Energy and Climate Plan
NID	Nationally Inventory Document
NIR	Nationally Inventory Report
NSDEI	National Strategy for Development and European Integration
NSDI	National Strategy for Development and Integration
NTUA	National Technical University of Athens
OECD	Organization for Economic Co-operation and Development
PDCA	Plan-Do-Check-Act-Cycle
PFCs	Perfluorocarbons
PRIMES	Price-Induced Market Equilibrium System
QA / QC	Quality Assurance / Quality Control
QM	Quality Management
RCP	Representative Concentration Pathways
RES	Renewable Energy Source
SEI	Stockholm Environment Institute
SIDS	Small Island Developing States
SLED	Scenario-based Life Cycle Emissions Data
SLR	Sea Level Rise
SNC	Second National Communication
SPI	Standardized Precipitation Index
SSP	Shared Socio-economic Pathways
TACCC	Transparency, Accuracy, Completeness, Comparability And Consistency
TCI	Tourism Climate Index
TNA	Technology Needs Assessment
UN	United Nations
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNSD	United Nations Statistics Division
VRB	Vjosa River Basin
WAM	With Additional Measures
WEM	With Existing Measures

Foreword

It is with great satisfaction that I present Albania's First Biennial Transparency Report (BTR), prepared in accordance with the Enhanced Transparency Framework of the Paris Agreement and reflecting the modalities, procedures, and guidelines adopted. This report represents a landmark achievement in Albania's journey toward greater climate accountability and serves as a cornerstone in strengthening our national climate governance.

The BTR offers a comprehensive and structured overview of Albania's climate actions, tracking both our progress and our evolving commitments under the Paris Agreement. It provides a complete national greenhouse gas inventory, applying improved methodologies and strengthened quality assurance protocols, and offers a robust analysis of our trajectory in fulfilling the Nationally Determined Contributions (NDCs), including the mitigation measures under NDC 2.0 and the updates introduced in the context of NDC 3.0.

Furthermore, the report outlines Albania's adaptation priorities and institutional arrangements, developed through the National Adaptation Plan (NAP) process. It also offers a reflection on the international support received thus far, alongside an articulation of the continued need for cooperation in finance, technology transfer, and capacity building. Lastly, the BTR situates Albania's climate agenda within the broader policy framework, highlighting the alignment with the EU Green Deal and the key national climate strategies currently in force.

The preparation of this report has been the product of strong domestic collaboration, under the leadership of the Ministry of Tourism and Environment, and with the dedicated contributions of national experts, sectoral ministries, and institutional stakeholders. The process was further strengthened through constructive international cooperation, which helped enhance Albania's institutional capacity, data quality, and transparency systems.

Beyond fulfilling our reporting obligations, this BTR is a strategic tool. It informs national decision-making, supports cross-sectoral policy alignment, and helps mobilize the resources needed to close the implementation gap. It reflects Albania's determination to act on climate in a transparent, evidence-based, and inclusive manner, ensuring that our development path remains sustainable, resilient, and equitable.

As we move forward, we do so with a clear sense of urgency and responsibility. Strengthening climate transparency is not an endpoint; it is an ongoing process that demands continued investment, institutional coordination, and global partnership. Albania is committed to this path and to playing its part in the collective global effort to address climate change.

Sofjan Jaupaj

Minister of Environment

1. National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases

1.1. Definitions

Annual monitoring of greenhouse gas emissions and removals is one of the obligations stemming from the *UN Framework Convention on Climate Change* and its *Paris Agreement* namely 18/CMA.1 and 5/CMA.

Albania became a Party to the UN Framework Convention on Climate Change (UNFCCC) as Non-Annex I Party in October 1994, accede the Kyoto Protocol also on 1 April 2005 and ratified the Paris Agreement on 21 September 2016.

The Convention divides countries into three main groups according to differing commitments:

Annex I Parties	The industrialized countries that were members of the OECD (Organization for Economic Co-operation and Development) in 1992 and listed in Annex I to the Convention. They include the 24 original OECD members, the European Union, and 14 countries with economies in transition (EIT).
Annex II	Parties Consist of the OECD members of Annex I, but not the EIT Parties.
Non-Annex I	Parties Refers to countries that have ratified or acceded to the United Nations Framework Convention on Climate Change that are not included in Annex I of the Convention.

The GHG emission data presented in this Biennial Transparency Report are consistent with the GHG emissions and removals reported by Albania in the NID. The inventory covers anthropogenic emissions of direct greenhouse gases CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3.

1.2. National circumstances and institutional arrangements

1.2.1. National Circumstances

1.2.1.1 Political Arrangement

The Constitution of Albania was adopted in 1998 through a national referendum. It defines Albania as a unitary, parliamentary republic in which sovereignty rests with the people. The Constitution guarantees the separation of powers, the rule of law, political pluralism, and the protection of human rights.

Albania has a parliamentary democracy. The Head of State is the President of the Republic, elected by Parliament for a five-year term, renewable once. The President's role is largely ceremonial, with limited powers in foreign affairs, defense, and the appointment of key officials. Executive power is exercised by the Council of Ministers, led by the Prime Minister, who serves as the central decision-making authority. Legislative power is vested in the unicameral Parliament (Kuvendi), composed of 140 deputies elected every four years through a proportional representation system. The judiciary functions as an independent branch of government. Since 2016, judicial reforms have introduced a vetting process for judges and prosecutors and established new institutions such as the High Judicial Council (KLGJ), the High Prosecutorial Council (KLP), the Special Anti-Corruption Structure (SPAK), and the restructured Constitutional and High Courts.

Elections in Albania are based on a proportional representation system with regional multi-member constituencies. A 1% threshold applies to political parties and a 5% threshold to coalitions at the constituency level. The Central Election Commission (CEC) is responsible for overseeing and administering elections.

Albania's political system is dominated by two major parties: the Socialist Party of Albania (PS), a center-left party currently in government, and the Democratic Party of Albania (PD), a center-right party serving as the main opposition. Other political actors include the Socialist Movement for Integration (LSI) and smaller minority parties. The overall political environment is characterized by strong polarization between the two main parties.

Following the territorial reform of 2015, the number of municipalities in Albania was reduced from 373 to 61. Each municipality is led by an elected mayor and a municipal council. At the regional level, prefects represent the central government. Local self-governance is recognized by the Constitution and aligned with the principles of the European Charter of Local Self-Government, although local authorities still face limitations in financial and administrative capacity.

1.2.1.2. Social Arrangement

Albania's social and political arrangements reflect its transition from a centralized socialist state to a pluralist democracy integrated into Euro-Atlantic structures. The political system is a parliamentary republic with an independent judiciary undergoing deep reform. Socially, Albania is marked by ethnic homogeneity, religious tolerance, and strong diaspora ties. Despite progress, persistent challenges remain in governance, rule of law, and demographic sustainability. Albania's trajectory is closely tied to its EU integration process, which serves as both a framework and a driver for political, social, and institutional modernization.

Following the collapse of its socialist regime in 1991, the country transitioned into a pluralist democracy with a market-oriented economy. Since then, Albania has undertaken major reforms in governance, social policy, and institutional frameworks, aligning its structures with Euro-Atlantic integration objectives. It has been a member of NATO since 2009 and was granted EU candidate status in 2014, with accession negotiations formally opened in 2022.

INSTAT[1] data published in June 2023, show that the population of Albania on 1st January 2023 is 2,761,785 inhabitants, experiencing a decrease by 1.1 % compared to 1st January 2022 due to sustained emigration and low birth rates. The population is predominantly Albanian, accounting for about 98%, with recognized minorities including Greek, Macedonian, Roma, Egyptian, Aromanian, and Montenegrin communities. Over 60% of the population lives in urban areas, with major concentrations in Tirana, Durrës, Shkodra, Vlora, and Fier. The Albanian diaspora is significant, numbering more than 1.5 million people, mainly residing in Italy, Greece, the United States, the United Kingdom, and Germany.

The Albanian Constitution guarantees freedom of religion and upholds the secular character of the state. The main religious groups include Sunni Muslims (around 50–55%), Bektashi Muslims (around 15%), Orthodox Christians (15–17%), and Catholic Christians (around 10%). Albania is widely recognized for its tradition of religious tolerance and peaceful coexistence among different faiths.

Education in Albania is compulsory for nine years, covering primary and lower secondary levels. Secondary and higher education are offered through both public and private institutions. The country's leading universities include the University of Tirana, the Polytechnic University of Tirana, and the Agricultural University of Tirana, along with several regional universities. Ongoing reforms aim to harmonize the national education system with the European Higher Education Area under the Bologna Process.

The Albanian health care system is publicly funded but faces financial constraints that have led to the expansion of private health services. While universal access to healthcare exists in principle, disparities remain between rural and urban areas. The social protection system provides pensions, unemployment benefits, disability allowances, and social assistance programs. National social inclusion strategies focus on vulnerable groups such as Roma and Egyptian communities, women, and youth.

Civil society organizations in Albania are active in areas such as governance, human rights, and social inclusion, though they often depend on external donors for funding. The media landscape is diverse, comprising numerous television, radio, print, and online outlets. However, the sector faces persistent challenges related to political influence, concentration of media ownership, and limited financial sustainability.

Albania in International and Regional Context

Albania has been a member of NATO since 2009 and actively contributes to Euro-Atlantic security. The country has been an official candidate for European Union membership since 2014, with accession negotiations formally launched in 2022. Ongoing reforms focus on strengthening the rule of law, combating corruption, and consolidating judicial independence. Regionally, Albania plays an active role in cooperation frameworks such as the Berlin Process, the Open Balkan initiative, and Central European Free Trade Agreement (CEFTA). It also engages in cross-border relations with Greece, North Macedonia, and Montenegro to proMoE minority rights and enhance regional collaboration.

[1] https://www.instat.gov.al/en/themes/demography-and-social-indicators/population/publication/2023/population-of-albania-on-1st-january-2023/

Key Challenges

Albania faces several structural and institutional challenges. Political polarization and limited accountability continue to affect governance, while corruption remains an obstacle to institutional integrity. Despite progress in judicial reforms, particularly through the establishment of SPAK and the vetting process, the rule of law still requires consolidation. Demographically, the country struggles with high emigration rates among youth and professionals, contributing to a growing brain drain. Socio-economic inequalities persist, especially between rural and urban areas and among marginalized groups. Additionally, both the media and civil society sectors need greater independence and long-term sustainability to strengthen democratic resilience.

1.2.1.3. Energy

Albania's energy sector is the main channel through which CO_2 and other GHGs enter the atmosphere in the country: heavy reliance on oil products for transport and final energy explains the bulk of fossil CO_2, while electricity is largely clean because it comes from hydropower (≈95–98%). The country's mitigation opportunity is therefore to replace oil use in transport and heating with electricity and efficiency measures while expanding non-hydro renewables and climate-proofing hydropower to reduce volatility and overall emissions (*IEA*).

Albania is a low-emitting country in absolute and per-capita terms, but its energy sector remains the single most important driver of national GHG emissions because energy use produces most CO_2 from fossil fuels (combustion for transport, heating, industry and limited thermal power). Total national GHGs are on the order of single-digit million tonnes CO_2-equivalent per year (about 8–9 $MtCO_2e$ reported for 2021), while fossil CO_2 emissions are roughly 4–4.5 $MtCO_2$ in recent years. Per-capita CO_2 emissions are low—around 1.6–1.8 tCO_2 per person (2022–2023) (*Emission Index; Worldometer*).

The energy sector plays a central role in shaping Albania's greenhouse gas (GHG) emissions profile. Energy-related fuel combustion is the dominant source of carbon dioxide (CO_2) emissions in the country, accounting for the majority of its total fossil-based emissions. Within this sector, the main contributors include fuel use for transportation, residential and commercial heating, and industrial processes. Each of these activities involves the burning of fossil fuels such as oil products, coal, and natural gas, which directly release CO_2 into the atmosphere. According to national inventory data submitted to the UNFCCC, energy combustion consistently represents the largest single source of Albania's total CO_2 output.

Electricity generation, however, is a distinct case within the Albanian energy profile. Unlike many other countries in the region, Albania's power sector is overwhelmingly dominated by hydropower. In most recent years, hydropower has accounted for approximately 95–98% of total electricity generation, leaving only a small portion covered by solar power and a minimal share by thermal (fossil-fueled) plants. This heavy reliance on renewable hydropower gives Albania one of the cleanest electricity mixes in the region[2] .

Albania's energy mix, though characterized by a renewable electricity base, still generates measurable greenhouse gas emissions due to the structure of its final energy use. The mechanics behind the observed emissions numbers can be explained through three main channels: the dominance of oil-based fuels, hydropower variability, and energy-related combustion in other sectors.

[2] https://www.iea.org/countries/albania/electricity?utm_source

First, the transport sector is the largest consumer of fossil fuels and thus the leading contributor to energy-related CO_2 emissions. While electricity production is almost entirely hydro-based and low in carbon intensity, the country's final energy consumption remains heavily dependent on oil products. Diesel and gasoline power the vast majority of road transport vehicles, and diesel fuel is also used in agriculture, small industries, and construction. In addition, heating oil continues to be used for residential and commercial purposes in some areas, particularly where natural gas infrastructure is limited. According to IEA data, petroleum products represent the dominant share of Albania's final energy consumption, making them the primary source of fossil CO_2 emissions.

Second, hydropower output—although clean—varies significantly from year to year due to changing hydrological conditions. During dry years or prolonged droughts, when river flows decline, hydropower generation drops substantially. In such cases, Albania compensates for the shortfall by either running its few thermal power plants or importing electricity from neighboring countries whose grids are more carbon-intensive, often reliant on coal or natural gas. This hydrological dependency introduces considerable volatility into the annual emission totals: emissions tend to rise sharply in dry years and fall again when hydropower generation recovers.

Third, additional energy-related emissions stem from industrial fuel combustion, construction, and agriculture. Industrial processes often require on-site fuel use for heat or mechanical power, while heavy machinery in construction and agricultural equipment such as tractors and harvesters also rely on diesel. These activities, while smaller in scale compared to transport, collectively contribute to the overall energy-sector emissions recorded in Albania's national greenhouse gas inventories submitted to the UNFCCC.

Therefore, the apparent paradox of low-carbon electricity but persistent CO_2 emissions in Albania is explained by its strong dependence on oil-based fuels in transport and other non-electric energy uses, combined with the hydrological variability of its renewable electricity system. This structure creates both opportunities—due to the low baseline of power-sector emissions—and challenges, as decarbonization will require shifting away from imported oil and stabilizing renewable energy production across seasons.

In the NID, under the Energy Sector section, emissions originating from, fuel combustion activities in road traffic, in the energy and manufacturing industry and in the commercial, agricultural and residential sector (Category 1.A) as well as fugitive emissions from fuels (Category 1.B) are considered

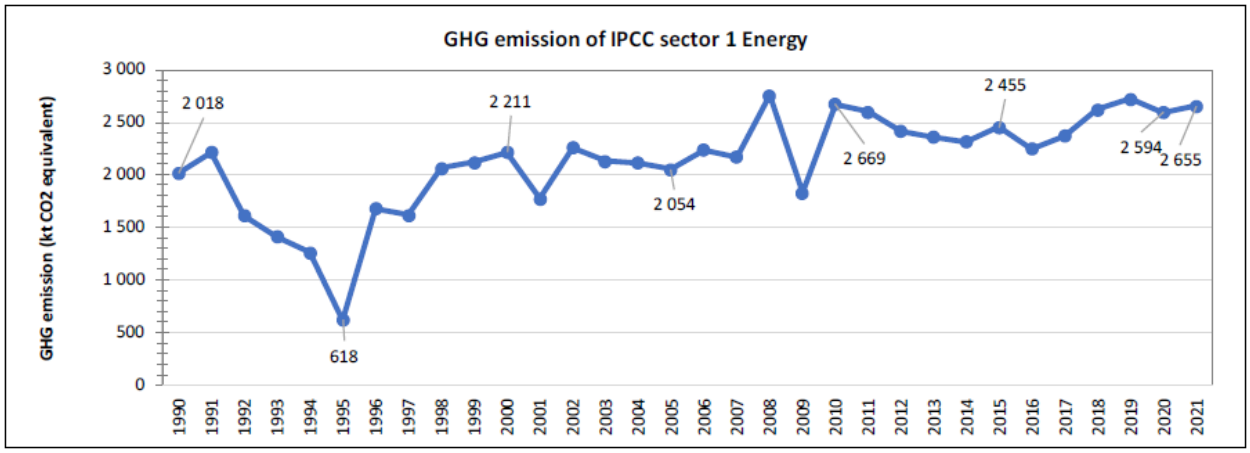

Figure 1: Trend of GHG emissions from CRT sector 1 Energy: 1990 – 2022

Source: National Inventory Document (NID) of Albania

In 2022, greenhouse gas emissions from CRT sector 1 *Energy* are not provided by NID, as per kt CO_2 equivalents which corresponds to % of the total national emissions (without LULUCF). The same results are missing at NID as % of the emissions from this sector originate from fuel combustion (1.A) and the fugitive emissions from fuels (1.B) as contribution in %. The main sub-categories within 1.A fuel combustion are 1.A.1. Energy industries and 1.A.3. Transport (here road transport)

The **overall trend** in GHG emissions from the sector *Energy* shows increasing emissions, but the value of increase in % from 1990 to 2022 is not provided by NID.

Fugitive emissions are decreased since 1990 due to slightly decreasing mining and post-mining activities, but there is not provided a value in NID.

Fluctuation of emissions are due to stopped/shut-down industrial production and limited public life during the time of:

- overall economic downturn in the country after 1994;
- world-wide economic crisis in 2007/2008;
- increased electricity production by hydropower and solar photovoltaic.
- agricultural activities;
- change in number of population;
- increasing road transport;
- worldwide COVID pandemic and the lockdown.

The CRT category 1.C. Carbon capture and storage (CCS) does not exist in Albania.

1.2.1.4. Transport

The Transport Sector is the largest energy consuming sector in Albania and plays an important role in the consumption of energy resources. After 1990, there was a significant increase in the number of the transport modes, especially for road transport, which lead to a significant increase of transport activity and fuel consumption, mainly diesel and gasoline. In order to calculate the future transport energy demand, the sector was divided in two sub sectors: transport of freight and passengers. For the transport sector, two main indicators measure the demand for passenger and freight transport: passenger-km and ton-km. It is forecasted that ton-km will increase by 85% in 2030 compared to 2014, while passenger-km will increase by 37%. The vast majority of transport is undertaken by road vehicles. Albania's transport sector has been increasing rapidly since 2000. The number of vehicles in circulation has increased and infrastructure is being improved, which leads to an ever-increasing total traffic load. The transport sector consumes significant quantities of energy (mostly in the form of diesel and gasoline).

The main driver of the transport sector is the demand for mobility, seen in a rising annual demand for person km. This variable has seen a strong growth in the past and is projected to continue to grow with historic growth rate. Transport of freight is projected to undergo growth with GDP.

In addition to total demand for transport, the share between transport modes is an important factor to consider. Figure 2 presents the modal shares of passenger transport. The largest share of passenger transport happens by passenger cars, with motorcycles and navigation taking small shares. Shared and public transport is an important factor. Rail transport is negligible, so transport by busses is the only shared

road transport mode. This has seen a decrease from 15.4% in 2015 to just below 11% in 2018. This share is projected to recover to 12% by 2030 and remain stable after. This still corresponds to an increase in total bus km even after 2030 due to the overall increase in transportation activity. Another important factor to regulate energy demand in passenger transport is the load of vehicles, but this is not projected to change with existing measures.

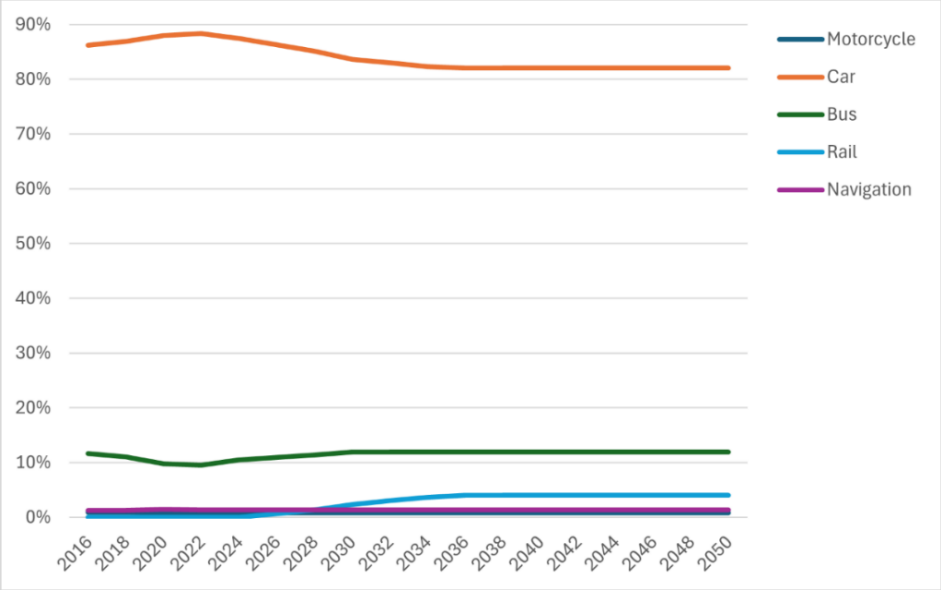

Figure 2: Shares of transport modes in passenger transport in Albania projected with existing measures until the year 2050

Source: National Energy and Climate Plan of the Republic of Albania - 31 October 2024

The energy demand in the transport sector is also determined by the technology used and respective fuels. The passenger transport and notably by car is the main driver of energy demand. New technologies are projected to penetrate the vehicle stock of passenger cars in Albania. A notable increase of electric vehicles is projected to start and continue towards 2050. As the vehicle market is dominated by used cars and the average age of cars is around 14 years, the penetration with novel technologies like electric vehicles limited even until 2050.

1.2.1.5. Industrial Processes and Product Use (IPPU)

In the Sector *Industrial Processes and Product Use (IPPU),* emissions originating from industrial processes, from the use of greenhouse gases in products, and from non-energy uses of fossil fuel carbon are considered. Emissions from this sector comprise emissions from the following subcategories:

- 2.A Mineral Industry
- 2.B Chemical Industry
- 2.C Metal Industry
- 2.D Other Production
- 2.E Production of HFC/PFC and SF6
- 2.F Consumption of HFC/PFC and SF6
- 2.G Other product manufacture and use
- 2.H Other

Greenhouse gas emissions are produced from a wide variety of industrial activities. The main emission sources are releases from industrial processes that chemically or physically transform materials like:

- Cement and Lime industry in category 2.A Mineral Industry,
- Iron and steel from scraps in category 2.C Metal Industry,

In the following table, an overview of the IPCC sub-categories included in this chapter is given and is provided information on the status of emission estimates of all subcategories. A „✓" indicates that emissions from this sub-category have been estimated.

Table 1: Overview of categories of CRT sector 2 Industrial Processes and Product Use (IPPU) and status of estimation

IPCC Code	CRT category	CO_2	CH_4	N_2O	HFC	PFC	SF6	NF3
2.A	Mineral Industry	✓	NA	NA	NA	NA	NA	NA
2.B	Chemical Industry	✓	NA	NA	NA	NA	NA	NA
2.C	Metal Industry	✓	✓	NO	NO	✓	NO	NA
2.D	Other Production	✓	NA	NA	NA	NA	NA	NA
2.E	Production of HFC/PFC and SF6	✓	NA	NA	NO	NO	NO	NO
2.F	Consumption of HFC/PFC and SF6	NE	NA	NA	NE	NE	NE	NE
2.G	Other Product Manufacture and Use	NE	NO	✓	NA	NA	NE	NA
2.H	Other	NA	NO	NA	NA	NA	NA	NA

Source: NID Albania, 2024

Other Industries of the CRT sector Industrial Processes and Product Use (IPPU), such as primary aluminium production, electronic industries (e.g. semiconductor), or production of Electrical Equipment are not existing in Albania.

During these processes, many different greenhouse gases, including carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), can be produced. The so-called F-gases hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), sulfur hexafluoride (SF6) and Other halogenated gases are oftentimes used in products such as refrigerators, foams or aerosol cans as well as electrical equipment.

Due to lack of data and resources GHG emissions from the use of greenhouse gases (HFC, PFC) and Other halogenated gases used in products were not estimated for all subcategories in this inventory cycle (2.F Consumption of HFC/PFC and SF6).

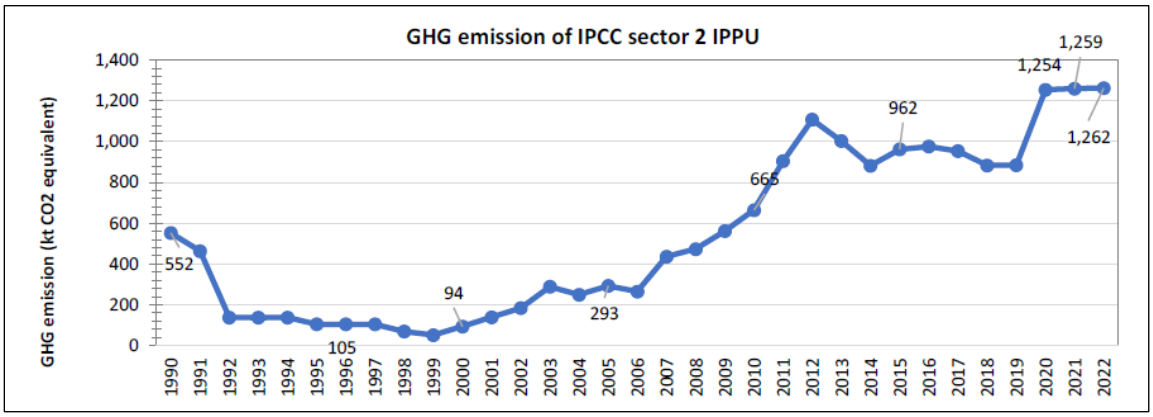

Figure 3: Trend of GHG emissions from CRT sector 2 IPPU: 1990 – 2022

Source: NID Albania, 2024

In 2022 greenhouse gas emissions from sector Industrial Processes and Other Product Use amounted to 1,262.44 kt CO2 equivalent.

The most important sub-categories of this sector are 2.A Mineral industry (mainly cement production). N2O does occur from 2.G.3 N2O from Product Uses.

In 2005 greenhouse gas emissions from sector Industrial Processes and Other Product Use amounted to 293.00 kt CO2 equivalent. The overall trend in GHG emissions from Industrial Processes and Other Product Use is an increase of 330.8% from 2005 to 2022 due to intensive cement production.

In 1990 greenhouse gas emissions from sector Industrial Processes and Other Product Use amounted to 551.48 kt CO2 equivalent.

The general trend is marked by significant dips and jumps mostly due to unstable cement production.

1.2.1.6. Agriculture

According to FAO Agriculture remains the most important sector in the Albanian economy, measured by its contribution to the country's gross domestic product, employment and macroeconomic stability. Evidenced by the fact that it is the only sector that has continued to grow during the last three years (about 3 per cent), agriculture in Albania has demonstrated a high capacity of adaptation and resistance to different crises, like the (rather prolonged) transition from centralized economy to market economy as well as the more recent economic crisis. Family farming in Albania represents a rural way of working which is, in many ways, deeply rooted in the traditions and the savoir-faire of Albanian farmers. Considering the importance of the agricultural sector in the economy of Albania nowadays, as well as the specific weight of family farming in Albanian agriculture, the main challenge for today consists of modernizing the methods of production and increasing the productivity of family-run farms while preserving as much as possible the benefits of this type of agriculture – such as the intact agro biodiversity and natural resources that characterize most of the agricultural landscape in Albania.[3] Albania lies into three agro-ecological zones:

- **The lowland zone**. This agro-ecological zone lies in Fieri region and includes municipalities of Fieri and Patos. The area starts from Vjosa mouth (north of it) alongside the Adriatic Sea where plains range from 1 to 200 m above sea level. Alluvial soils dominate here and also there are different spots with saline soils.

- **The Intermediate zone.** This zone lies in southern part of Vjosa mouth and include all Vlora region, municipalities of; Vlora, Selenica, Himara, Saranda, Delvina, Konispol and Livadhja. In this area is induced as well the Mallakaster and Roskovec municipalities (Fieri region). This area is between the lowland and mountain zones at altitudes from 100 to 900 m. Here field crops and fruit trees are grown but there is also low forest and shrubs.

- **The Southern Highlands Mountain zone** (Southern Highlands and Northern & Central Mountains) where the summer is warm and the winter is cold, with more than 100 days per year with frost. In this zone forests and pastures dominate. In this zone is included all Gjirokaster region (municipalities: Memaliaj, Tepelene, Permet, Gjirokaster, Kelcyre, Libohove, Dropull) and Kolonja municipality of Korca region.

[3] Available (5. September 2024) on https://www.fao.org/family-farming/countries/alb/en/

GHG emissions from this sector comprise emissions from the categories presented in the table below.

Table 2: Categories of GHG emissions from Agriculture sector

IPCC Code	Description	CO_2	CH_4	N_2O
3.A.1	Enteric Fermentation	NA	√	NA
3.B.2	Manure Management	NA	√	√
3.C	Rice Cultivation	NA	NO	NA
3.D.a	Direct N2O emissions from managed soils	NA	NA	√
3.D.b	Indirect N2O Emissions from managed soils	NA	NA	√
3.E	Prescribed burning of savannas	NO*	NO	NO
3.F	Field burning of agricultural residues	√*	√	√
3.G	Liming	NE	NA	NA
3.H	Urea application	√	NA	NA
3.I	Other carbon-containing fertilizers	NO	NA	NA
3.J	Other (please specify)	NO	NA	NA
A '√' indicates emissions from this sub-category have been estimated. * CO2 from biomass burning is not accounted in this category Notation keys: IE -included elsewhere, NO – not occurrent, NE -not estimated, NA -not applicable, C – confidential				

Source: NID Albania, 2024

The NID, under Chapter 5 "Agriculture (CRT sector 3)" includes information on and description of methodologies used for estimating GHG emissions as well as references to activity data and emission factors reported under CRT sector 3 Agriculture for the period 1990 to 2022.

1.2.1.7. LULUCF and Forestry

Currently, the LULUCF sector is a source of emissions (12.1% of total emissions), as the natural sink capacity cannot compensate for emissions from forest management. This is not projected to change with existing measures. Forest fires are another source of emissions, which can become a dominant factor in the overall GHG balance. Improved forest management can also help to reduce the impact and spread of forest fires, however, an increase to median fire area (4.8kha) is still projected (increase of 50% until 2050), with no large fire episodes considered.

1.2.1.8. Waste

NID Albania includes information on and description of methodologies used for estimating GHG emissions, as well as references to activity data and emission factors reported under CRT sector 5 – Waste for the period 1990 to 2021. In the Waste sector emissions of CO2, CH4 and N2O originate from the IPCC categories:

- 5.A *Solid waste disposal*,
- 5.B *Biological treatment of solid waste*,
- 5.C *Incineration and open burning of waste*,
- 5.D Wastewater treatment *and* discharge.

As regards the emission trends in 2022, GHG emissions from CRT sector 5 *Waste* amounted to 1,450.17kt CO_2 equivalent. In the period 1990 to 2022 GHG emissions from the CRT sector 5 *Waste* increased by 88.5% from 769.14 kt CO_2 eq in 1990 due to increasing landfilling activities (CRT category 5.A *Solid waste disposal*) as a result of decreasing population but significant growing waste generation rates. Also, the reduction of illegal disposal (sites) or open burning results in increasing landfilling. In the same period GHG emissions from the CRT category 5.D *Wastewater treatment and discharge* decreased due to decreasing number of population connected to sewage systems without treatment.

The most important categories of *Waste* are *solid waste disposal* followed by *wastewater treatment and discharge*. The most important greenhouse gas is CH_4.

Emissions from the categories 5.B *Biological Treatment of Solid Waste* was not estimated due to lack of data.

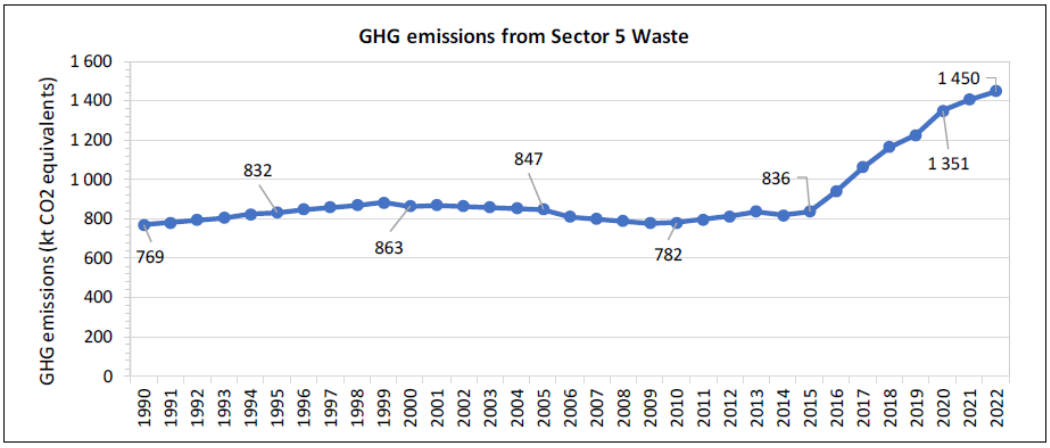

Figure 4: Trend of GHG emission of CRT sector 5 Waste for the period 1990 – 2022

Source: NID Albania, 2024

As regards the waste generation, in 2024, a total of 862,241 tons of waste were managed in Albania, marking an increase of 2.14% compared to 2023. Each inhabitant generated an average of 360 kg of waste during the year. Waste per capita increased by 9 kg over the last two years (from 351 kg in 2023 to 360 kg in 2024).

Recycling of waste has remained almost unchanged, while landfilling continues to dominate as the main disposal method. The composition of municipal waste has maintained the same structure over the years, with a slight increase in plastics and metals.

Key Points:

- 89.5% of the total waste consisted of household and similar waste (771 thousand tons).
- Organic waste accounted for more than half of the total (57.3%).
- Plastics and paper/cardboard followed as the next categories (around 9–10% each).
- 76.3% of waste was disposed of through landfilling.
- 18.8% of waste underwent recycling (material recovery).
- 4.9% was incinerated with energy recovery.
- Uncontrolled disposal outside landfills was significantly reduced, remaining at only 0.02% of the total.

Table 3: Total urban waste managed by generating sources (kg/capita) 2022-2024

Year	Total waste Ton	Total managed kg/capita/year	Of which not urban kg/capita/year	Of which urban kg/capita/year
2022	820,322	295	34	261
2023	844,157	351	36	315
2024	862,241	360	38	322

Source: INSTAT (https://www.instat.gov.al/media/h4iefy5h/urban-solid-waste-2024.pdf)

1.2.2. Institutional Arrangements

As a Party to the Convention and according to the Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention, section III, non-Annex I Parties:

> *Para 6. shall, in accordance with Article 4, paragraph 1 (a), and Article 12, paragraph 1(a) of the Convention, communicate to the Conference of the Parties a national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases (GHGs) not controlled by the Montreal Protocol, to the extent its capacities permit, following the provisions in these guidelines.*
>
> *Para 7. shall estimate national GHG inventories for the year 1994 for the initial national communication (INC) or alternatively may provide data for the year 1990. For the second national communication (SNC), non-Annex I Parties shall estimate national GHG inventories for the year 2000. The least developed country Parties could estimate their national GHG inventories for years at their discretion.*

Therefore, Albania is required to produce regularly a National Greenhouse Gas Inventory (National Inventory Document - NID), containing detailed and complete information on the inventory. In order to ensure the transparency of the inventory, the two relevant Guidelines provide the following guidance:

- 'Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement'
- Guidance for operationalizing the modalities, procedures and guidelines for the enhanced transparency framework referred to in Article 13 of the Paris Agreement which is in place from 2024 onwards:
  - Application of 2006 IPCC Guidelines for National Greenhouse Gas Inventories and 2019 Refinement to the 2006 IPCC Guidelines.

Albania's NID with detail description of the GHG inventory is prepared as a stand-alone report.

In the following tables are presented the Convention, Kyoto Protocol and Paris Agreement with the dates of entry into force and the current status as well as the Albanian submissions – reports and data sets.[4]

Table 4: Status of signature/ratification by Albania of the UNFCCC, Kyoto Protocol and Paris Agreement

Events	Entry into force	Status (07/2024)	Albania	
			Signature	Ratification
United Nations Framework Convention on Climate Change (UNFCCC)	21 March 1994	198 Parties		3 Oct 1994 [a]
Kyoto Protocol *to the UNFCCC* (First commitment period 2008-2012)	16 February 2005	192 Parties		1 Apr 2005 [a]
Doha Amendment *to the Kyoto Protocol* (Second commitment period 2013-2020)		130 Parties		31 Mar 2017 A
Copenhagen Accord			agreeing to the Accord	
Paris Agreement *to the UNFCCC*	4 November 2016	195 Parties	22 Apr 2016	21 Sep 2016

Remark: Ratification, Acceptance(A), Accession(a), Approval (AA), Succession(d)
Source: National Inventory Document (NID) 2024 of Albania (draft)

[4] National Inventory Document (NID) 2024 of Albania (draft)

Table 5: Status of Albania's submission of the National Communication (NC), Biennial Update Report (BUR) and Nationally Determined Contribution (NDC)

UNFCCC Reporting obligation	Communication (NC)	Biennial Update Report (BUR)	Biennial transparency report (BTR)	National Inventory Report (NID)	GHG inventory as part of NC and BUR/BTR *Time series based on*		
					1996 revised IPCC GL & IPCC GPG	2006 IPCC Guidelines	2019 Refinements to the 2006 IPCC GL
NC1 = INC	13 Sep 2002				1990-1994		
NC2	23 Nov 2009				1990–2000		
NC3	13 Oct 2016				2000 - 2009		
NC4	3 Nov 2022					2009-2019	
1st BUR		12 Oct 2021		12 Oct 2021		2009-2016	
1st BTR			Planned for 2025	31 Dec 2024 (draft)		1990-2022	

UNFCCC Reporting obligation	Intended Nationally Determined Contribution (INDC) / Nationally Determined Contribution (NDC)
INDC	September 2015
NDC	Entered into force 2016
Updated NDC	12 Oct 2021

Source: National Inventory Document (NID) 2024 of Albania (draft)

1.2.3. Inventory process

The current National GHG Inventory and National Inventory Report (NID) of Albania for the period 1990 – 2022 was compiled according to the recommendations for inventories set out in the 'Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement,[5] which is in place from 2024 onwards:

- Application of 2006 IPCC Guidelines for National Greenhouse Gas Inventories;
- Preparation of the NID according to the principles listed in section B. Guiding principles para 3:
  a) Building on and enhancing the transparency arrangements under the Convention, recognizing the special circumstances of the least developed countries (LDCs) and small island developing States (SIDS), and implementing the transparency framework in a facilitative, non-intrusive, non-punitive manner, respecting national sovereignty and avoiding placing undue burden on Parties;
  b) The importance of facilitating improved reporting and transparency over time;
  c) Providing flexibility to those developing country Parties that need it in the light of their capacities;
  d) Promoting transparency, accuracy, completeness, consistency and comparability;
  e) Avoiding duplication of work and undue burden on Parties and the secretariat;
  f) Ensuring that Parties maintain at least the frequency and quality of reporting in accordance with their respective obligations under the Convention;
  g) Ensuring that double counting is avoided;
  h) Ensuring environmental integrity.

1.2.4. Official inventory result approval process

Based on the UNFCCC procedures and Albania's own NID/NIR practice, the process for official consideration and approval of the National Inventory Document (NID), follows the steps below:

[5] Available (8 January 2020) on FCCC/PA/CMA/2018/3/Add.2 (18/CMA.1) https://unfccc.int/sites/default/files/resource/CMA2018_03a02E.pdf

1. Preparation and technical compilation (sector teams)

- **Data collection & methods.** Sectoral teams compile activity data and emission/removal estimates following IPCC guidance (2006/2019 methods as applicable). This includes Energy, IPPU, AFOLU, Waste and (where relevant) LULUCF. Teams document data sources, assumptions, emission factors and calculation spreadsheets.
- **Use of a national manual.** Albania uses a national inventory manual / procedure to ensure consistency, transparency and sustainability of the process (methodologies, QA/QC, institutional responsibilities).

2. QA/QC, verification and uncertainty analysis (technical quality control)

- **Tiered QA/QC.** Technical QA/QC is applied at the sector level (checking inputs, spreadsheets, calculation logic), followed by cross-sector checks (consistency, time-series, CRF tables). Uncertainty analysis and time series reconciliation are carried out and documented. This is central to the NID/NIR before it goes for wider review. https://unfccc.int/ghg-inventories-annex-i-parties/2024?utm_source=chatgpt.com

3. Internal review and consolidation by the Climate Change Unit / national coordinator

- **Central coordination.** The Climate Change Unit (the UNFCCC national focal point within the Ministry of Environment, MoE) consolidates sector outputs into the national inventory document and common reporting tables. The Unit checks that documentation requirements for the NID are satisfied (methods, institutional arrangements, QA/QC, archiving). Albania's practice shows MoE acting as the central coordinator and final sign-off authority at national level. https://www.undp.org/albania/publications/albanias-national-greenhouse-gas-inventory-report?utm_source=chatgpt.com

4. Inter-ministerial / stakeholder consultation and formal consideration

- **Inter-agency review.** Draft inventory and NID are circulated to relevant public institutions (ministries: energy, agriculture, forestry, transport, waste, statistical office, national environment/forestry agencies), and to stakeholders (research institutes, major data providers, donors/technical partners) for factual checks and comments. This step addresses data gaps, improves transparency, and documents national assumptions. Albania's NID/NIRs describe a broad consultative process.
  https://unfccc.int/documents/645244?utm_source=chatgpt.com
- **Responding to comments and revising.**

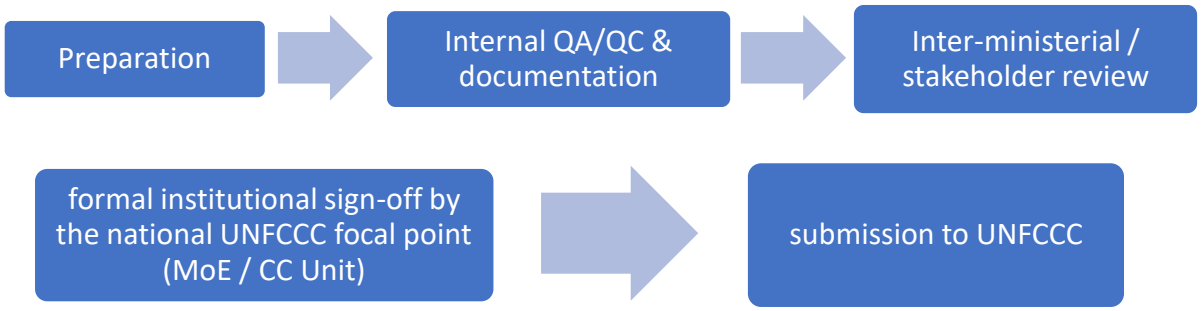

Figure 5: Schematic overview of the preparation and approval steps

1.2.5. Methodological aspects and Key categories

The main sources for activity data are national statistics from INSTAT and international statistics like Eurostat, UNSD and FAO. In order to fill gaps expert judgement based on discussion with relevant national experts is applied.

The main sources for emission factors of GHG are the 2006 IPCC Guidelines and 2019 Refinements to the 2006 IPCC Guidelines. For the emission factors of air pollutants, the EMEP/EEA air pollutant emission inventory guidebook 2023 is used.

For key categories, the most accurate methods for the preparation of the greenhouse gas inventory should be used. Due to lack of data and resources, it was not possible to estimate for all emissions according to the sectoral decision trees. Where the methodological choice is not in line with the sectoral decision tree, actions are defined and listed in the inventory improvement plan.

The following table briefly presents the activity data (AD) sources, the types of emission factors (EF) used, and the methods applied for estimating GHG emissions reported in this NID. Detailed information on applied methodology, used activity data (AD) and emission factors (EF) are presented in the relevant sectoral chapters.

The preparation of the inventory starts always with identification of the key categories of the previous inventory followed by the selection of the appropriate identify the appropriate method for estimation for each category according to the decision tree of each source presented in Volume 2 – 5 of the 2006 IPCC guidelines. In the following Figure the general Decision Tree to choose a Good Practice method is presented.

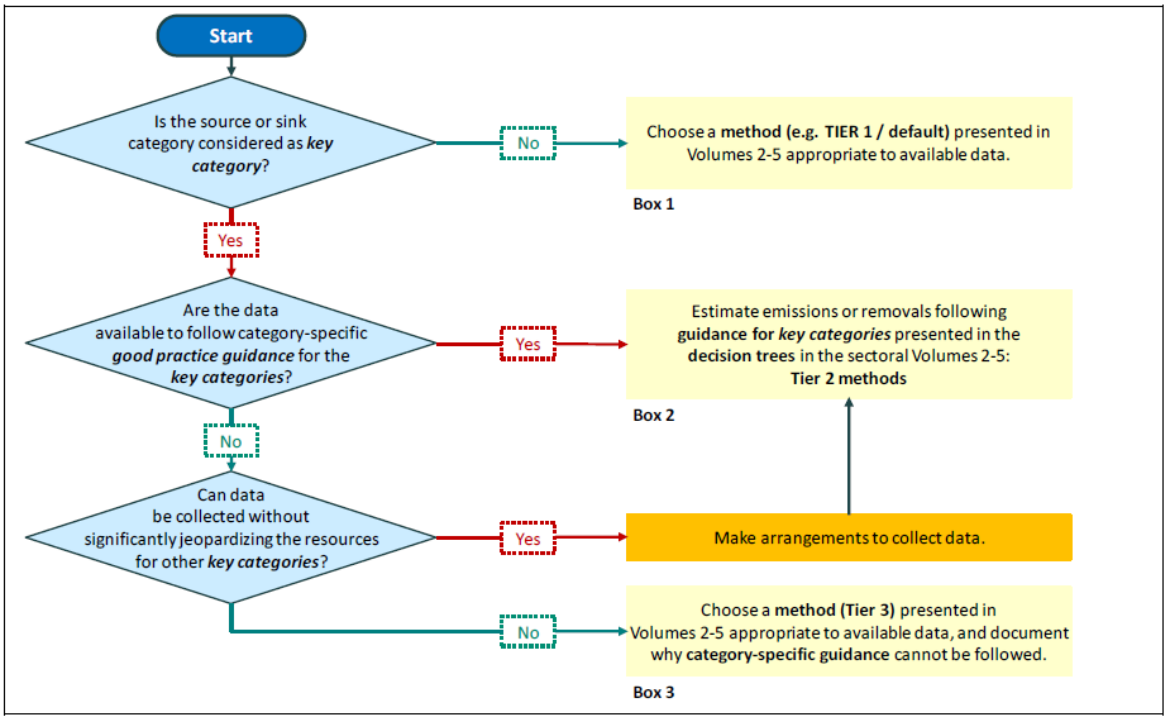

Figure 6: Decision Tree to choose a Good Practice method

Source: NID Albania, 2024

In the following table, an overview is provided for:

- Notation keys (in general)
- Notation keys to specify the method applied
- Notation keys to specify the emission factor used
- Notation keys to specify the activity data used

Table 6: Notation keys used to specify the method applied, emission factor used report and activity data used

Notation keys to specify completeness		Notation keys to specify the method applied			
NA	Not applicable	**D**	IPCC default	**CS**	Country Specific
NO	Not occurring	**T1**	IPCC Tier 1	**CR**	CORINAIR
NE	Not estimated	**T1a, T1b, T1c**	IPCC Tier 1a, Tier 1b and Tier 1c, respectively	**RA**	Reference Approach
IE	Included elsewhere	**T2**	IPCC Tier 2	**OTH**	Other
C	Confidential	**T3**	IPCC Tier 3	**M**	Model
Notation keys to specify the emission factor used		**Notation keys to specify the activity data used**			
D	IPCC default	**Q**	Specific Questionnaire	**PS**	Plant specific
CS	Country specific	**INSTAT**	Statistical Office of Albania	**EJ**	Expert Judgement
PS	Plant specific	**UNSD**	United Nations Statistics Division (UNSD)		
OTH	Other	**FAO**	FAO Statistics Division (FAOSTAT)		
M	Model				

Source: NID Albania, 2024

The National Inventory Document contains details on methods and emission factors used and source of activity data in all sectors (Energy, Industry, Agriculture, Waste, etc.)

The identification of key categories (KCA) is prepared in accordance with 2006 IPCC Guidelines[6] It stipulates that a key category is one that is prioritized within the National System because its estimate has a significant influence on a country's total inventory of greenhouse gases in terms of the absolute level of emissions or removals, the trend in emissions or removals, or both.

Key categories are those that, when summed together in descending order of magnitude, add up to 95% of the sum of all Lx,t or any category meeting the 95% threshold in any year of the Level Assessment (LA) or in the Trend Assessment (TA) is considered a *key category*.

The identification of key categories consists in general of six steps:

1. Identifying categories
2. Level Assessment excluding LULUCF (Approach 1)
3. Trend Assessment excluding LULUCF (Approach 1)
4. Level Assessment including LULUCF (Approach 1)
5. Trend Assessment including LULUCF (Approach 1)
6. Qualitative considerations

[6] IPCC. (2006). Methodological Choice and Identification of Key Categories. Volume 1 - General Guidance and Reporting, Chapter 4

However, for the current submission a KCA no qualitative considerations were included.

The National Inventory Document contains details on the level of disaggregation and identification of key categories, as well as the level of assessment in terms of contribution of each source or sink category to the total national inventory.

1.2.6. Inventory uncertainties

Uncertainty analysis characterizes the extent (i. e. possible interval) of results for the entire national inventory and for its individual components. Knowledge of the individual and overall uncertainties enable compilers of emission inventories better understanding of the inventory process, which encompasses collection of suitable input data and their evaluation. Uncertainty analysis also helps in identifying those categories of emission sources and sinks that contribute most to the overall uncertainty and thus establish priorities for further improvement of the quality of the data.

As provided in the NID, a general uncertainty assessment is not performed for this inventory cycle. However, for all sources uncertainties for activity data and emission factors used are provided in the sectoral chapters. The provided information on uncertainties is mainly based on default uncertainties provided in the 2006 IPCC Guidelines.

Uncertainty estimates are an essential element of a complete inventory of greenhouse gas emissions and removals and require a detailed understanding of the uncertainties of the respective input parameters. They should be derived for both the national level and the trend estimate, as well as for the component parts such as emission factors, activity data and other estimation parameters for each category.

As presented in the 2019 Refinement to the 2006 IPCC Guidelines, two approaches for the estimation of combined uncertainties can be applied.

- Approach 1 uses simple error propagation equations and is used to estimate uncertainty in individual categories, in the inventory as a whole, and in trends between a year of interest and a base year.
- Approach 2 uses Monte Carlo or similar techniques.

However, the GHG inventory for 1990 – 2022 is prepared mainly applying TIER 1 methodology including TIER 1 emission factor of the 2006 IPCC guidelines and the 2019 Refinement to the 2006 IPCC Guidelines. Therefore, the default uncertainties associated with the activity data and emission factors were selected.

TIER 1 should be implemented using Table 3.2 of the 2019 Refinement to the 2006 IPCC GL.

- The excel based tool '19R_V1_Ch03_Ad_IPCC_Tool_for_Approach_1_Uncertainty_Analysis.xlsx' provided with the 2019 Refinement to the 2006 IPCC GL[7] was applied.
- The uncertainty calculation was performed applying TIER 1 of the 2019 Refinements to the IPCC 2006 GL, for all sectors excluding LULUCF.

As a result of the uncertainty analysis, the NID tables do not provide the total uncertainty for 2022 (excluding LULUCF) and the total trend uncertainty for 1990 – 2022. Currently the NID document is in draft version.

[7] https://www.ipcc-nggip.iges.or.jp/public/2019rf/vol1.html

1.2.7. QA/QC control procedures

The 2006 IPCC Guidelines set out the major elements of a QA/QC system to be implemented by inventory compilers:

(1) inventory agency (Environmental Protection Agency) responsible for coordinating QA/QC activities and definition of roles and responsibilities,
(2) a QA/QC plan,
(3) general QC procedures (Tier 1) and source category-specific QC procedures (Tier 2)
(4) QA and review procedures, and verification activities,
(5) QA/QC system interaction with uncertainty analysis (see chapter on uncertainties),
(6) reporting, documentation and archiving.

The first steps to carry out quality assurance (QA) and quality control (QC) procedures have already been undertaken but need further

As described in the 2006 IPCC Guidelines, Chapter 6.5, a QA/QC plan is a fundamental element of a QA/QC and verification system. The QA/QC plan:

- outlines the QA/QC and verification activities;
- includes a scheduled time frame for the QA/QC activities;
- is an internal document to organize and implement QA/QC and verification activities that ensure the inventory is fit for purpose and allow for improvement.
    - QC activities
    - procedures for country specific methodologies
    - internal/external audits (QM specific)
    - inventory improvement plan
    - documentation and archiving
    - treatment of confidential data

A key component of a QA/QC plan is the list of data quality objectives, against which an inventory can be measured in a review. However, a good practice approach is a pragmatic means of building inventories that are TACCC – and maintaining them in a manner that improves inventory quality over time. This means that the good practice approach reflects the national circumstances regarding financial and technical resources and capacities.

However, the GHG inventory - estimation of GHG emissions and removals including reporting elements - is subject to continuous improvement.

A detailed QA/QC management explanation is provided in the National Inventory Document, Chapter 1.5.

1.2.8. Systematic improvement of inventory quality

The plan for improvement of inventory quality also constitutes one of the good practice tools besides being one of the fundamental provisions of the Paris Agreement (PA).[8] The National inventory system has drafted and annually updates an improvement plan for the existing inventory system. One of the basic tools for this planning is, among other, analysis of key categories. The improvement plan is yearly evaluated and updated. Focus on the improvement is on key categories, as well as on the development of country

[8] Decision 18/CMA.1, Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement, https://unfccc.int/resource/tet/0/00mpg.pdf

specific emissions factors and other necessary computational factors. Important part of the improvement plan are annual reviews held by UNFCCC and EU.

The planning of the GHG inventory preparation of each inventory cycle start with thoroughly analysis of the QA/QC plan and Inventory improvement plan in order to prioritize the tasks and available resources.

- QA/QC plan: based on findings of internal and external audits; it also includes a training plan for sector experts;
- Inventory improvement plan: bases on findings of the International Consultation and Analysis (ICA), peer-reviews, audits of the GHG inventory.

The QA/QC plan and the improvement of the GHG inventory follows a Plan-Do-Check-Act-Cycle (PDCA-cycle)[9], which is an accepted model for pursuing a continual improvement of a process, product or service according to international standards and is in line within the General Guidance and Reporting of the 2006 IPCC Guidelines.

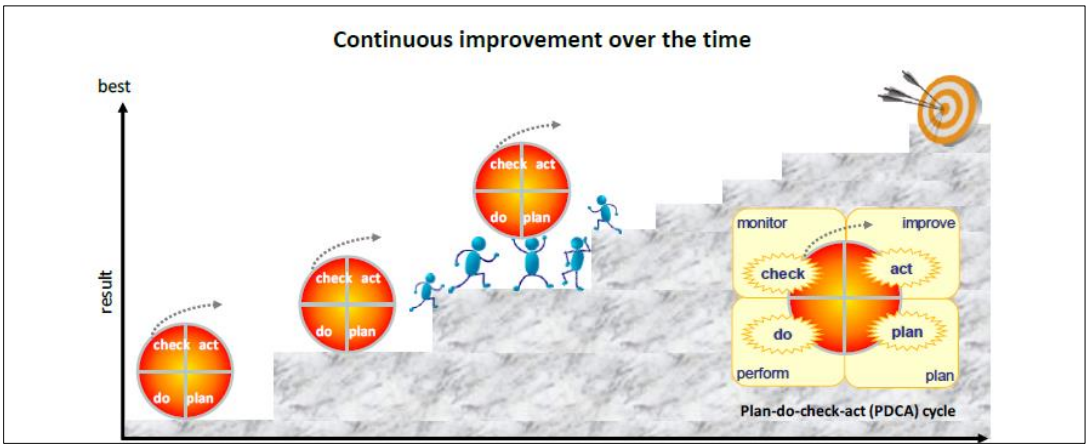

Figure 7: Continuous improvement

Source: NID Albania

The results from internal/external audits, expert peer reviews and UNFCCC international consultation and analysis (ICA) are merged in the inventory improvement plan and Quality improvement plan. These plans list the relevant sector, recommendations for improvement (reference and citation), priorities, responsibilities, deadlines and confirmation of implementation.

For further details please consult Chapter 1.5.1.2 and Chapter 10 of the National Inventory Document.

[9] https://asq.org/quality-resources/pdca-cycle

1.3. Summary tables

The paragraphs below contain a description and analysis for CTF Table 4 “Structured summary: Tracking progress made in implementing and achieving the NDC under Article 4 of the Paris Agreement” and CTF Table 6 “Summary of greenhouse gas emissions and removals in accordance with the common reporting table 10 emission trends”

The CTF Table 4 is part of Albania’s national climate reporting framework under the United Nations Framework Convention on Climate Change. It follows the official NDC reporting format used to present greenhouse gas emissions data, national targets, and progress toward those targets. The document is organized around a structured table that includes baseline data, indicator descriptions, target levels, and narrative assessments of progress.

The indicator chosen for tracking is “Total GHG emissions in CO_2 equivalent,” which serves as the primary quantitative measure of Albania’s mitigation efforts. Emissions are expressed in kilotonnes of CO_2 equivalent, and the reference year is 2016, which serves as the baseline for comparison. The reporting period covers the years 2022 and 2023, reflecting Albania’s implementation phase within the current NDC cycle.

According to the data, Albania’s total greenhouse gas emissions were 10,139 kilotonnes of CO_2 equivalent in 2016, rising to 11,010.7 kilotonnes in 2022 and 11,085.6 kilotonnes in 2023. The Business-As-Usual projection for 2030 is 15,148 kilotonnes of CO_2 equivalent, whereas the national NDC target for the same year is 11,361 kilotonnes. This corresponds to a reduction of approximately 25 percent compared with the Business-As-Usual level. The table also includes reference lines for total GHG emissions and removals including the LULUCF sector and for LULUCF contributions, but both are marked “not available,” indicating that data from this sector have not yet been integrated.

Table 7: Quantitative Analysis

Year	Total GHG emissions (kt CO_2-eq)	Change vs 2016	% Change
2016	10,139	—	—
2022	11,010.7	+871.7	+8.6%
2023	11,085.6	+946.6	+9.3%
2030 Target	11,361	+1,222	+12.0% (vs 2016)
2030 BAU	15,148	+5,009	+49.4% (vs 2016)

The data show that Albania’s greenhouse gas emissions have increased only slightly since 2016, with an overall rise of around nine percent by 2023. Despite this moderate growth, total emissions remain well below the level projected under the Business-As-Usual scenario for 2030. This indicates that Albania is broadly on track to meet its 2030 mitigation target, assuming that current policies and measures continue to be implemented effectively.

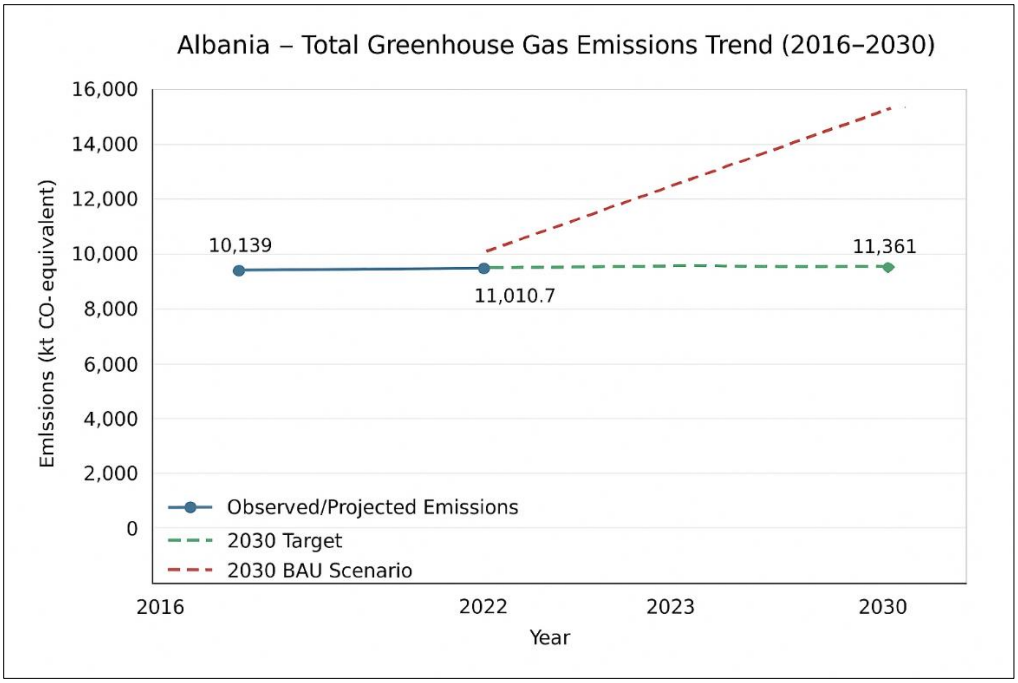

Figure 8: Trend chart comparing 2016–2030 baseline, target, and BAU scenarios

The trend reflects steady economic growth and ongoing reliance on fossil fuels, but also the impact of early mitigation actions in the energy and waste sectors. The absence of LULUCF data, however, limits a complete assessment of Albania's carbon balance, since forests and land use often act as a carbon sink that can offset a portion of national emissions. Incorporating these data in future reporting would allow for a more accurate picture of progress and the potential for further mitigation through reforestation and land management policies.

In general, the table aligns with UNFCCC reporting guidelines and demonstrates that Albania has achieved measurable progress in stabilizing its emissions trajectory. The key findings point to positive trends in maintaining low emission growth while advancing development. Nevertheless, data gaps remain—particularly in LULUCF and in the sectoral breakdown of emissions—which suggest the need for stronger monitoring, reporting, and verification systems. Expanding coverage to include non-CO_2 gases and improving data quality will enhance transparency and accuracy in subsequent NDC updates.

Overall, the data presented in the table confirm that Albania's emissions have risen modestly but remain consistent with its NDC targets. The 2030 objective of limiting emissions to 11,361 kilotonnes of CO_2 equivalent appears achievable, provided that ongoing efforts in renewable energy, efficiency improvements, and sustainable land use continue. The structured summary thus provides a clear snapshot of Albania's progress and highlights both its achievements and areas for further improvement in national climate reporting and policy implementation.

The CTF Table 6 presents time-series data for the main greenhouse gases (CO_2, CH_4, N_2O, and HFCs), both *including* and *excluding* the effects of the LULUCF (Land Use, Land-Use Change, and Forestry) sector. The data show the evolution of Albania's total emissions, highlighting the changing contributions of different gases and the mitigating role of land use and forestry.

The dataset summarizes Albania's greenhouse gas (GHG) emissions expressed in kilotonnes of CO_2-equivalent (kt CO_2-eq) for the period from 1990 to 2022. The gases covered are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and hydrofluorocarbons (HFCs), presented both with and without LULUCF adjustments. Each gas exhibits distinct behavior reflecting the structure of Albania's economy, its energy transition, agricultural intensity, and waste management systems.

In 1990, Albania's CO_2 emissions (excluding LULUCF) were around 9,622 kt, while including LULUCF they were slightly lower at 8,990 kt, indicating that the land-use sector acted as a modest carbon sink. Over the following decades, emissions exhibited a fluctuating downward trend, largely due to structural changes in the energy system, the decline of heavy industry, and shifts in land management. By 2022, total CO_2 emissions excluding LULUCF had declined to 7,006 kt, whereas including LULUCF they stood at 7,200 kt. This represents an overall decline of approximately 27% from 1990 levels, despite moderate year-to-year variations.

During the early 1990s, CO_2 emissions were relatively high, primarily due to fossil fuel combustion in the industrial and energy sectors during the transition period following the collapse of state industries. The period 1990–1995 marks a steep decline in CO_2 levels, coinciding with economic restructuring, the shutdown of heavy industry, and reduced energy demand. In subsequent years, a gradual recovery occurs as the economy stabilizes and energy consumption increases, though the carbon intensity remains lower than the pre-1990 levels. CO_2 remains the dominant contributor throughout the series, accounting for roughly 65–75 percent of total GHG emissions.

Methane emissions followed a different trajectory. Excluding LULUCF, CH_4 emissions started at 1,856 kt CO_2-eq in 1990 and fell to 1,198 kt by 2022, a reduction of about 35%. The inclusion of LULUCF effects slightly altered these totals, reflecting limited interaction between methane and land-use dynamics. The primary sources of CH_4 emissions remain the agricultural and waste sectors—especially livestock enteric fermentation and landfill gas—both of which have shown gradual mitigation since the early 2000s.

Methane (CH_4) emissions display a flatter but fluctuating trend, largely tied to agriculture (especially livestock and manure management) and solid waste disposal. CH_4 levels remain fairly stable through the 1990s, with minor reductions following improvements in waste handling practices. However, from the mid-2000s onward, there are slight increases attributable to growing livestock populations and urban expansion, which increase the volume of organic waste. Methane's contribution to total GHG emissions averages between 20–25 percent, highlighting its sustained importance in the national inventory.

Nitrous oxide (N_2O) emissions have fluctuated more irregularly. In 1990, emissions excluding LULUCF were 685 kt, falling to 283 kt by 2022, marking a 59% reduction. When including LULUCF, N_2O emissions were 640 kt in 1990 and 364 kt in 2022. These values suggest improvements in fertilizer management and declining agricultural intensity, but also a potential offset from soil and forest-related emissions.

Nitrous oxide (N_2O) emissions remain the smallest share, typically around 5–10 percent of total GHGs. The trend line for N_2O is relatively stable, with small variations reflecting agricultural fertilizer use and changes in land-use intensity. Slight increases in N_2O in the late 2000s and early 2010s coincide with agricultural recovery and intensified crop cultivation, while more recent years suggest stabilization due to better fertilizer management and shifts toward less emission-intensive practices.

Hydrofluorocarbons (HFCs), although minor in magnitude compared to other gases, have emerged as a growing source of emissions in recent years. Recorded data show HFC emissions increasing from negligible

levels in 1990 to approximately 116 kt CO_2-eq in 2022, rising by about 1.7% between 2021 and 2022. This reflects increased use of refrigeration and air-conditioning equipment, signaling the need for targeted mitigation policies under the Kigali Amendment framework.

The LULUCF sector continues to play a small but vital role as a carbon sink. While it offsets a portion of CO_2 emissions each year, its effect is insufficient to neutralize the overall increase in emissions from other sectors, especially energy and transport. Still, the positive sink capacity underscores the importance of sustainable forest management and reforestation initiatives as part of Albania's long-term mitigation strategy.

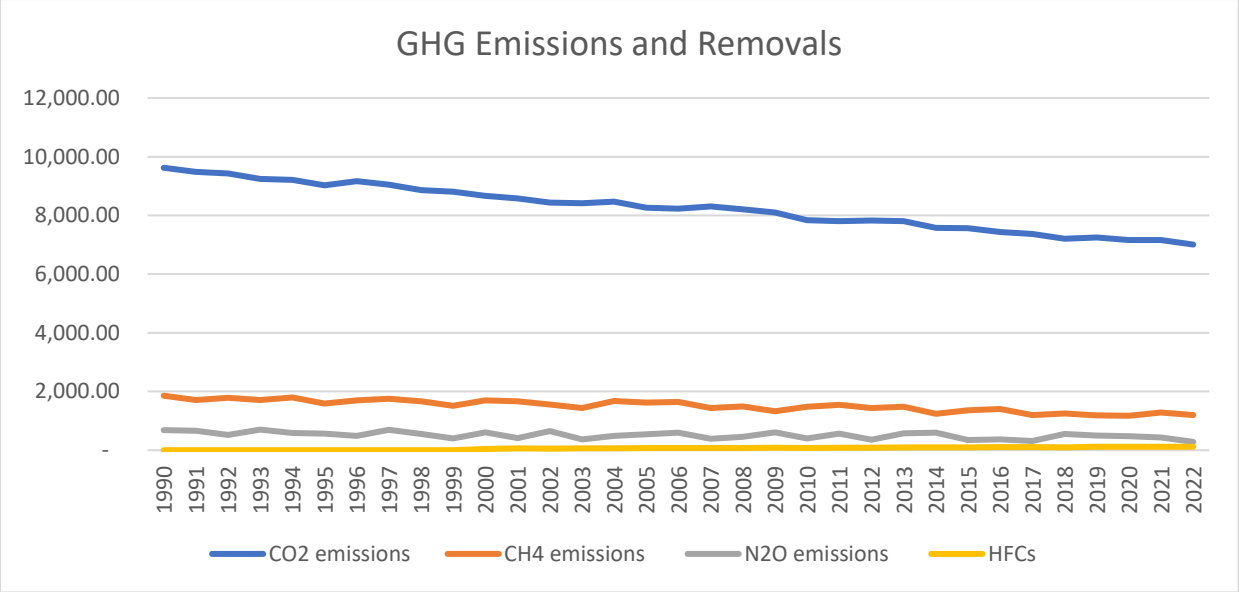

Figure 9: Evolution of CO_2, CH_4, N_2O, and HFCs emissions over time

Overall, the data indicates that Albania's greenhouse gas emissions profile has undergone significant transformation since 1990. The early period of industrial contraction produced immediate emission reductions, but subsequent modernization and economic growth led to partial rebounds, particularly in energy-related CO_2 emissions. Methane and nitrous oxide trends suggest that agriculture and waste management remain consistent sources that are less sensitive to short-term economic changes.

From a climate policy perspective, this trend highlights three key dynamics. First, the decarbonization of energy production and transport is crucial, as CO_2 remains the dominant driver. Second, long-term reductions will depend increasingly on agricultural efficiency and waste management innovation to tackle CH_4 and N_2O. Third, while total emissions appear to have stabilized in recent years, achieving significant further cuts will require systematic transition to renewable energy, electrification of transport, and sustainable rural practices.

1.4. Descriptive summary

Inventories of greenhouse gases for the purposes of the UN Framework Convention on Climate Change monitor emissions and sinks of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and F-gases emissions (HFCs, PFCs, SF_6 and NF_3). Emphasis is placed on accurate calculations of emissions of greenhouse gases with direct radiation absorption effect (CO_2, CH_4, N_2O, HFCs). The total impact of emissions of these gases is given as the aggregated emissions, expressed as the equivalent amount of carbon dioxide, taking into account the Global Warming Potential values (GWP) for a time period of 100 years.

Greenhouse gas inventories are prepared in accordance with the standard IPCC method. A detailed description of the methodology, emission factors employed and activity data is contained in the National Inventory Report document.

1.4.1. Description and interpretation of emission trends by gas

The major greenhouse gas in Albania is CO_2, followed by CH_4, N_2O and F-gases. The trend of individual GHG emissions relative to emissions in the respective base years is presented in Figure 6 below.

It can be observed a dominance of CO_2 emissions (in 1990, CO_2 made up almost 80% of emissions; by 2022, it still dominates but has reduced significantly in absolute terms). As regards the impact of CH_4 and N_2O, it shows that CH_4 declined moderately, reflecting improvements in waste management and energy efficiency; meanwhile N_2O remained relatively constant, showing little improvement in agriculture practices. Role of LULUCF (forests/land use) is important as the difference between "with" and "without LULUCF" bars suggests that land use acts as a carbon sink, reducing net CO_2 emissions. Its impact grows over time, meaning forests and land management help offset part of Albania's emissions. In long-term trend it is noticed that the steepest reductions occurred between 1990–2005, likely linked to the economic transition and reduced heavy industry. After 2010, the decline slows, with emissions plateauing around 17–18,000 $ktCO_2e$.

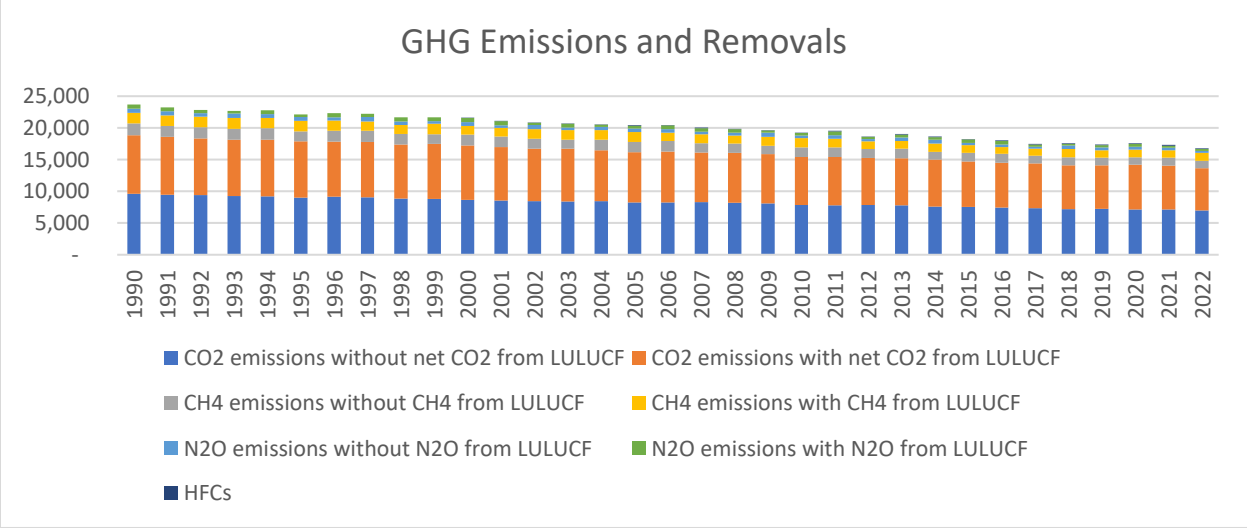

Figure 10: Total GHG emissions by gas (Kte)

The graphic shows that Albania's GHG emissions have declined by ~25–30% since 1990, primarily due to reductions in CO_2 emissions from energy and industry, with land use contributing as a carbon sink. However, agriculture-related CH_4 and N_2O emissions remain relatively stable, and overall emissions have plateaued in recent years, highlighting the need for additional mitigation efforts.

In particular, the following topics can be pointed out:

- ***Transition economy effect***: The fall after 1990 reflects Albania's shift from a centrally planned economy with high-emission industries toward a service-oriented, less energy-intensive economy.
- ***Energy sector restructuring***: Reliance on hydropower has reduced fossil fuel CO_2 emissions compared to regional peers.
- ***Agriculture challenge***: Methane and nitrous oxide emissions remain relatively steady, showing agriculture's resilience as a source of emissions.
- ***Climate policy***: Forestry and land use policies seem to play a growing role in carbon absorption.
- ***Future concern***: Emissions have stabilized rather than continuing to decline, suggesting that further reductions require targeted policies in energy, agriculture, and waste sectors.

1.4.2. Description and interpretation of emission trends by categories

The figure below presents greenhouse gas (GHG) emissions by sectoral sources and sinks over time. Total emissions have declined overall from ~11,000 $ktCO_2e$ in 1990 to ~9,500–10,000 $ktCO_2e$ in 2022. The trend shows a reduction during the 1990s–2005, followed by relative stabilization in the last decade.

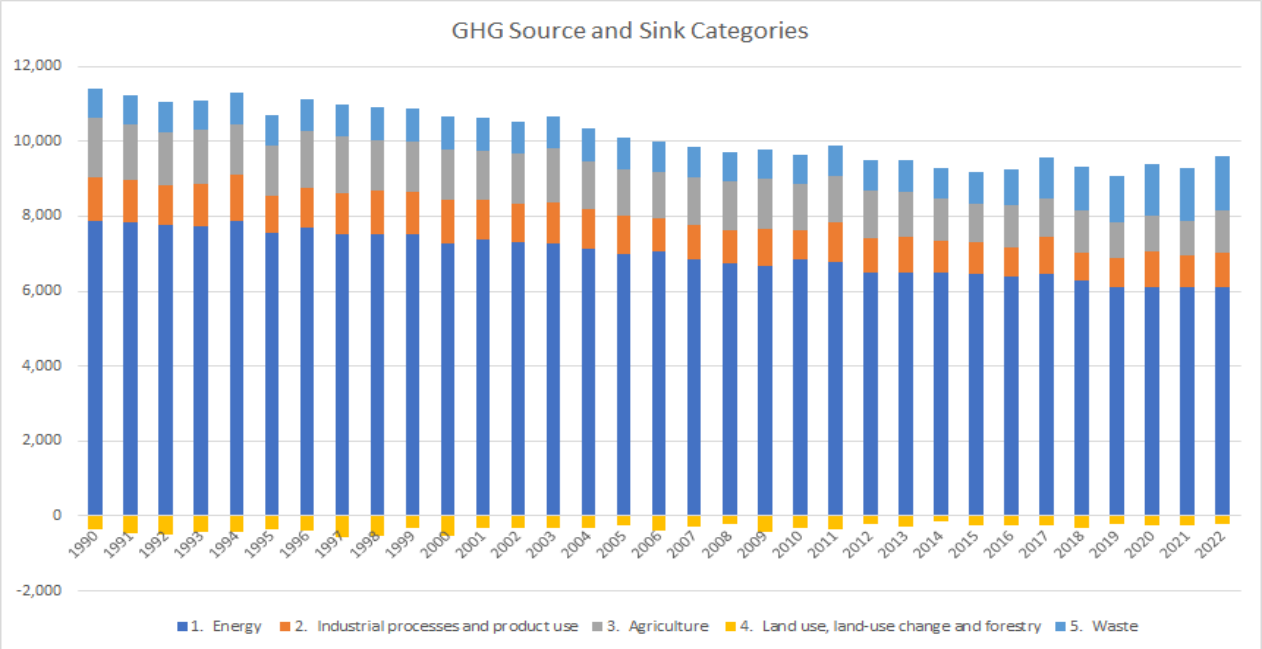

Figure 11: GHG emissions and removals from all economic sectors (Kte)

In terms of sectoral contributions, it can be pointed out the following:

- ***Energy (blue)***: This is the largest contributor across all years, making up more than 60% of total emissions. However, the graph shows a marked decline from 1990 (~7,500 $ktCO_2e$) to 2010 (~6,000 $ktCO_2e$); since 2010, emissions are relatively stable with minor fluctuations. This reflects Albania's

restructuring of energy supply, including the dominance of hydropower. Albania's emission profile is energy-sector heavy, with strong reliance on hydropower explaining much of the decline.

- ***Industrial Processes and Product Use (orange)***: This sector has a moderate contribution (~1,000–1,200 $ktCO_2e$ annually). It stays fairly stable over the entire period, with only minor variation.

- ***Agriculture (grey)***: Consistently contributes ~1,500–2,000 $ktCO_2e$ annually, while showing a slight decline after the 1990s, then it is stable. This indicates limited changes in farming practices and livestock-related emissions. Agriculture (together with the waste sector – see below) remain steady sources, pointing to challenges in modernizing farming practices and improving waste management.

- ***Waste (light blue on top)***: This sector is a small but stable contributor (~500–800 $ktCO_2e$). It is noticed that there is no significant change over time, showing that waste sector policies have not strongly altered emissions.

- ***Land Use, Land-Use Change, and Forestry (yellow, below zero)***: The negative values indicate that this sector acts as a carbon sink. It provides a consistent offset of ~500 to 1,000 $ktCO_2e$ per year, reducing net emissions, thus acting as a natural ally, offering a steady carbon sink. It is obvious that Albania's forest coverage plays an important mitigation role.

In more details, the graph shows a dominance of the energy sector as the driving force of Albania's GHG profile, while its reductions explain most of the overall decline since 1990. As regards the other sectors (specifically, agriculture, industrial processes and waste) it is noticed a relative stability with no significant changes over the past 30 years, thus pointing to structural rigidity and limited sector-specific mitigation. It is obvious that the LULUCF sector has a mitigation role due to the fact that forests and land management provide consistent CO_2 absorption; this is essential in offsetting emissions, especially as energy reductions level.

This graph shows that while Albania has cut emissions mainly through the energy sector and benefits from forestry carbon sinks, other sectors (agriculture, waste, industry) remain steady emitters. To continue reductions, Albania will need new interventions in agriculture (livestock management, fertilizer efficiency), waste (recycling, landfill gas capture), and industry (greener processes). Without further policy changes, emissions will remain stagnant at current levels, slowing progress toward climate goals.

2. Information necessary to track progress

2.1. National circumstances

2.1.1. Geographical Profile

Albania is situated in South Eastern Europe in the West of Balkan Peninsula. It encompasses an area of 28,748 square kilometers, between 39038' and 42039' of North Latitude and 19016' to 21040' latitude, with a maximum length from north to south of about 340 kilometers and a maximum width of about 154 km.

Bordering Countries: northwest Montenegro, northeast Kosovo, east Macedonia, and to the southeast and south by Greece. To the west and southwest, the Adriatic and Ionian seas border Albania. Albania's immediate western neighbor, Italy, lies some 80 km across the Adriatic. From the geographical position point of view, Albania represents a strategic point in crossing roads from Western Mediterranean Countries to Balkan and Small Asia.

Albania's geographic profile is defined by its mountainous terrain, fertile western plains, abundant freshwater resources, and diverse ecosystems. The country's strategic position between the Adriatic and Ionian seas and its complex relief result in a wide range of climatic conditions, from Mediterranean coasts to alpine highlands. However, these same features also make Albania highly vulnerable to natural hazards such as earthquakes, floods, and droughts.

2.1.2. Economic profile

Albania is implementing important structural reforms that will support equitable growth, raise productivity and competitiveness in the economy, create more jobs, and improve governance and public service delivery. Enhanced regional connectivity and access to regional and global markets, coupled with export and market diversification, can also help proMoE faster growth.[10]

Recent economic developments
Growth held steady at 4% in 2024, mirroring the 2023 performance. Services and construction led the expansion, while industry and agriculture slowed. On the demand side, private consumption and investment drove growth, while net exports weighed negatively. The employment rate averaged 68.6% in 2024, and poverty declined by 1.7 percentage points. Unemployment dropped to 9.4%. Average wages rose by 9.8% in 2024, with gains across all sectors. Credit grew by 12% year-on-year, with strong increases for both businesses and households.
During Q1–Q3 2024, the current account deficit widened to an estimated 1.5% of GDP, driven by a rising trade deficit due to falling goods exports and increasing imports, but it remained below the five-year average. Net Foreign Direct Investment (FDI) continued to perform strongly, increasing by 6.1%, and foreign currency reserves reached $6.6 billion as of December 2024.

In 2024, inflation more than halved relative to 2023, averaging 2.2%, mainly due to lower import-driven pressures. Domestic inflationary pressures are now the main driver of rising consumer prices.

[10] https://www.worldbank.org/en/country/albania/overview#1

As of December 2024, fiscal performance remained strong, supported by solid revenue collection and sluggish capital spending. The primary surplus met fiscal rules, and the overall deficit stayed low at 0.8% of GDP.

Economic outlook

Economic growth is expected to moderate to 3.2% in 2025 and 3.1% in the medium-term, amidst global trade policy uncertainty and the evolving global outlook. Inflation is expected to rise to the 3% target and fluctuate around it, driven by domestic pressures like wage growth and supply chain disruptions linked to trade shifts.

The current account deficit is expected to hover around 3.7% of GDP from 2025, gradually rising to 4.1% by 2027, yet remaining below the historical average. Higher imports linked to large public investments will widen the deficit, though improved service exports will help contain it. Poverty is expected to decline to 16%.

Albania's primary fiscal balance is expected to remain positive from 2025, averaging 0.4% of GDP. This assumes partial execution of capital expenditures and does not fully reflect the Medium-Term Revenue Strategy 2025- 2027. Public debt is projected to decline to an average of 52.8% of GDP over the period.

Risks to the outlook include heightened geopolitical tensions and uncertainty in global trade and economic policy, which could dampen EU growth—Albania's main trading partner. Domestic fiscal risks from public-private partnerships and state-owned enterprises add to vulnerabilities. However, effective EU Growth Agenda implementation and strong tourism receipts represent upsides to the uncertainty.

Albania's economy is structured around three primary sectors: services, industry, and agriculture. The services sector is the largest contributor, accounting for approximately 48% of the country's Gross Domestic Product (GDP) and employing a substantial share of the labor force. Within this sector, tourism plays a particularly vital role. The country experienced record-breaking numbers of foreign tourist arrivals in 2024, reflecting Albania's growing appeal as a Mediterranean destination and a key driver of service-sector expansion.

The industrial sector includes manufacturing, mining—particularly the extraction of chromium, which remains a leading export commodity—and energy production, with hydroelectric power as the dominant source. Albania's energy production is largely renewable, as hydropower accounts for almost all electricity generation, though the sector is vulnerable to climate variability.

Agriculture continues to play an important economic role, leveraging Albania's fertile plains and favorable climate. The sector provides food security, supports rural employment, and contributes to exports through products such as olives, fruits, vegetables, and dairy goods.

In terms of recent economic performance, Albania's economy recorded stable growth of around 4% in 2024, driven primarily by private consumption and investment. Inflation fell sharply from 2023 levels, averaging 2.2%—a decline attributed mainly to reduced import prices and improved energy stability. Foreign Direct Investment (FDI) remained strong, increasing by 6.1%, signaling investor confidence in key sectors such as energy, infrastructure, and tourism. The labor market also showed positive trends, with the unemployment rate decreasing to 9.4% and average wages continuing to rise. However, the current account deficit widened due to a drop in exports combined with growing imports, highlighting ongoing

trade imbalances.

Albania possesses valuable natural resources that underpin several industries. The country remains one of Europe's top producers of chromium and has significant hydroelectric potential that supports domestic energy generation and export capacity. Additionally, the food processing industry is expanding, capitalizing on Albania's agricultural base to add value and enhance competitiveness in both domestic and foreign markets. Emerging sectors such as technology and light manufacturing are being proMoEd as part of broader efforts to diversify the economy and reduce dependence on traditional industries.

Despite these positive developments, several challenges persist. The trade deficit remains a structural issue, underscoring the need for policies that proMoE export growth and industrial competitiveness. Emigration continues to affect the labor market, leading to workforce shortages in some sectors, but it also generates significant remittance inflows that support household consumption. Moreover, the return of skilled migrants offers potential for innovation and productivity gains, contributing to a possible "brain gain."

Albania continues to pursue strategies to attract foreign investment as a key lever for economic growth and diversification. Ongoing improvements in governance, infrastructure, and the business climate are essential to sustaining these trends and ensuring balanced, long-term economic development.

INSTAT[11] publishes the final data for Gross Domestic Product (GDP) for the year 2023 and the preliminary data for the year 2024. GDP at current prices in 2024 was estimated at ALL 2,517,821 million and ALL 2,364,275 million for 2023.

In 2024, the Albanian economy, increased in real terms by 4.05 %, while in 2023 it increased by 4.02%.

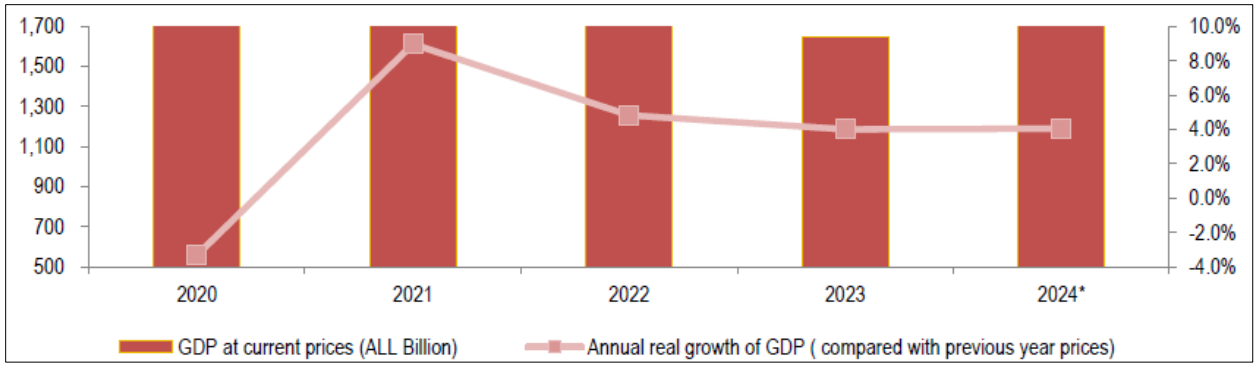

Figure 12: GDP and real growth rate, 2020-2024

Source: https://www.instat.gov.al/media/zxjh5vt4/gross-domestic-product-2023-final-and-2024-semi-final.pdf

2.1.3. Climate profile

Albania's climate is shaped by its Mediterranean location and diverse topography, resulting in three main climatic zones. The Mediterranean climate dominates the coastal and lowland regions, characterized by mild, wet winters and hot, dry summers. Inland basins and valleys experience a continental climate, with colder winters and hotter summers. The high mountain regions have an alpine climate, featuring long, cold winters and short, cool summers.

[11] https://www.instat.gov.al/media/zxjh5vt4/gross-domestic-product-2023-final-and-2024-semi-final.pdf

The annual average temperature across Albania ranges between 12°C and 16°C, depending on altitude and geographic location. In coastal regions, winter temperatures generally range from 7°C to 10°C, while summer temperatures average between 24°C and 32°C, occasionally exceeding 40°C during heatwaves. Inland valleys such as Elbasan and Korça often record winter temperatures below 0°C and summer averages between 17°C and 25°C. In the high mountain zones, winters bring sub-zero temperatures and heavy snowfall, while summers remain cool and short.

Albania receives an annual average rainfall of 1,000 to 2,000 millimeters, placing it among the wettest countries in Europe. The northern and western regions, including the Albanian Alps and coastal mountain ranges, can receive between 2,500 and 3,000 millimeters per year. Central and eastern basins, by contrast, receive less rainfall—typically between 600 and 800 millimeters annually. Rainfall is highly seasonal, with winter and autumn being the wettest periods, while summers are hot and dry, particularly across the southwestern regions of Vlora and Fier.

Albania is frequently affected by various weather-related hazards. Floods occur commonly in the northern and western regions due to intense winter rains and river overflow. Droughts are recurrent in the central plains and southern areas during the dry summer months. In recent decades, the country has also faced increasingly severe and frequent heatwaves. Snowstorms and cold waves are typical in the mountainous regions, often disrupting transportation and local infrastructure.

Climate change poses an additional layer of risk by amplifying existing vulnerabilities, particularly through increased temperature extremes, irregular precipitation, and sea-level rise. As such, Albania's development strategies must integrate climate resilience, disaster risk reduction, and sustainable natural resource management.

Due to a combination of political, geographic, and social factors, Albania is recognized by the World Bank (2021) as vulnerable to climate change impacts, ranking 80th out of 185 countries as per the 2021 ND-GAIN Index, which summarizes a country's vulnerability to climate change and its readiness to improve resilience to climate change.

Albania is especially vulnerable to natural disasters, including hydro-meteorological hazards such as floods, droughts, forest fires, and landslides and geophysical hazards such as earthquakes. According to the World Bank, the expected sea level rise due to climate change, in combination with intense rainfall events, pose a major threat to the country's urban areas.

Over the past six decades, Albania has experienced a rise in average temperature of approximately 1.2°C to 1.5°C. Rainfall patterns have become more variable, with an overall decline in annual totals but more frequent short and intense precipitation events. Sea levels along the Adriatic and Ionian coasts are gradually rising, threatening low-lying areas such as Durrës, Lezha, Shëngjin, and Vlora. Climate change has intensified several hazards, leading to more frequent droughts, heatwaves, flash floods, forest fires, and coastal erosion driven by both rising seas and human activities.

2.2. Institutional arrangements

2.2.1. Institutional arrangements for tracking progress

The Ministry of Environment (MoE), which is also the United Nations Framework Convention on Climate Change (UNFCCC) Action for Climate Empowerment (ACE) Focal Point for Albania, is responsible for any climate change-related activities, scientific evaluations, strategic planning, establishing environmental policy and legislation, and overseeing environmental protection in multiple areas including forest, water quality, and protected areas. The Climate Change Unit, developed by the Ministry of Environment, collaborates with other technical teams to ensure that Albania is performing its duties as a member of the United Nations Framework Convention on Climate Change. Together, the Albanian government and the Climate Change Unit support the country's actions in monitoring greenhouse gas emissions and ensuring adherence to its Nationally Determined Contributions (2022), which delineates commitment to climate change mitigation.

In 2014, the Albanian Prime Minister established the Inter-Ministerial Working Group on Climate Change, chaired by the Deputy Ministry of Environment, to assist in climate change mitigation and adaptation by coordinating institutions that are engaged in climate change processes and integrating climate change into new and existing policies, programs, and activities. The group is supported by nominated technical focal points in every related institution. The State Inspectorate of Environment, Forestry and Water, a public institution formed in 2014 (formerly State Inspectorate of Environment and Forestry) subordinate to the Ministry of Environment, is in charge of identifying and responding to issues related to the environment and climate change.

According to the Fourth National Communication (2022), to ensure sustainability and linkage with climate change–enabling activities already implemented in the country, climate change activities are implemented by the United Nations Development Programme Climate Change Programme Unit established in the frame of Albania's First National Communication (2002) to the United Nations Framework Convention on Climate Change. A steering committee has specific responsibilities in this respect and its members comprise the Ministry of Infrastructure and Energy, the Ministry of Agriculture and Rural Development, the Ministry of Health and Social Welfare, the Ministry of Defence/Civil Emergency Directory, the Institute of Statistics (INSTAT), the Institute of Geosciences, Energy, Water and Environment, the Vlora Prefecture, and Environmental Center for Development Education and Networking (EDEN), which is an environmental non-governmental organization.

The Albanian government set up the National Environment Agency (NEA), financed from the state budget, which is responsible for collecting climate-related data, ensuring environmental performance, conducting research and collecting environmental knowledge, conducting environmental impact assessments, and ensuring inspection of and compliance with legal requirements and environmental conditions. The National Environment Agency was established after restructuring the Environment and Forestry Agency in 2019.

Other institutions that are involved in the implementation of environmental policy, including implementation of climate change and climate development mechanisms are the Ministry of Agriculture, Rural Development and Water Administration, Ministry of Infrastructure and Transport, etc. These institutions collectively provide the data required for reporting greenhouse gas emissions and develop appropriate sector-specific actions to reduce the impacts of climate change.

Also, in Albania operates a wide net of Civil Society Organizations that aim to enhance environmental sustainability amongst Albanian citizens through a myriad of methods including policies, raising awareness, and dissemination.

2.2.2. Institutional arrangements for implementation of the NDC[12]

2.2.2.1. Institutional and legal aspects

Strengths: The Inter-Ministerial Working Group on Climate Change (IMWGCC), which coordinates all institutions involved in climate change processes, will facilitate the implementation of this NDC, and will proMoE some of the proposed adaptation measures, especially on strengthening the enabling environment. Furthermore, Albania's institutional arrangements already enable the preparation of national inventory and projections and comply with international reporting requirements. The existing coordination between the Ministry of Environment, other ministries, UNDP, FAO-Albania, and other institutional actors, is a strength to improve the MRV framework in the country as well as the implementation of mitigation and adaptation actions. General and sectoral mitigation and adaptation strategies are well documented in specific legal and policy documents, such as the National Energy and Climate Plan. The National Climate Change Strategy included national mitigation and adaptation plans (NAP). The Government of Albania is currently developing an action plan for this NDC to provide direction and a timeline for implementing adaptation and mitigation actions.

Gaps: Precise objectives or means of implementation are sometimes lacking, and some of the policy and legal documents have not been fully approved. There is a lack of consistency among different areas of policy, which relies on a high number of external consultancy projects. There is a need to move from a project-based approach to a more mainstreamed process. There is a lack of public awareness to acknowledge relevance of climate change. Adopted policies and measures are not always applied.

The adaptation section of this NDC incorporates adaptation actions for the Albanian Coast encompassing all current policies and strategies targeting settlements, population and tourism. This structure provides an opportunity to adopt a systematic approach to implementing adaptation actions. The NAP focuses on mainstreaming adaptation into sectoral approaches. Doing this will contribute to strengthen the enabling environment when implemented.

2.2.2.2. Knowledge and capacity

Strengths: Some knowledge and capacities are available within the administration, universities and other Albanian institutions both on mitigation and adaptation. For example, technical capacities are available to develop the MRV for mitigation in all sectors.

Gaps: However, scientific, technical and societal capacities could be further developed, to generate scientific evidence to support decision making on the most strategic measures and their implementation. For instance, on mitigation, the country is lacking harmonized, complete and consistent datasets for various sectors, such as for Waste and FOLU. Existing datasets could be improved for a more precise monitoring. Furthermore, there is no mitigation action tracking system that would enable the monitoring of implementation of policies and measures and of their impact in terms of GHG emissions reduction. In terms of adaptation, technical capacity to plan for adaptation, both on policy and on technical aspects, needs to be further strengthened at all levels.

[12] Albania NDC (revised)

2.2.2.3. Technology transfer

Strengths: Albania already benefits from the creation of the *Units of Information, Technology and Communication* and the *Agency of Research, Technology and Innovation* (AKTI). In some sectors, there is no need for important technology transfer (Agriculture, FOLU). In the Waste sector, a technology transfer is already undergoing with the building of new incinerators.

Gaps: Albania would benefit from updating its Technology Needs Assessment (TNA), assessing the technology needs for both mitigation and adaptation in the different economic sectors. Its latest version was published in 2005 and is a bit outdated. For the energy sector, there is a need to enhance technology transfer, for example for the oil and gas sector and on renewable energy. According to the EU Low Carbon Economy Roadmap, significant investments and technological transfers will be needed, in particular in new low-carbon technologies, renewable energy, energy efficiency, and grid infrastructure. Adapting the supporting built environment and climate proofing residential and productive infrastructure, touristic accommodation and assets and health (and other social) facilities will also require accessing new technologies.

2.2.2.4. Finance

Strengths: Albania has a robust financial strategy on mitigation and adaptation, including financial needs and potential sources of funding. Adaptation measures were prioritized in this revised NDC according to the relative magnitude of their costs, among others. Several measures that are very important for adaptation also have a low cost including several measures related to generating scientific evidence in support of decision-making and to capacity-building. These could be more easily incorporated in budgets and short-term plans. In the agriculture sector, most mitigation actions have a low cost and even can deliver additional revenues.

Gaps: Albania does not currently integrate climate change considerations and criteria, as well as relevant policies, in the guidance, procedures and methodologies used for selection and appraisal of public investment programs and projects. Such criteria need to include: (i) impacts of the project on climate change mitigation efforts, to determine if the project will lead to an increase or decrease of GHG emissions. Projects that have significant impact on GHG emissions should conduct GHG accounting and use the shadow price of carbon in their economic analysis and (ii) assessment of climate change risks and vulnerabilities relevant for the project, as well as if the project outcomes contribute to adaptation efforts and strengthening climate resilience. Public and private investments shall be secured and tracked so that they ensure effective implementation of the NDC in all sectors. In addition, Albania has limited experience in carbon pricing instruments to proMoE decarbonisation, including the EU Emissions Trading Scheme. With regards to adaptation, some essential measures involving among other climate-proofing infrastructure, or disaster risk management are not highlighted as having a “very high priority” mainly due to their high technical complexity and costs.

2.3. Description of the Nationally Determined Contribution

Albania submitted its updated First NDC in 2021. Albania's revised NDC presents a greater overall emissions reduction target of 20.9% below the business-as-usual scenario, or a 6.674 ktCO2e reduction from 2021 to 2030 as compared to the baseline scenario for the period 2016 to 2030.

The revised NDC contains more robust historical emissions data and an increased scope in mitigation targets, including targets for the industrial processes and product use, agriculture, energy (excluding international transport), waste, and land use, land-use change, and forestry sectors.

The main mechanisms of achieving this objective are related to maintaining the low-level greenhouse gases emissions from energy production sector and developing low carbon policies in order to prevent the increase of greenhouse gases emissions from other sectors of the economy.

All sectors need to contribute to the low-carbon transition according to their technological and economic potential. The EU Low Carbon Economy Roadmap calls for actions in all main sectors responsible for Europe's emissions – power generation, industry, transport, buildings, construction, and agriculture - and significant investments need to be made in:

- New low-carbon technologies
- Renewable energy
- Energy efficiency and
- Grid infrastructure.

The following table provides a detailed description of the elements of clarity, transparency and understanding of the NDC.

Table 8: Clarity, transparency and understanding of the NDC

Element of transparency	Albania updated NDC
1. Quantifiable information on the reference point (including, as appropriate, a base year):	
Reference year(s), base year(s), reference period(s) or other starting point(s)	Albania is committed to reduce its GHG emissions from its projected BAU baseline by the year 2030. Therefore, the target is expressed as a mitigation effort of -20.9% total GHG emissions reduction in 2030 compared to business-as-usual scenario for this year. Starting point of projections calculation is 2016: emissions are calculated from 2016 to 2030. NDC's implementation timeframe spans from 2021 to 2030.
Quantifiable information on the reference indicators, their values in the reference year(s), base year(s), reference period(s) or other starting point(s), and, as applicable, in the target year	Business-as-usual emissions in 2030 are calculated through a projection of emission based on the continuation on recent trends, current implemented policies, and take into account macroeconomics indicators evolution such as GDP and population. Total emissions (including FOLU) for the BAU scenario increase by: +49.4% between 2016 and 2030. Details of emissions for the reference year and the starting point are given in the NDC main text.
Target relative to the reference indicator, expressed numerically, for example in percentage or amount of reduction	The difference, in 2030, with the BAU scenario, is -3,170 kt CO2e below BAU in 2030, which represents a **mitigation impact of -20.9%.**
Information on sources of data used in quantifying the reference point(s)	National inventory GHG emissions from the 1st BUR draft and the 4th National Communication were used to estimate the starting point (2016) and to projected emissions up to 2030.

Information on the circumstances under which the Party may update the values of the reference indicators	National inventory emissions may be updated in two years, for the compilation of the 2nd BUR to reflect more accurate data.	
2. Time frames and/or periods for implementation		
Time frame and/or period for implementation, including start and end date, consistent with any further relevant decision adopted by the CMA	NDC's implementation timeframe spans from 2021 to 2030. Additional mitigation actions (actions that are not already in place even if sometimes they were already planned, but not effectively enforced) are considered in the calculation for this period. However, mitigation actions from existing policy and strategy have already begun and some are taken into account between the starting date (2016) and the current year (2021), considering their level of enforcement, explaining some differences between the BAU and NDC scenarios for this period.	
Whether it is a single-year or multi-year target, as applicable.	A single year target, 2030, is considered.	
3. Scope and coverage		
General description of the target	Albania aims to reduce emissions relative to business-as-usual by 2030, with the implementation of mitigation actions in the main emitting sectors of the economy: Energy, IPPU, Agriculture, Waste and Forest and Other Land Use (FOLU). The inclusion of IPPU, Agriculture, Waste and FOLU are an enhancement since the INDC only covered Energy.	
Sectors, gases, categories and pools covered by the nationally determined contribution, including, as applicable, consistent with IPCC guidelines	Sectors and categories	The NDC covers all IPCC sectors: Sectors covered by NDC are: - Energy (excluding international transport) - Industrial processes and product use (excluding F-gases) - Agriculture - Forest and Other Land Use (FOLU) - Waste Mitigation actions are considered for all sectors (for the IPPU sector, impacts of the Kigali Amendment are considered in the BAU).
	Gases	Carbone dioxide (CO_2) Methane (CH_4) Nitrous oxide (N_2O) HFCs PFCs, SF_6 and NF_3 are not covered as they are considered negligible. The inclusion of perfluorocarbons (PFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3) will be added to the NDC coverage once included in Albania's GHG inventory.
	Geographical	Entire national territory
How the Party has taken into consideration paragraphs 31(c) and (d) of decision 1/CP.21	Albania revised NDC takes into consideration all main emitting sectors as well as removals. For IPPU, the ratification of the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, is considered in the BAU and NDC scenarios.	
Mitigation co-benefits resulting from Parties' adaptation actions and/or economic diversification plans, including description of specific projects, measures and initiatives of Parties' adaptation actions and/or economic diversification plans.	Mitigation co-benefits are expected to result from the implementation of adaptation actions: - Strengthen the policy framework: development and enactment of laws, policies, regulations and plans, including action plans, and mainstreaming as well as Enhancing technical capacity are crucial for the implementation of mitigation actions. - Adaptations actions targeting the protection of environment to preserve the water resources, such as the protection of forest in the upper areas of	

	watersheds, are consistent with the implementation of actions to enhance forest management and reduce the fuelwood exploitation increasing the sinks in the FOLU sector. - Adaptations actions targeting the diversification of energy sources and the promotion of energy efficiency are consistent with the mitigation actions defined for the Energy sector. - Climate proofing transport infrastructure could also increase the reduction of emissions from the fossil fuel combustion within the Energy sector. - Adaptation actions targeting the adoption of integrated, ecosystem-based approaches (EbA) and/or nature-based solutions (NbS), such as the protection and restoration of existing forest/vegetation or green approaches to the built environment are consistent with the implementation of FOLU mitigation actions and can help reach additional carbon uptakes in soil and biomass. - Adaptation actions targeting the promotion of climate-smart and sustainable agriculture, forestry and fisheries can result in mitigation co-benefits, in line with the objectives defined for croplands and grassland within the FOLU sector. - Adaptation actions targeting the climate proofing coastal buildings and facilities are beneficial to the mitigation actions set up for the residential and commercial buildings subsector within the Energy sector. - Adaptation actions in the hydropower infrastructure allow to further exploit renewable energy and decrease emissions from the energy industries.
4. Planning process	
Information on the planning processes that the Party undertook to prepare its NDC and, if available, on the Party's implementation plans, including, as appropriate:	
i. Domestic institutional arrangements, public participation and engagement with local communities and indigenous peoples, in a gender-responsive manner;	To enhance its 1st NDC, Albania has set up an institutional arrangement that implies experts from different institutions, such as the Ministry of Environment and Tourism and UNDP Albania. The development of the revised NDC has been highly participatory.
ii. Contextual matters, including, inter alia, as appropriate:	National circumstances, such as geography, climate, economy, sustainable development, and poverty eradication	The Republic of Albania is a Balkan country in Southeast Europe, mostly mountainous. Albania has a subtropical Mediterranean climate, with some continental influence. In 2019, Albania had an estimated population of 2.88 million. Recent demographic developments show that Albania's population is shrinking and heading towards aging. Albania is fairly densely populated. In 2018, the average population density was 99.7 inhabitants per km_2. Albania has experienced a strong urbanization process. After 50 years of communist rule, Albania has transformed from one of the poorest countries in Europe in the early 1990s to an upper-middle- income country in 2020. Economic growth has been associated with structural economic changes. In 2019, the service sector constituted about 50% of the GDP of the country. Industry and construction made up about 20% of the GDP and the agriculture sector contributed about 19% of the GDP. The socio-economic progress of Albania has been recently hampered by two shocks: the country was hit by a devastating earthquake in November 2019; and the COVID-19 crisis. The earthquake and the pandemic are expected to significantly increase poverty. A detailed presentation of the national circumstances is provided in the main text of the NDC.

	Best practices and experience related to the preparation of the NDC	To prepare the update of the NDC, the objective was to maintain consistency between existing inventory and reporting processes. The preparation of the NDC was a work implying national experts for the mitigation and adaptation sections.	
Specific information applicable to Parties, including regional economic integration organizations and their member States, that have reached an agreement to act jointly under Article 4, paragraph 2, of the Paris Agreement, including the Parties that agreed to act jointly and the terms of the agreement, in accordance with Article 4, paragraphs 16–18, of the Paris Agreement;	The updated NDC target for 2030 will be fulfilled by Albania and is not part of regional joint agreement.		
How the Party's preparation of its NDC has been informed by the outcomes of the global stocktake, in accordance with Article 4, paragraph 9, of the Paris Agreement	Albania will consider the results of the Global Stocktake to be issued by the UNFCCC in 2023[13].		
Each Party with an NDC under Article 4 of the Paris Agreement that consists of adaptation action and/or economic diversification plans resulting in mitigation co-benefits consistent with Article 4, paragraph 7, of the Paris Agreement to submit information on:	How the economic and social consequences of response measures have been considered in developing the NDC;	This revised NDC is an enhancement of the first NDC in that it includes adaptation measures, focusing on the Albanian coast and AFOLU. Section 4 presents climate variability and change in the country, analyses climate risks, impacts and vulnerability for three priority sectors, discusses gender distribution, gaps and structural barriers regarding climate risks, impacts and vulnerability, and categorizes and prioritizes adaptive measures. Development and mitigation co-benefits and ease of implementation was considered to prioritize adaptation measures.	
	Specific projects, measures and activities to be implemented to contribute to mitigation co-benefits, including information on adaptation plans that also yield mitigation co-benefits, which may cover, but are not limited to, key sectors, such as energy, resources, water resources, coastal resources, human settlements and urban planning, agriculture and forestry; and economic diversification actions, which may cover, but are not limited to, sectors such as manufacturing and industry, energy and mining, transport and communication, construction, tourism, real estate, agriculture and fisheries		See the list of expected mitigation outcomes resulting from adaptation actions in section 3 of this table.
5. Assumptions and methodological approaches, including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals			
Assumptions and methodological approaches used for accounting for	Methods applied are presented in the main text of the NDC.		

[13] According to Article 14.2 of the Paris Agreement, the Conference serving as the Meeting of the Parties to the Agreement (CMA) shall undertake its first global stocktake in 2023 and every 5 years thereafter unless otherwise decided by the CMA. It is expected that the reduction commitments of the updated NDC of Albania will be considered in the Global Stocktake Report to be published in 2023 by the UNFCCC and its outcomes will be considered for the 2025 NDC.

anthropogenic greenhouse gas emissions and removals corresponding to the Party's nationally determined contribution, consistent with decision 1/CP.21, paragraph 31, and accounting guidance adopted by the CMA		
Assumptions and methodological approaches used for accounting for the implementation of policies and measures or strategies in the nationally determined contribution	The NDC takes into account current and draft policies and measures that have been used to define the list of mitigation actions for each sector. Assumptions about the level of implementation of these policies and measures were prepared in discussion with national experts, considering the national circumstances and the current level of implementation of existing objectives.	
If applicable, information on how the Party will take into account existing methods and guidance under the Convention to account for anthropogenic emissions and removals, in accordance with Article 4, paragraph 14, of the Paris Agreement, as appropriate;	The NDC takes into account the existing methods and guidance under the Convention, and considers its key principles of transparency, accuracy, completeness, comparability and consistency, and ensure the avoidance of double counting.	
IPCC methodologies and metrics used for estimating anthropogenic greenhouse gas emissions and removal.	Methodologies from IPCC 2006 Guidelines are applied to estimate historical and projected emissions. The NDC is consistent with the latest national GHG inventory compiled. Global Warming Potential Values from IPCC Second Assessment Report are applied.	
Sector-, category- or activity-specific assumptions, methodologies and approaches consistent with IPCC guidance, as appropriate, including, as applicable	i. Approach to addressing emissions and subsequent removals from natural disturbances on managed lands;	Natural disturbances are accounted for in the inventory and in the calculation of projections for the NDC. Forest wildfires are the only disturbances considered and are not excluded from the total of emissions in the FOLU. A background level (excluding exceptional episodes) of emissions is used for the projections, as exceptional episodes cannot be predicted.
	ii. Approach used to account for emissions and removals from harvested wood products;	Harvested wood products (HWP) are not yet accounted in the national inventory, immediate oxidation assumption is applied. The same is done in the NDC to be consistent. Next inventories will consider whether HWP calculation could be improved.
	iii. Approach used to address the effects of age-class structure in forests;	No specific modelling of forest biomass has been applied. Projection is based on the parameters (increment rate, losses) used in the inventory.
Other assumptions and methodological approaches used for understanding the nationally determined contribution and, if applicable, estimating corresponding emissions and removals	i. How the reference indicators, baseline(s) and/or reference level(s), including, where applicable, sector-, category- or activity specific reference levels, are	The BAU scenario is based on the most likely evolution of the Albanian energy sector according to the baseline scenario of the National Energy Strategy approved by the Albanian Government on August 8, 2021 and with no further policy interventions. It was developed accordingly to the National Energy Strategy considering new set of macro- economic drivers such as GDP and population. LEAP was the energy model used for energy demand forecast until 2030.

	constructed, including, for example, key parameters, assumptions, definitions, methodologies, data sources and models used;	
The intention to use voluntary cooperation under Article 6 of the Paris Agreement, if applicable	The accounting rules for international carbon markets under Article 6 of the Paris Agreement have not been set up yet. Albania intends to sell carbon credits during the period until 2030 to contribute to cost-effective implementation of the low emission development pathway and its sustainable development. Albania foresees that the utilization of international market mechanism is conditional on having effective accounting rules developed under the UNFCCC to ensure the environmental integrity of the mechanisms.	
6. How the Party considers that its NDC is fair and ambitious in light of its national circumstances		
How the Party considers that its NDC is fair and ambitious, in the light of its national circumstances,	Albania will take into account the ultimate objective of the UNFCCC in its future development and commits to decouple GHG emissions from its economic growth and embark on a low emission development pathway beyond 2030.	
Fairness considerations, including reflecting on equity;	Albania considers its update of the INDC ambitious because it covers more sectors and gases, and it increases the reduction target compared to BAU to be achieved in 2030. To ensure the implementation of this higher mitigation ambition, substantial investments will be required. The updated NDC target thus represent progression beyond the current NDC. Adaptation has also been considered in the updated NDC. The country's emissions per capita will remain substantially lower than the European average (3.5 Mg CO_2 eq. per capita in Albania, compared to 8.4 Mg CO_2 eq. per capita in the EU-27).	
How the Party has addressed Article 4, paragraph 3, of the Paris Agreement;	Albania's updated NDC represents an enhancement of the first NDC, as the scope includes more sectors and gases, and the mitigation target in 2030 is more ambitious (from 11.5% to 20.9%).	
How the Party has addressed Article 4, paragraph 4, of the Paris Agreement;	The updated NDC includes all sectors except PFCs, SF_6 and NF_3 from IPPU, while the first NDC included only Energy sector, showing the intent to have a mitigation target covering all sectors.	
7. How the NDC contributes towards achieving the objectives of the Convention as set out in its Article 2		
How the NDC contributes towards achieving the objective stated in UNFCCC Article 2, which has been later clarified as the objective of limiting global warming at +2°C and if possible +1.5°C through the climate neutrality during the 21st century	The revised NDC of Albania contributes to the global mitigation effort considering its national circumstances. The mitigation actions are defined for all sectors and therefore tackle all sectors of the economy. The inclusion of the FOLU sector allows an increase in the absorptions by the sinks of this sector, which could contribute to the global climate neutrality during the second half of the 21st century.	
How the NDC contributes towards Article 2, paragraph 1(a), and Article 4, paragraph 1, of the Paris Agreement	Albania is a developing country, highly vulnerable to the effects of the climate change. National GHG emissions represent only 0.02% of global emissions in 2016. Considering the national circumstances for the economic development of the country, the NDC mitigation actions reduce the increase of emission from 2016 to 2030. A peak of emissions is not projected during the timeframe of the current NDC.	

2.4. Indicators, definitions, methodologies and progress

2.4.1. Indicator

For the tracking of progress towards implementing and achieving the NDC of the EU, an indicator is used which has the same unit and metric as the NDC base year and target values. The chosen indicator is '*annual total net GHG emissions consistent with the scope of the NDC in CO_2eq'*. Table below provides more information on this indicator.

Table 9: Indicator for tracking progress

Information	Description
Selected indicator	Total GHG emissions in CO_2eq
Reference level and base year	Base Year: 2016 2030 BAU: 15,148 ktCO2e 2030 Target NDC: 11,978 ktCO2e (compared to BAU scenario, represents a mitigation impact of -20.9%).
Relation to NDC	The indicator is defined in the same metric, methodology, scope and unit as the target of the NDC.
Definitions	Definition of the indicator 'Total GHG emissions in CO2eq': *Total economy wide GHG reductions in ktCO2e by 2030, in comparison to BAU projections* Other relevant definitions: Albania's NDC provides details on adaptation actions with mitigation co-benefits. Below are presented some of the specific actions which relate to GHG emission reductions: • Strengthen the institutional framework (e.g. coordination) • Strengthen the policy framework: development and enactment of laws, policies, regulations and plans, including action plans, and mainstreaming. • Increase funding for climate change adaptation: financing and fiscal planning • Climate proofing coastal buildings and facilities to prevent further damage and degradation

Note: The information in this table is identical to the information in Common Tabular Format (CTF) Table 1 (Description of selected indicators) and Table 2 (Definitions needed to understand the NDC), which were submitted electronically together with this BTR. These tables are also annexed to this BTR.

2.4.2. Methodologies and accounting approach

Albania's methodologies and accounting approach for greenhouse gas (GHG) emissions and removals are fully aligned with the principles and guidance of the Intergovernmental Panel on Climate Change (IPCC) and the Paris Agreement. The country applies the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, ensuring that all estimations of emissions and removals are transparent, consistent, and comparable over time. The metric used for GHG accounting is the Global Warming Potential (GWP) on a 100-year timescale, in accordance with the IPCC Second Assessment Report, with emissions expressed in CO_2 equivalent (CO_2e) based on values from the IPCC Fifth Assessment Report.

The Low Emissions Analysis Platform (LEAP) model is used as the primary analytical tool for assessing energy system development and emissions projections under different scenarios. This model allows Albania to evaluate both baseline and mitigation pathways to support long-term planning and policy decisions.

Sectoral methodologies are based on IPCC-recommended tiers and default factors. In the energy sector, the Tier 1 method is used to estimate emissions based on fuel combustion data and default emission factors. For industrial processes and product use (IPPU), emissions are calculated using IPCC software (version 2.691), while agriculture, forestry, and other land uses (AFOLU) are assessed through the integrated 2006 IPCC software, which combines agricultural and land-use emissions to ensure completeness and consistency. In the waste sector, emissions are estimated using the First Order Decay (FOD) method, reflecting the time-dependent decomposition of waste materials.

Albania's accounting approach ensures compliance with Articles 4, 13, and 14 of the Paris Agreement and Decision 4/CMA.1, promoting environmental integrity, transparency, and avoidance of double counting. It guarantees that all significant sources and sinks are reported once and accurately attributed. The approach also establishes a consistent baseline year (2015 or 2021) for tracking progress toward the Nationally Determined Contribution (NDC) targets.

Albania intends to participate in international carbon markets under Article 6, conditional on the establishment of robust international accounting rules that preserve environmental integrity. The accounting rules for international carbon markets under Article 6 of the Paris Agreement have not been set up yet. Albania intends to sell carbon credits during the period until 2030 to contribute to cost-effective implementation of the low emission development pathway and its sustainable development. Albania foresees that the utilization of international market mechanism is conditional on having effective accounting rules developed under the UNFCCC to ensure the environmental integrity of the mechanisms.[14]

Through the implementation of its National Energy and Climate Plan (NECP) and the periodic preparation of Biennial Update Reports (BURs), Albania has established a robust national monitoring, reporting, and verification (MRV) framework to ensure systematic oversight of climate-related policies and measures. This framework enables the continuous assessment of mitigation performance, facilitates institutional coordination, and ensures consistency between Nationally Determined Contribution (NDC) targets and the associated tracking indicators.

The NECP functions as the principal policy instrument for integrating climate and energy objectives across sectors. It delineates quantified targets for greenhouse gas (GHG) emission reductions, energy efficiency improvements, and renewable energy deployment, consistent with the EU Governance Regulation (2018/1999) and the UNFCCC transparency framework. Each mitigation measure is defined with corresponding key performance indicators (KPIs), baseline data, implementation timelines, and assigned responsibilities to designated implementing entities, including the Ministry of Tourism and Environment, the Ministry of Infrastructure and Energy, and relevant line agencies.

Monitoring is operationalized through an integrated MRV system that aligns with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and the UNFCCC reporting requirements. This system encompasses three principal components:

[14] Albania Revised NDC, pg. 85

1. Measurement – Systematic collection and aggregation of sectoral emissions data using standardized methodologies and activity data reported by competent national institutions (e.g., the National Environmental Agency, INSTAT, and sectoral ministries).
2. Reporting – Consolidation of GHG inventory results, mitigation actions, and their impacts into official submissions, including the BURs and NECP progress reports, ensuring alignment with both UNFCCC and EU reporting templates.
3. Verification – Application of internal quality assurance/quality control (QA/QC) protocols and external expert review processes to validate data accuracy, consistency, and completeness, in accordance with IPCC Good Practice Guidance.

Progress under the NECP and BURs is evaluated using quantitative tracking indicators, such as GHG intensity per GDP unit, sectoral emission trends, and renewable energy penetration rates. These indicators are monitored on an annual or biennial basis, enabling the identification of implementation gaps and the recalibration of policy measures. The integration of these mechanisms within Albania's national inventory system ensures methodological coherence and facilitates transparent, evidence-based decision-making in line with the Enhanced Transparency Framework (ETF) of the Paris Agreement.

Overall, the NECP–BUR monitoring architecture provides a coherent, internationally compliant accounting framework that strengthens institutional accountability, enhances data reliability, and supports the iterative assessment of Albania's progress toward achieving its NDC commitments and long-term decarbonization objectives.

Details on methodologies and accounting approaches consistent with the accounting guidance under the Paris Agreement can be found in CTF Table 3 (Methodologies and accounting approaches), which was submitted electronically together with this BTR. This table is also annexed to this BTR.

2.4.3. Structured summary – status of progress

An important purpose of the BTR is to demonstrate where the country stands in implementing its NDC, and which progress they have made towards achieving it. The most recent information on GHG emissions and removals in the scope of the NDC constitutes the key information for tracking this progress. Table below summarises the current status of progress.

Table 10: Summary of progress towards implementing and achieving the NDC

Indicator	Unit	Base year value	Values in the implementation period			Target level	Target year	Progress made towards the NDC
			2022	2023	2030			
Total GHG emissions in CO2eq	Kt CO_2eq	10,139	11,010	11085.6	n.a.	2030 BAU: 15,148 ktCO2e 2030 Target NDC: 11,978 ktCO2e (compared to BAU scenario, represents a mitigation impact of -20.9%).	2030	The overall indicator is in relation to the target in comparison to BAU projections for 2030. As noticed, the indicator value in 2023 stands on the 2030 target value.

Note: More detailed information can be found in CTF table 4 (Structured summary: Tracking progress made in implementing and achieving the NDC under Article 4 of the Paris Agreement), which has been submitted electronically together with this BTR. This table is also annexed to this BTR.

The table provides that total GHG emissions in 2023 reached 11,085.6 kt CO_2eq, showing a slight increase from 2022 (11,010 kt CO_2eq) but remaining close to the 2030 NDC target level of 11,978 kt CO_2eq. Compared to the projected BAU scenario of 15,148 kt CO_2eq for 2030, current emissions are already about 27% lower, indicating strong progress toward the mitigation goal. This suggests that Albania is broadly on track with its NDC commitments, though sustained efforts will be needed to maintain this trajectory and prevent future rebounds in emissions.

2.5. Mitigation policies and measures, actions and plans

2.5.1. Climate policy development

Institutional Arrangements: Albania has established a dedicated institutional structure to manage its climate change agenda and ensure compliance with international agreements (UNFCCC, Kyoto Protocol, Paris Agreement). The Ministry of Environment (MoE) serves as the national focal point for climate change, coordinating Albania's obligations under the UNFCCC. Within MoE, a Climate Change Unit leads policy implementation and reporting. An Inter-Ministerial Working Group on Climate Change (IMWGCC) brings together technical representatives from various ministries and agencies to fulfill Albania's UNFCCC duties.[15] This interdisciplinary team, along with the National Environment Agency collaborates on GHG inventories, climate data, and policy actions. These arrangements ensure climate change is addressed across government sectors in a coordinated manner.

Strategic Framework Documents: Albania's overarching strategic framework for climate action is defined by several key documents. Foremost among them is the

- Climate Change Strategy and Action Plans 2020–2030, is considered the country's foundational climate policy, serving as a roadmap toward a low-carbon economy and climate-resilient development. It outlines a long-term vision focused on three main components: climate change mitigation, adaptation, and sustainable development. The strategy sets specific strategic priorities, including economy-wide GHG mitigation targets consistent with Albania's international commitments, establishing a robust Monitoring, Reporting and Verification (MRV) system for emissions, strengthening institutional capacities, and mainstreaming climate considerations into all sectors.

- In tandem with the NCCS. Albania has developed the **National Adaptation Plan (NAP)** as the adaptation component of the strategy, detailing measures to reduce vulnerability to climate impacts.

- Climate action has also been integrated into broader development plans such as the National Strategy for Development and Integration (NSDI), ensuring alignment of climate objectives with Albania's socio-economic development goals.

International Commitments: At the international level, Albania is a non-Annex I Party to the UNFCCC and has ratified the Paris Agreement, under which it has submitted a **Nationally Determined Contribution (NDC)**. Albania's updated NDC for 2021–2030 aims for an overall GHG emissions reduction of **20.9% by 2030** relative to a business-as-usual scenario. This target is more ambitious than the country's initial pledge (INDC of 11.5% reduction by 2030), reflecting a scaling-up of climate ambition.

Additionally, as part of regional initiatives, Albania signed the **Sofia Declaration on the Green Agenda for the Western Balkans (2020)**, committing to achieve climate neutrality by 2050 in line with EU climate goals. To operationalize these commitments, Albania adopted its first integrated **National Energy and Climate Plan (NECP) 2021–2030**, which aligns national energy policy with climate targets. The NECP, based on the

[15] Although it is currently in force, this Inter-Ministerial Order is being revised, becoming new by changing its content and giving it more functions - it is expected to be approved by the end of the year.

national energy strategy and the NDC, sets out trajectories for renewable energy, energy efficiency, and emission reductions for 2030. In summary, Albania's climate policy development is anchored in a clear institutional setup and a suite of strategic documents and international pledges that guide the country's transition to a low-emission, climate-resilient future.

2.5.2. Cross-cutting policies and measures

Albania has implemented a range of economy-wide laws, policies, and instruments that directly or indirectly contribute to reducing greenhouse gas emissions. Below is a list of key **cross-cutting** policies and measures, each with a brief description and, where available, their impact on GHG emissions:

- **Climate Change Law No. 155/2020[16]:** This comprehensive framework law on climate change establishes the legal and institutional basis for climate action across all sectors (climate-laws.org). In force since July 2021, it ensures Albania meets its obligations under the UNFCCC and aligns national climate governance with EU regulation. The law formally **recognizes climate change as an emergency** and sets up an inter-institutional coordination mechanism for mitigation and adaptation. Crucially, Law 155/2020 provides for the development of a national **Monitoring, Reporting and Verification (MRV) system** for GHG emissions and climate actions. It regulates GHG emissions from both stationery and mobile sources and establishes conditions for carbon capture and storage. By creating a legal mandate for GHG monitoring and emission controls, this law underpins all sectoral mitigation efforts. *(Impact:* The law itself enables future emissions reductions by mandating MRV and compliance; for example, its provisions are leading to new regulations on emissions monitoring that will improve data and accountability (greenclimate.fundgreenclimate.fund).

- **National Climate Change Strategy (NCCS) 2020–2030:** As noted, the NCCS is a cross-sectoral strategy defining Albania's climate objectives in mitigation and adaptation. For mitigation, it sets an economy-wide vision of **sustainable growth with controlled GHG emissions**, aiming eventually for an economy-wide target encompassing all sectors (napglobalnetwork.org). The NCCS mandates integration of climate considerations in sector plans (mainstreaming) and calls for establishing a national GHG inventory and MRV system in line with EU requirements. It also prioritizes capacity building and public awareness (cross-cutting issues). *(Impact:* While the NCCS does not reduce emissions itself, it guides and coordinates sectoral policies that do. Its implementation is monitored through defined indicators, and it provides the policy umbrella under which specific measures (renewable energy, energy efficiency, etc.) are pursued, aiming to bend the emissions trajectory toward the NDC goals)

- **Nationally Determined Contribution (NDC) 2021–2030:** Albania's NDC is a policy commitment covering the whole economy. The current NDC 2.0 target is a **20.9% reduction of GHG emissions by 2030** relative to baseline (eea.europa.eu). This target drives domestic policy by setting a quantitative goal for aggregate emissions. The NDC is supported by a portfolio of planned measures across energy, transport, industry, agriculture, LULUCF, and waste sectors as detailed in Albania's climate action plans. However, meeting the NDC target will be challenging given recent increases in emissions in some sectors (eea.europa.eu). The NDC influences all cross-sectoral planning, including the NECP and climate law enforcement.

[16] Amendments to the Climate Change Law are expected to be approved shortly.

- **Carbon Tax on Fossil Fuels:** Albania introduced a carbon tax in 2008 as a fiscal measure targeting fossil fuel use. The tax is levied at a rate of ALL 1,255.2 per ton CO_2 (12.69 euro per ton) on fuels, effectively covering emissions from **electricity, industry, transport, and buildings.** This broad coverage means the carbon tax encompasses the majority of Albania's GHG emissions sources. The tax is applied downstream (e.g., on fuel sales) and aims to discourage carbon-intensive fuel use by raising costs. *(Impact:* The carbon tax in Albania is estimated to cover more than 70% of national GHG emissions, one of the highest coverage rates in Europe (climatepolicydatabase.org). While its direct emissions reduction impact has not been fully quantified, the tax contributes to modest CO_2 reductions by incentivizing lower coal and oil consumption. For instance, it has slightly shifted electricity generation costs and proMoEd the use of domestically produced hydroelectric power over imported fossil fuels. In 2023, the government moved to **increase the carbon tax on coal** imports as part of adjustments to the EU Carbon Border Adjustment Mechanism, further strengthening this measure's future impact (carbon-pulse.com).

- **National Energy and Climate Plan (NECP) 2021–2030:** Albania's NECP is an integrated policy document aligning energy sector development with climate mitigation goals. Adopted in line with EU guidance, the NECP sets targets for **renewable energy share, energy efficiency improvements, and GHG emission reductions** by 2030. Albania has already achieved the EU's 2030 target for renewable energy share, thanks to its large hydroelectric base and new solar capacity. The NECP outlines measures such as expanding solar and wind power, improving power grid efficiency, reducing energy losses, and promoting cleaner cooking and heating fuels. It also targets a **15.5% reduction in primary energy consumption** by 2030 through efficiency measures *(Impact:* The NECP, together with the national energy strategy, guides substantial GHG cuts in the energy sector – the largest emitting sector. By 2030, full NECP implementation is expected to keep Albania's emissions on a lower trajectory despite economic growth, leveraging the country's nearly 100% renewable electricity mix and curbing growth in energy demand (eea.europa.eu).

- **Cross-Sectoral Environmental Legislation:** A number of broader environmental laws and policies complement climate-specific measures and have indirect GHG benefits. For example, Albania's legislation on **air quality and industrial emissions** has been aligned with EU standards, pushing industries and power plants to modernize and reduce pollution (eea.europa.eu). Stricter Euro 5 and Euro 6 fuel quality standards were adopted, which indirectly lower CO_2 emissions by improving vehicle engine efficiency and reducing fuel sulfur content. While primarily aimed at environmental protection, these frameworks proMoE resource efficiency and cleaner technologies that contribute to GHG mitigation (e.g., fostering public transport, waste recycling, and renewable energy use across sectors).

In summary, Albania's cross-cutting climate policies create a strong enabling environment for emissions reduction. The combination of a framework climate law, a national strategy with clear targets (NDC/NECP), economic instruments like the carbon tax, and supportive environmental regulations ensures that all sectors are oriented toward the goal of curbing GHG emissions.

2.5.3. Sectoral policies and measures

In addition to economy-wide initiatives, Albania has implemented **sector-specific** policies and measures to address GHG emissions in key emitting sectors. Below is an overview by sector (Energy; Industrial Processes and Product Use (IPPU); Agriculture; Transport; Land Use, Land-Use Change and Forestry (LULUCF); Waste), including the main instruments in place and any available data on their impact:

- **Energy Sector:** The energy sector (including power generation and energy use in buildings) is central to Albania's mitigation efforts. Albania's electricity is already nearly 100% renewable (dominated by hydropower), so policies focus on maintaining a clean electricity mix and improving efficiency. A **Law on Promotion of Renewable Energy Sources** (first adopted in 2017 and updated in 2023) provides incentives for renewables, including feed-in tariffs/feed-in premiums and competitive auctions for solar and wind projects (energy-community.orgerranet.org). As a result, several large-scale photovoltaic plants have been tendered (e.g. a 140 MW solar farm in 2020) and construction of Albania's first wind farms is planned, diversifying beyond hydropower. The government's goal is to ensure energy security while keeping power-sector emissions low; notably, it **met its 2020 target of 38% renewables in gross final energy consumption** and continues to increase this share (unece.org). On the demand side, the **Law on Energy Efficiency** (2015, amended 2020) and National Energy Efficiency Action Plans impose efficiency standards in buildings and industry. Measures include improving insulation and heating in public buildings, promoting LED lighting and efficient appliances, and reducing distribution losses in the electricity grid. These efforts aim to reduce overall energy consumption by 15.5% by 2030 (eea.europa.eu). *(Impact:* Thanks to the clean electricity mix, **Albania's CO_2 emissions per capita are among the lowest in Europe**, at about 3.1 tons CO_2e per capita (emission-index.com). The expansion of solar and wind capacity by 2030 is expected to avoid emissions that would have arisen from possible fossil-based generation, keeping power sector emissions near zero. Energy efficiency measures are projected to cut several hundred kilotons of CO_2 per year by 2030 by curbing energy waste in buildings and industrial processes, contributing significantly to the NDC goal.)

- **Industrial Processes (IPPU):** Albania's industrial base is relatively small, but certain industries contribute to GHG emissions, especially cement production. Nearly **90% of industrial process GHG emissions in Albania come from cement manufacturing**, due to CO_2 released during clinker production and fuel combustion in kilns. Policies for this sector focus on technology upgrades and fuel switching. The government, in collaboration with industry, has explored using **alternative fuels in cement plants** – for example, co-processing non-hazardous waste (such as refuse-derived fuel) to replace coal and petcoke. A Nationally Appropriate Mitigation Action (NAMA) proposal was developed in 2015 for the cement sector to proMoE this practice (greenclimate.fund). While full implementation is pending. Additionally, Albania has transposed EU regulations on industrial emissions (e.g. requiring best available techniques in large installations), which drives factories to modernize and reduce energy usage. *(Impact:* Upgrades at the cement plants and partial fuel switching have the potential to reduce cement industry emissions by an estimated **10–15%**. If alternative fuels supply 20% of kiln energy, Albania could avoid roughly **160,000 tons CO_2** annually in this sector by 2030. Other industries (steel, chemicals) are minor in Albania, but overall industrial energy efficiency improvements are contributing to incremental GHG reductions.)

- **Agriculture:** Agriculture is a significant source of methane (CH_4) and nitrous oxide (N_2O) emissions in Albania, mainly from livestock, manure, and fertilizer use. Policies in this sector emphasize sustainable agriculture and improved practices. The **National Strategy for Agriculture and Rural Development** include measures for climate-smart agriculture, such as promoting organic farming, efficient irrigation, and better manure management. Through the EU-supported IPARD program (Instrument for Pre-Accession in Rural Development), Albania has provided grants to farmers who adopt organic farming and other sustainable practices. This has led to a notable increase in land under organic cultivation in recent years (eea.europa.eu) – an expansion that not only improves food quality but can lower GHG emissions by reducing synthetic fertilizer use and increasing soil

carbon sequestration. The government also encourages modernization of livestock farms with biogas digesters and improved feed to cut methane emissions, although such initiatives are still at pilot stage. *(Impact:* Quantitatively, agriculture accounts for roughly **77% of Albania's methane emissions** (openknowledge.worldbank.org), so even modest efficiency gains can be meaningful. Converting waste biomass to biogas and compost is expected to reduce CH_4 emissions from manure; one estimate suggests that widespread adoption of anaerobic digesters could cut agricultural emissions by **5-10%** over the next decade. Organic farming incentives, meanwhile, are indirectly reducing N_2O emissions by lowering mineral fertilizer application. These measures also enhance resilience to climate change, creating co-benefits for adaptation.)

- **Transport:** Transport emissions in Albania have been rising due to an aging vehicle fleet and increased road traffic. To address this, Albania has enacted policies to modernize the transport sector and reduce emissions. A major step was the **ban on import of older, high-emitting vehicles**: as of January 2019, the government prohibits the import of cars older than 10 years that do not meet at least Euro 5 emission standards. This regulatory measure is gradually improving the fleet efficiency and reducing tailpipe CO_2 and pollutant emissions. At the time of its introduction, the average car in Albania was 20 years old (balkangreenenergynews.com), so this policy is expected to significantly lower future road transport emissions by accelerating turnover to cleaner vehicles. In addition, Albania is **promoting electric mobility and public transport improvements**. The capital city Tirana, for example, has introduced electric buses on some lines and aims to expand e-bus usage in the coming years. According to projections, if Albania achieves its plan for about **23% of urban buses to be electric by 2030**, it could avoid roughly **80 kT CO_2 per year by 2030** from the urban transport sector (uri.org.aluri.org.al). Other measures include investments in better road infrastructure to reduce congestion (thus cutting unnecessary fuel burn) and encouragement of non-motorized transport in cities (bike lanes, pedestrian zones). Fuel quality improvements (adoption of Euro 5/Euro 6 fuels) since 2017 have also contributed to lower emissions per kilometer traveled. *(Impact:* The vehicle import ban has an immediate qualitative impact – already by 2020, far fewer highly-polluting vehicles were entering the fleet, and the share of newer, efficient cars is rising. Over the medium term, this could **reduce CO_2 emissions from road transport by an estimated 10%** compared to a business-as-usual scenario, while also dramatically cutting air pollutants (balkangreenenergynews.com). The electrification of transport, though nascent, sets the stage for deeper decarbonization post-2030 as Albania's electricity is renewable. Overall, transport policies are crucial since transport is one of the fastest-growing emission sources; these measures help bend that trajectory downward.)

- **LULUCF (Forestry and Land Use):** Albania's forests and land use play a dual role – they are carbon sinks but also at risk from illegal logging and land-use change. To protect and enhance carbon sinks, Albania implemented a **national forest moratorium** in 2016, banning all commercial logging in natural forests for a 10-year period until 2026 (ppnea.org). This moratorium was aimed at halting uncontrolled deforestation and allowing forest ecosystems to recover. In the initial years, it led to a sharp drop in legal logging permits and a slowdown in forest loss rates (tiranatimes.com). However, enforcement challenges remain with illegal logging in some areas. Alongside the moratorium, the government has expanded **protected areas** coverage: notably, in 2023 Albania declared the Vjosa Wild River a National Park – the first of its kind in Europe – protecting a large riverine forest corridor (eea.europa.eu). Overall, the share of territory under protection has grown over the past decade, contributing to preservation of carbon-rich habitats like forests and wetlands. The **National Forestry Strategy** and various reforestation programs (often supported by donors) are in place to rehabilitate degraded lands with tree planting and erosion control, which

help increase carbon uptake. *(Impact:* The LULUCF sector in Albania has traditionally been a net carbon sink, offsetting a portion of emissions from other sectors. Strengthening forest protection via the moratorium and new protected areas has likely enhanced this sink. For example, satellite monitoring showed the **rate of deforestation slowed** after the moratorium's introduction (ppnea.orgppnea.org). If the moratorium is strictly enforced through 2026, and reforestation projects continue, Albania could see its forest CO_2 removals increase, contributing an additional few hundred kilotons of CO_2 absorption annually. Maintaining a healthy forest cover is also crucial for adaptation (reducing flood and landslide risks) and biodiversity conservation.)

- **Waste Management:** The waste sector, particularly solid waste disposal, is a notable source of methane emissions (from landfill decomposition). Albania has recognized this and is reforming waste management to reduce emissions and pollution. A **National Integrated Waste Management Strategy 2020–2035** was adopted, aiming to transition from open dumping to EU-standard integrated waste management (giz.de). The strategy emphasizes the **circular economy** principles: increasing recycling rates, composting organic waste, and improving landfill practices. Several regulations support this, such as the law on waste management and extended producer responsibility schemes for packaging. In practice, Albania is investing in modern waste infrastructure – for instance, regional sanitary landfills with landfill gas capture systems, and **composting facilities for organic waste**. A recent initiative supported by international partners established a composting center in Cërrik, which processes 300 tons of green waste per year that was previously burnt or landfilled, thus cutting methane emissions (giz.de). Likewise, pilot recycling programs in municipalities have begun to divert a greater share of paper, plastic, and glass away from landfills (19% recycling as of 2019) (giz.degiz.de). *(Impact:* Modernizing waste management has direct mitigation benefits. Diverting organic waste to composting significantly reduces methane generation from dumpsites. **Methane (CH_4) emissions from waste** were a growing concern, but these measures are expected to stabilize or lower those emissions over time. The GHG reduction from composting and recycling in pilot cities has been documented – for example, a German-funded project reported that new waste practices led to measurable decreases in GHG emissions, alongside health and environmental co-benefits (giz.de). Over the next decade, full implementation of the 2020–2035 Waste Strategy could reduce waste-sector emissions by an estimated **20-30%** through improved landfill gas management, higher recycling (thus avoiding emissions from new production), and composting of organics. This not only contributes to mitigation but also aligns Albania with EU environmental standards.)

Each sectoral measure contributes a piece to Albania's overall mitigation puzzle. While the energy sector gives Albania a head-start with its renewable electricity, other sectors like transport and agriculture require sustained policy effort to curb their emissions. The measures described above are the most significant current actions; moving forward, Albania will need to enhance these and introduce new technologies (such as electric vehicles, industrial innovation, etc.) to further accelerate GHG reductions and meet its long-term climate objectives.

2.5.4. Key planned policies and measures

Albania has planned mitigation measures and actions that address greenhouse gas (GHG) emissions reduction across its main economic sectors. The measures mentioned and analysed here are drawn from strategic national documents such as the *National Energy and Climate Plan (NECP)* and the *Biennial Update Report (BUR)*.

Most of these actions are currently under implementation or planned for 2025–2030, showing a clear trajectory toward mid-century decarbonization in line with EU climate objectives. However, quantified emission reduction estimates (in kt CO_2e) are missing ("n.a." in all rows), indicating a gap in Measurement, Reporting, and Verification (MRV).

Table 11: Sectoral Distribution and Focus of Mitigation Policies and Measures

Sector	Main Measures	Timeframe	Responsible Entities	Implementation Status	CO_2 Relevance
Transport	Improvement of bus networks, integrated freight management, EV charging, electrification, clean vehicle procurement, railway upgrades	2020–ongoing	Ministry of Infrastructure & Energy (MIE), General Directorate of Transport	Mostly *under implementation*	High
Buildings	Building renovation plan, RES in heating/cooling, energy audits, EE action plans, eco-design standards	2021–ongoing	MIE, Energy Efficiency Agency, Municipalities	*Under implementation*	High
Industry	Energy audits, management systems (ISO 50001), cement sector modernization	2023–ongoing	MIE, National Environment Agency	*Planned / Implementing*	High
Agriculture & Forestry	Organic agriculture, improved monitoring, regulating burning, carbon sink enhancement	2015–2030	Ministry of Agriculture & Rural Development, Ministry of Environment	*Planned / Ongoing*	Moderate
Energy Supply	RES auctions, RES operator, renewable cooperatives, interconnectors, gas supply for Vlora TPP	2017–ongoing	Council of Ministers, ERE, OST, KfW	*Under implementation*	High

Cross-Sectoral Trends and Insights

Recent developments reveal several important cross-sectoral trends shaping climate and energy policies. Regulatory instruments remain dominant across sectors, often complemented by financial incentives and educational tools. Examples include energy efficiency legislation, eco-design transposition, and the adoption of vehicle emission standards. A strong emphasis is placed on the decarbonization of the transport sector, with significant efforts directed toward the electrification of mobility and the modernization of public transport. Key initiatives such as the installation of electric vehicle (EV) charging stations, the upgrading of intercity bus fleets, and the procurement of clean vehicles highlight this transition.

The energy sector continues to undergo a gradual transformation toward renewables and increased regional interconnection. Projects related to renewable energy auctions, the establishment of a national renewable operator, gas supply developments in Vlora, and transmission network upgrades demonstrate the ongoing energy transition. Institutional involvement is broad and coordinated, involving multiple governance levels—line ministries, national agencies, and municipalities—such as the Ministry of Infrastructure and Energy (MIE), the Energy Regulatory Entity (ERE), and the National Agency of Natural Resources (AKBN).

Despite progress, capacity and monitoring gaps remain a persistent challenge. The absence of quantified greenhouse gas (GHG) reduction estimates in most measures reflects limited monitoring, reporting, and

verification (MRV) capacities. Nevertheless, there is strong alignment with the EU policy framework, including the National Energy and Climate Plan (NECP) and EU Energy Efficiency Directives. In parallel, growing attention is being given to forestry and carbon sink measures under the Land Use, Land-Use Change, and Forestry (LULUCF) sector, through initiatives such as national planting programs and reforestation efforts aimed at enhancing carbon absorption capacity.

Implementation Status Summary

Out of approximately 26 identified mitigation measures, around 60 percent are currently under implementation, 35 percent are in the planning stage, and roughly 5 percent have been completed or are ongoing since 2017. While this distribution indicates strong policy momentum, the long implementation timelines—typically spanning from 2020 to 2030—suggest that tangible emission reductions may take several years to materialize.

Observed Strengths

The portfolio of measures demonstrates broad sectoral coverage, including energy, transport, buildings, agriculture, industry, and LULUCF. Clear institutional mandates are in place, and there is a strategic integration of legal, financial, and informational instruments. Furthermore, long-term planning is well aligned with both EU accession objectives and the Paris Agreement's climate targets, indicating a coherent policy framework.

Key Gaps and Recommendations

However, several gaps need to be addressed to enhance policy effectiveness. None of the current measures include quantified GHG reduction estimates, underscoring the urgent need to strengthen MRV systems and data collection. Financial mechanisms remain insufficiently defined, with limited information on funding sources, incentive structures, or budgetary allocations. Private sector engagement also appears minimal, as most measures are government-driven with little mention of private participation or partnership models. There is an evident sectoral imbalance, with a predominant focus on energy and transport, while agriculture and waste management remain underrepresented. Finally, many ongoing measures lack clearly defined milestones and completion indicators, making it difficult to track real progress and assess overall impact.

The analysis described above, is presented in the following summary table

Table 12: Summary Table: Cross-Sectoral Trends, Strengths, and Gaps

Category	Main Findings	Examples / Notes
Cross-Sectoral Trends	**Regulatory dominance** across all sectors, often supported by financial and educational tools.	Energy efficiency laws, eco-design standards, vehicle emission regulations.
	Transport decarbonization gaining momentum through electrification and cleaner mobility.	EV charging infrastructure, intercity bus modernization, clean vehicle procurement.
	Energy transition toward renewables and interconnection progressing steadily.	RES actions, Vlora gas diversification, transmission grid upgrades.
	Institutional coordination between ministries, agencies, and municipalities improving.	MIE, ERE, AKBN, and local authorities actively engaged.
	Capacity and MRV gaps persist, limiting data quality and quantification of results.	Absence of GHG reduction estimates ("n.a." in reporting fields).
	Alignment with EU frameworks ensures policy coherence and legal transposition.	NECP, EU Energy Efficiency Directive, Eco-design standards.
	Forestry and carbon sinks gaining visibility as part of climate strategy.	National planting programs, reforestation and LULUCF measures.

Category	Main Findings	Examples / Notes
Implementation Status	60% of measures are under implementation, 35% are planned, and 5% are completed or ongoing since 2017.	Strong policy momentum, but delayed impact realization due to long 2020–2030 timelines.
Observed Strengths	Broad sectoral coverage across energy, transport, buildings, industry, agriculture, and LULUCF.	Integrated legal, financial, and informational tools in line with EU and Paris Agreement targets.
	Clear institutional responsibilities and governance framework.	MIE, ERE, AKBN, municipalities coordinating actions.
	Long-term planning consistent with national and EU climate commitments.	NDC implementation and EU accession alignement.
Key Gaps & Recommendations	Lack of quantified GHG impact across measures due to weak MRV systems.	Develop sector-level emission baselines and monitoring mechanisms.
	Financial mechanisms and incentives remain unclear or insufficient.	Define funding sources, introduce fiscal incentives, and attract climate finance.
	Limited private sector engagement in mitigation actions.	Encourage PPPs, innovation funding, and business participation.
	Sectoral imbalance with overemphasis on energy and transport.	Increase focus on agriculture, waste, and industry efficiency.
	Overlapping timelines and missing performance indicators hinder progress tracking.	Establish measurable milestones and completion criteria for each measure.

Note: The detailed list of planned policies and measures can be found in CTF Table 5 (Mitigation policies and measures, actions and plans, including those with mitigation co-benefits resulting from adaptation actions and economic diversification plans, related to implementing and achieving a nationally determined contribution under Article 4 of the Paris Agreement), which has been submitted electronically together with this BTR. This table is also annexed to this BTR.

2.6. Projections of greenhouse gas emissions and removals

The preparation of GHG emissions projections include the following steps:

(i) Selection of the latest available database – The latest available databases consisted on two documents: (a) National Inventory Document (NID 2024) which, at the time of preparation of the projections, contained GHG emission estimates for the period 1990-2022; and (b) National Energy and Climate Plan (NECP), which contains projections (estimations) for the years 2025, 2030, 2040 and 2050.

(ii) Selection of base, final, and cross-cutting years for projections – 2016 was selected as the base year for GHG emissions projections for all sectors.

(iii) Selection of the methodology and model instruments for the projection preparation – Detailed methodology and modelling instruments used for GHG emissions projections can be found in respective chapters for each sector in both documents (NID and NECP).

(iv) Collection and analysis of input data for the projection – More detailed information about collection and analysis of input data used for GHG emissions projections can be found at NID in the chapter "Methodology" for each sector.

(v) Establishment of initial assumptions – More detailed information about initial assumptions used for GHG emissions projections can be found at NID in the chapter "Methodology" for each sector.

(vi) Definition of scenarios – GHG emission projections contain three scenarios: 'With Existing Measures' (WEM), 'With Additional Measures' (WAM) and 'Without Measures'.

(vii) Calculation of scenarios and results presentation – Results of GHG emission projections are presented for each sector as a total emission for the given sector, emissions by gases and emissions by categories. Results can be found at NECP in the chapter "Current situation and projections with existing policies and measures" for each sector.

2.6.1. Emission projections

2.6.1.1. Projections under the 'with measures scenario'

2.6.1.1.1. Projections according to sectors

The chart below illustrates projections of the greenhouse gas (GHG) emissions and removals for six key sectors — Energy, Transport, Industrial Processes and Product Use, Agriculture, Forestry/LULUCF, and Waste Management/Waste — for the years 2022, 2025, and 2030 under a "with measures" scenario, meaning it accounts for existing or planned mitigation policies and measures.

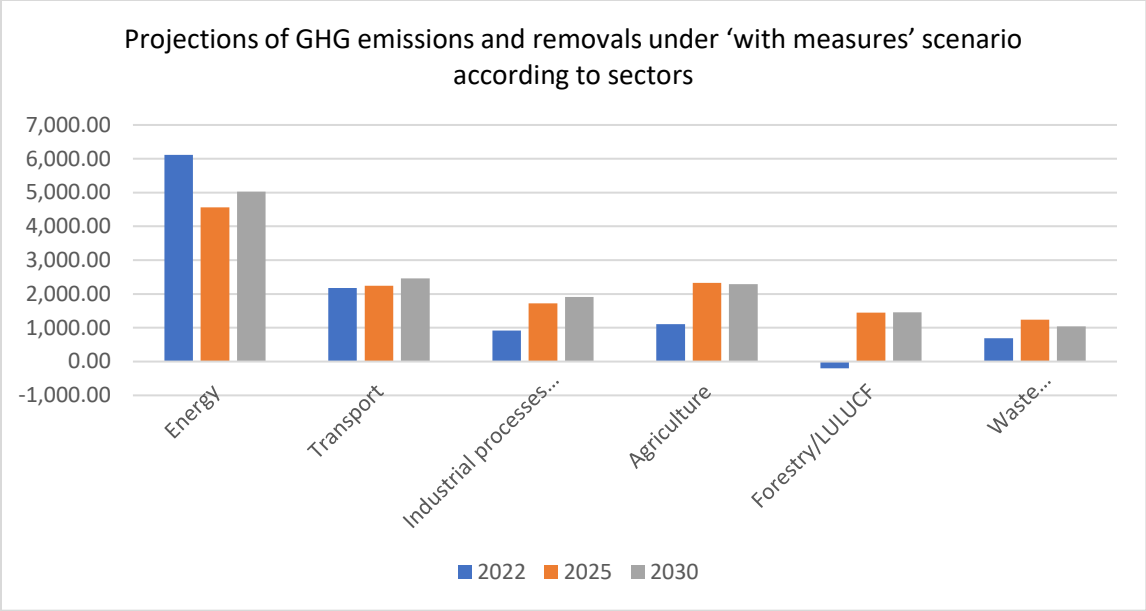

Figure 13: Projections of GHG emissions and removals under '*with measures*' scenario according to sectors

The energy sector remains the largest source of GHG emissions throughout the period, although a significant decline is projected from about 6,000 kt CO_2eq in 2022 to around 4,700 kt CO_2eq in 2025, before slightly rebounding to 5,000 kt CO_2eq in 2030. This suggests that mitigation measures such as renewable energy deployment and energy efficiency are having an effect, but growing demand and partial decarbonization limit deeper reductions. The transport sector shows a steady increase from approximately 2,100 kt CO_2eq in 2022 to about 2,400 kt CO_2eq by 2030, reflecting persistent dependence on fossil fuels and limited uptake of low-emission vehicles.

Emissions from industrial processes and product use are projected to rise sharply from roughly 900 kt CO_2eq in 2022 to almost 1,900 kt CO_2eq in 2030, indicating industrial growth with modest mitigation progress. Similarly, agricultural emissions increase from about 1,100 kt CO_2eq in 2022 to over 2,200 kt CO_2eq in 2030, largely due to livestock and fertilizer use, though they appear to stabilize toward 2030 as improved practices take effect. The Forestry and Other Land Use (LULUCF) sector shows a concerning reversal, shifting from a net sink of about –200 kt CO_2eq in 2022 to a net source exceeding 1,400 kt CO_2eq in later years, likely due to deforestation or declining forest absorption capacity. Waste sector emissions rise from about 700 kt CO_2eq in 2022 to 1,200 kt CO_2eq in 2025, then slightly decrease to around 1,000 kt CO_2eq in 2030, suggesting some improvement in waste treatment and methane recovery.

Table 13: Cross-Sectoral Trends of the GHG emissions under '*with measures*' scenario

Sector	General Trend		
	2022	2025	2030
Energy	↓ ↓	Significant drop, slight rebound	Still dominant source
Transport	↑	Gradual increase	Growing emissions
Industry	↑↑	Rapid rise, stabilizing	High growth sector
Agriculture	↑↑	Increase then stable	Persistent emissions
Forestry/LULUCF	↓→↑	From sink to source	Negative trend
Waste	↑→↓	Rise then mild drop	Moderate improvement

Overall, the projections indicate that while the energy sector demonstrates early mitigation success, rising emissions from transport, industry, agriculture, and the loss of forest sinks offset much of this progress. Without additional measures—especially in land use management, industrial efficiency, and transport decarbonization—the country risks falling short of its long-term emission reduction goals. Strengthening cross-sectoral actions and maintaining the forest sector's role as a carbon sink are essential to achieving sustainable progress toward NDC commitments.

2.6.1.1.2. Projections according to gas

The chart below presents projected greenhouse gas (GHG) emissions by gas type—CO_2, CH_4 (methane), N_2O (nitrous oxide), and HFCs (hydrofluorocarbons)—for the years 2022, 2025, and 2030 under a "with measures" scenario, meaning that it includes the effect of implemented or planned mitigation actions. The data distinguishes between emissions including and excluding contributions from LULUCF (Land Use, Land Use Change and Forestry), which can act either as a carbon sink or a source.

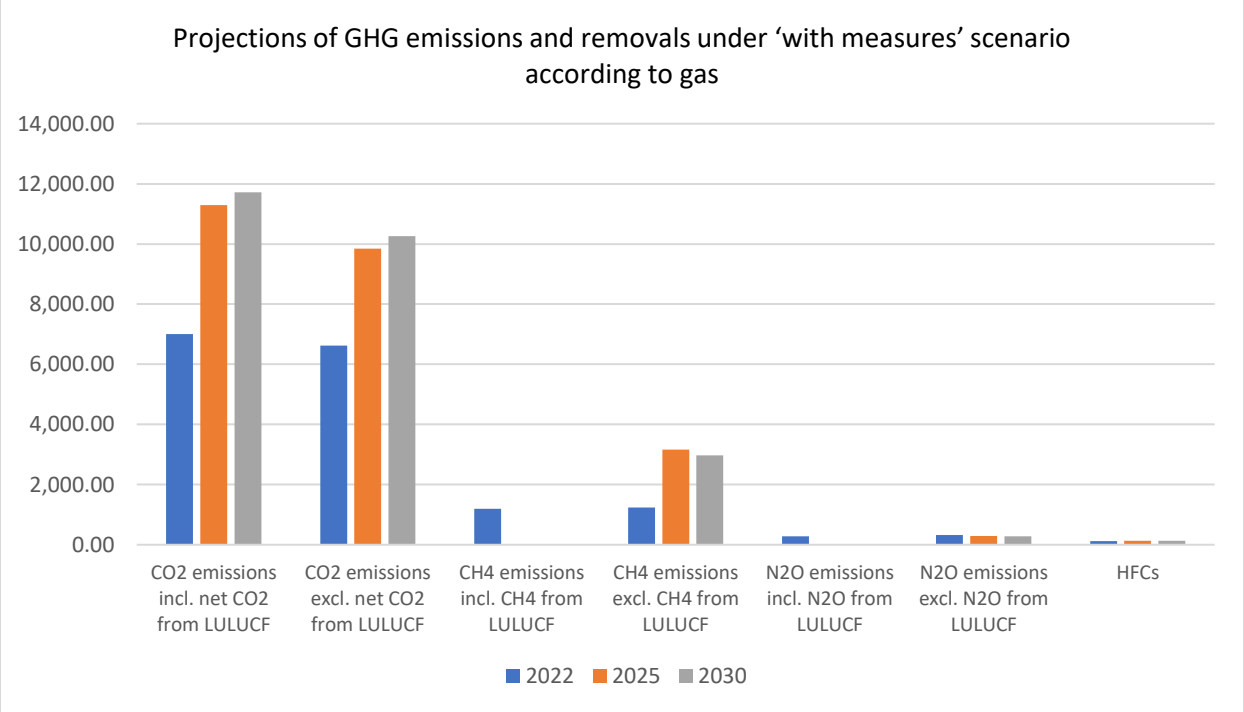

Figure 14: Projections of GHG emissions and removals under '*with measures*' scenario according to gas

The data show that CO_2 emissions are by far the largest contributor to total GHG emissions. When including net CO_2 from land use, land-use change and forestry (LULUCF), CO_2 emissions increase from about 7,000 kilotonnes of CO_2 equivalent in 2022 to approximately 11,200 kilotonnes in 2025, and reach around 11,800 kilotonnes by 2030. Excluding LULUCF, CO_2 emissions follow a similar upward trend, rising from roughly 6,500 kilotonnes in 2022 to about 9,800 kilotonnes in 2025 and 10,200 kilotonnes in 2030. This demonstrates that CO_2 remains the dominant gas in Albania's emissions profile, with only modest contributions from removals in the land-use sector.

Methane (CH_4) emissions, although much lower than CO_2, also show a noticeable increase. Including CH_4 from LULUCF, emissions rise from around 1,100 kilotonnes in 2022 to nearly 3,000 kilotonnes in 2025, before slightly declining to about 2,900 kilotonnes in 2030. This indicates a significant contribution from

agriculture and waste management activities, with partial stabilization expected toward the end of the projection period. Nitrous oxide (N_2O) emissions are relatively small, remaining below 500 kilotonnes of CO_2 equivalent across all years, and showing only minor variations between 2022 and 2030. Hydrofluorocarbon (HFC) emissions are negligible and contribute minimally to overall totals.

Table 14: Cross-Gas Trends of the GHG emissions under '*with measures*' scenario

Gas	2022	2025	2030	Main Driver	Trend
CO_2 incl. LULUCF	~7,000	~11,200	~11,800	Energy, deforestation	Sharp rise then stabilizes
CO_2 excl. LULUCF	~6,500	~9,800	~10,300	Fossil fuel use	Steady increase
CH_4 incl./ excl. LULUCF	~1,200 / ~1,100	~3,200 / ~3,000	~3,000 / ~2,900	Agriculture, waste	Sharp rise then stabilizes
N_2O incl./ excl. LULUCF	~300 / ~250	~400 / ~350	~450 / ~400	Agriculture	Gradual rise
HFCs	~50	~60	~70	Refrigerants	Stable, minimal

Overall, the projections suggest that total GHG emissions in Albania are expected to continue increasing through 2030 despite the implementation of existing mitigation measures. Carbon dioxide remains the primary driver of emissions growth, while methane plays a secondary but growing role. The data imply that current policies and measures may slow but not reverse the upward emissions trend, indicating a need for stronger or additional actions to achieve meaningful reductions or align with longer-term climate neutrality goals.

Note: More detailed information can be found in CTF Table 7 (Information on projections of greenhouse gas emissions and removals under a 'with measures' scenario), which has been submitted electronically together with this BTR. This table is also annexed to this BTR.

2.6.1.2. Projections under the 'with additional measures' scenario

2.6.1.2.1. Projections according to sectors

The graph below illustrates the expected evolution of greenhouse gas (GHG) emissions in Albania across key sectors—energy, transport, industrial processes and product use, agriculture, forestry and land use, and waste management—for the years 2022, 2025, and 2030. This scenario assumes the implementation of enhanced mitigation policies and technologies beyond those currently in place, aiming for deeper emissions reductions and improved carbon removals.

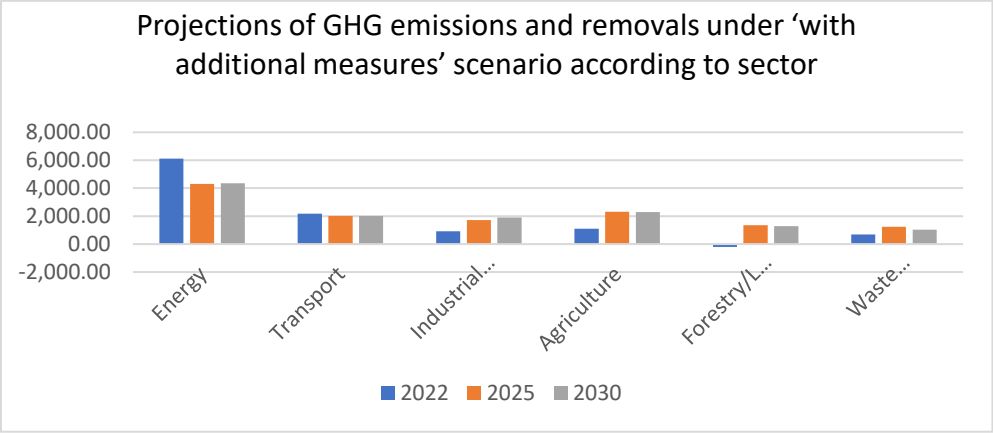

Figure 15: Projections of GHG emissions and removals under '*with additional measures*' scenario according to sector

The energy sector remains the dominant source of emissions, although it shows a significant reduction over time. Emissions decline from over 6,000 kilotonnes of CO_2 equivalent (kt CO_2eq) in 2022 to around 4,300–4,500 kt CO_2eq by 2025 and 2030, reflecting the impact of additional renewable energy deployment, improved efficiency, and possible shifts away from fossil fuels. Despite remaining the largest contributor, the downward trajectory indicates substantial mitigation potential within this sector.

Transport sector emissions remain relatively stable, with a slight decrease from about 2,100 kt CO_2eq in 2022 to around 1,900–2,000 kt CO_2eq in 2025 and 2030. This modest change suggests that while additional measures (such as cleaner vehicle technologies or modal shifts) may bring some improvements, deeper decarbonization in transport remains challenging without large-scale electrification or behavioral changes.

The industrial processes and product use sector shows a gradual rise from roughly 900 kt CO_2eq in 2022 to about 1,600 kt CO_2eq by 2025 and 2030, implying that industrial growth may offset mitigation gains unless low-emission technologies and process efficiency are accelerated. Agriculture contributes around 1,000 kt CO_2eq in 2022, increasing to over 2,000 kt CO_2eq by 2025 and 2030, reflecting continued emissions from livestock and crop production despite additional measures. This highlights the need for stronger climate-smart agricultural practices and methane reduction strategies.

The forestry and LULUCF (land use, land-use change and forestry) sector shifts from a small net sink (slightly negative emissions) in 2022 to positive removals in later years, reaching around 1,400–1,500 kt CO_2eq by 2025 and 2030. This improvement signals a strengthening carbon sink role through reforestation, afforestation, or improved forest management policies. Meanwhile, the waste management sector shows modest emission increases from about 700 kt CO_2eq in 2022 to around 1,200 kt CO_2eq in 2025, followed by stabilization near 1,000 kt CO_2eq in 2030, reflecting the gradual impact of improved waste treatment and methane recovery measures.

Table 15: Cross-Sectoral Trends of the GHG emissions under '*with additional measures*' scenario

Sector	2022 (kt CO_2eq)	2025 (kt CO_2eq)	2030 (kt CO_2eq)	Trend	Main Drivers / Interpretation
Energy	~6,100	~4,300	~4,400	***Strong decrease***	Reflects major emission cuts due to renewable energy expansion, energy efficiency improvements, and reduced fossil fuel dependence.
Transport	~2,100	~1,900	~2,000	***Slight decrease***	Limited improvement from efficiency gains and cleaner vehicles; deeper reductions constrained by slow electrification.
Industrial processes and product use	~900	~1,600	~1,700	***Increase***	Industrial growth offsets mitigation gains; emission reductions need low-carbon industrial technologies.
Agriculture	~1,000	~2,200	~2,100	***Increase***	Persistent emissions from livestock and fertilizers; additional measures have moderate effect without structural changes.
Forestry / LULUCF	~(-100)	~1,400	~1,300	***Improvement (net sink increase)***	Transition from minor sink to significant carbon removal through reforestation, afforestation, and forest management.
Waste management / Waste	~700	~1,200	~1,000	***Moderate increase then stabilization***	Improved waste treatment and methane recovery begin to balance growing waste generation by 2030.

Overall, the projections demonstrate that under the *"with additional measures"* scenario, Albania's GHG emissions are projected to stabilize or slightly decline by 2030, particularly due to reductions in the energy sector and enhanced removals in forestry and land use. However, rising emissions in agriculture and industry could offset part of these gains, indicating that achieving deeper decarbonization will require sustained and cross-sectoral efforts, alongside continued investment in renewable energy, sustainable land management, and low-carbon technologies.

2.6.1.2.2. Projections according to gas

The graph below shows projected national greenhouse-gas emissions broken down by gas type — CO_2 (both including and excluding LULUCF), CH_4 (methane, including and excluding LULUCF), N_2O (nitrous oxide, including and excluding LULUCF) and HFCs — for three points in time: 2022, 2025 and 2030. Values are expressed in kilotonnes CO_2-equivalent. Overall, CO_2 dominates the emissions profile and is responsible for the vast majority of projected emissions in every year; CH_4 is the second largest contributor, while N_2O and HFCs make relatively small contributions.

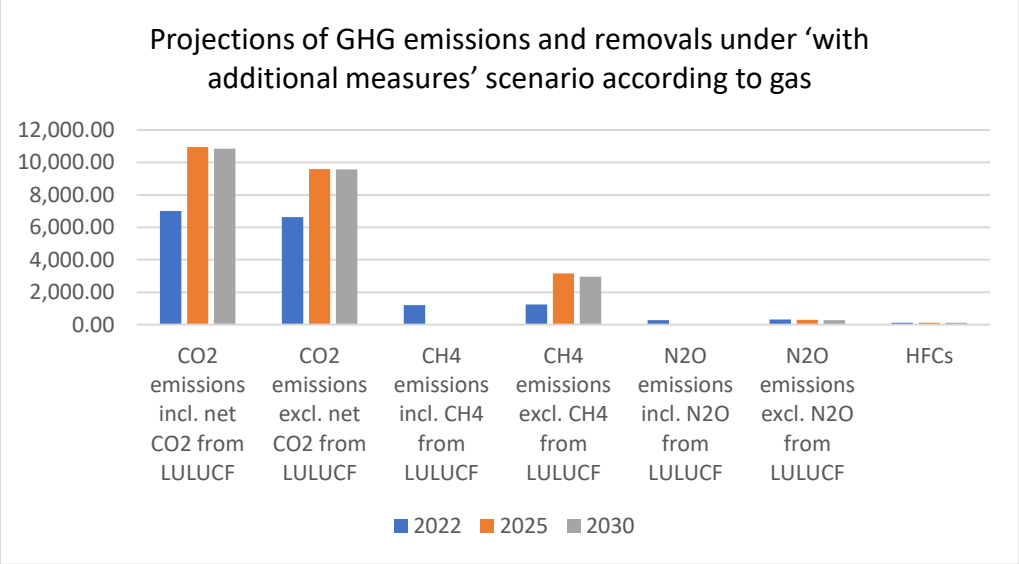

Figure 16: Projections of GHG emissions and removals under '*with additional measures*' scenario according to gas

Carbon dioxide including LULUCF is projected to rise sharply from roughly 7,000 kt CO_2-eq in 2022 to about 11,000 kt in 2025 and remain near 10,800–11,000 kt in 2030. When LULUCF is excluded, CO_2 follows a similar pattern but at a slightly lower level: roughly 6,500 kt in 2022, rising to around 9,600–9,800 kt in 2025 and about 9,700–10,200 kt by 2030. The difference between the "including" and "excluding" series points to a notable role (positive or negative) of land-use change and forestry in the overall CO_2 balance; under the "with additional measures" scenario the inclusion of LULUCF increases total CO_2 totals compared with the exclusion, implying that LULUCF is not providing a strong net removal in these projections or may even be a net source in some years.

Methane (CH_4) shows the next largest change: CH_4 including LULUCF increases from about 1,200 kt CO_2-eq in 2022 to around 3,200 kt in 2025 and then slightly below that in 2030 (≈3,000 kt). Excluding LULUCF yields very similar values, indicating that most methane emissions originate outside LULUCF (primarily

agriculture and waste). The sharp jump between 2022 and 2025 indicates expanding methane emissions in the near term under the scenario assumptions, with only modest mitigation effects evident by 2030. Nitrous oxide (N_2O) projections are comparatively small but show a steady upward trend: roughly 300 kt CO_2-eq in 2022 rising to about 350–400 kt in 2025 and approaching 400–450 kt by 2030 (both including and excluding LULUCF). This rise is consistent with increased agricultural activity or insufficient reduction of fertilizer-related emissions under the additional measures considered.

HFC emissions remain very small across all years and show little change, indicating either effective controls on HFCs or a marginal role of this gas in the national emissions inventory.

Tables 16 and 17 below provide a comparison of GHG emissions by gas

Table 16: Cross-Gas Comparison of GHG Emissions (kt CO_2-eq)

Gas Category	2022	2025	2030	Change 2022–2030	Trend Summary
CO_2 (incl. LULUCF)	~7,000	~10,900	~10,800	**+3,800**	Sharp rise by 2025, then stable; LULUCF not acting as major sink
CO_2 (excl. LULUCF)	~6,500	~9,600	~9,700	**+3,200**	Similar pattern, slightly lower; reflects fossil/industrial CO_2
CH_4 (incl. LULUCF)	~1,200	~3,200	~3,000	**+1,800**	Rapid growth by 2025, slight decline by 2030
CH_4 (excl. LULUCF)	~1,200	~3,100	~2,900	**+1,700**	Very similar; LULUCF contribution minimal
N_2O (incl. LULUCF)	~300	~350	~400	**+100**	Gradual, steady increase; mainly agricultural source
N_2O (excl LULUCF)	~250	~320	~380	**+130**	Similar trend; small LULUCF contribution
HFCs	~50	~70	~60	**+10**	Low and stable; minor contributor overall

Table 17: Relative Contribution by Gas (%)

Gas Category	2022 Share	2025 Share	2030 Share	Main Drivers
CO_2 (incl. LULUCF)	~78%	~72%	~73%	Energy use, industry, land-use emissions
CH_4 (incl. LULUCF)	~13%	~21%	~20%	Agriculture, waste management
N_2O (incl. LULUCF)	~3%	~2%	~3%	Fertilizer use, soil management
HFCs	<1%	<1%	<1%	Refrigerants, minor industrial gases
Total (approx.)	**100%**	**100%**	**100%**	—

The information provided in the tables show that carbon dioxide (CO_2) remains the dominant greenhouse gas, accounting for over 70% of total emissions across the period 2022–2030, despite growth in other gases. Methane (CH_4) demonstrates the fastest relative increase, rising by around 150% by 2025, which suggests that mitigation efforts in sectors such as agriculture and waste management remain limited. Nitrous oxide (N_2O) emissions increase at a slower but steady rate, indicating ongoing use of agricultural inputs. Hydrofluorocarbons (HFCs) play only a minor role, contributing very little to total emissions. The comparison between emission levels that include and exclude LULUCF (Land Use, Land-Use Change, and Forestry) shows minimal variation, implying that Albania's LULUCF sector functions as a weak or neutral carbon sink with limited offsetting capacity.

Taken together, the projected gas mix under the "with additional measures" scenario suggests that existing and additional measures reduce neither CO_2 nor non-CO_2 emissions sufficiently to produce an absolute peak-and-decline by 2030. Instead, CO_2 rises markedly from 2022 to 2025 and then stabilizes at an elevated level through 2030; methane grows substantially to 2025 and plateaus or slightly declines by 2030; N_2O rises gradually; and HFCs remain negligible. The rise in CO_2 (including the LULUCF contribution) is the single largest driver of increased total emissions in the near term, which implies continued reliance on fossil energy, industrial activity and land-use changes that either reduce sink strength or increase net emissions from land.

Policy implications are clear: to change this trajectory, stronger measures are required in the sectors that generate CO_2 and CH_4. For CO_2, accelerating decarbonization of the energy system (rapid renewable rollout, accelerated retirement of fossil generators, stronger efficiency and demand-side actions, and grid investments) would be necessary to bend the curve downwards. For methane, targeted interventions in agriculture (livestock management, manure handling, fertilizer optimization), waste (landfill methane capture, improved waste management and composting) and gas systems (leak detection and repair) could curb the substantial near-term increase. The modest but steady rise in N_2O calls for policies to optimize nitrogen fertilizer use and soil management practices. Restoring or strengthening the LULUCF sink is also essential: the chart's higher CO_2 totals when LULUCF is included indicate that land use is not offsetting emissions and may even be adding to them; afforestation, reforestation, avoided deforestation and sustainable forest management would help reverse that effect.

In summary, under the current set of "additional measures" emissions remain high and remain CO_2 dominated. The near-term increases to 2025 and only limited stabilization by 2030 indicate that measures included in this scenario slow growth in some areas but are insufficient for deep decarbonization. Stronger, faster, and more targeted interventions across energy, agriculture, waste and land-use sectors — together with improved MRV and financing to implement them — are required to achieve meaningful reductions in national GHG emissions by 2030 and beyond.

Note: More detailed information can be found in CTF Table 8 (Information on projections of greenhouse gas emissions and removals under a 'with additional measures' scenario), which has been submitted electronically together with this BTR. This table is also annexed to this BTR.

2.6.1.3. Projections under the 'without measures' scenario

2.6.1.3.1. Projections according to sectors

The graph below illustrates projected greenhouse gas (GHG) emissions (and removals where negative) across key sectors under a "without measures" baseline scenario. Energy remains the dominant emitter throughout, with estimated emissions around 6,000–6,200 kt CO_2e, followed by Agriculture (2,100–2,400), Transport (2,000–2,400), Industrial Processes (900–1,900), and Waste (800–1,400). Forestry and Other Land Use (LULUCF) initially act as a small sink but gradually shift to a net source, reaching approximately 1,200–1,400 kt CO_2e in later projections. The three bars per sector (blue, orange, and grey) represent different projection years or scenarios, likely moving from an early baseline to mid-term and long-term projections, showing a general increase in emissions over time when no mitigation measures are implemented.

The national "without measures" projection shows that Albania's total greenhouse-gas (GHG) emissions will continue to rise in the absence of new mitigation actions. The Energy sector remains the dominant source (≈50–55% of total emissions), while the Land Use, Land-Use Change and Forestry (LULUCF) sector

shifts from a modest carbon sink to a net source. Smaller but growing contributions come from Transport, Agriculture, Industrial Processes (IPPU), and Waste.

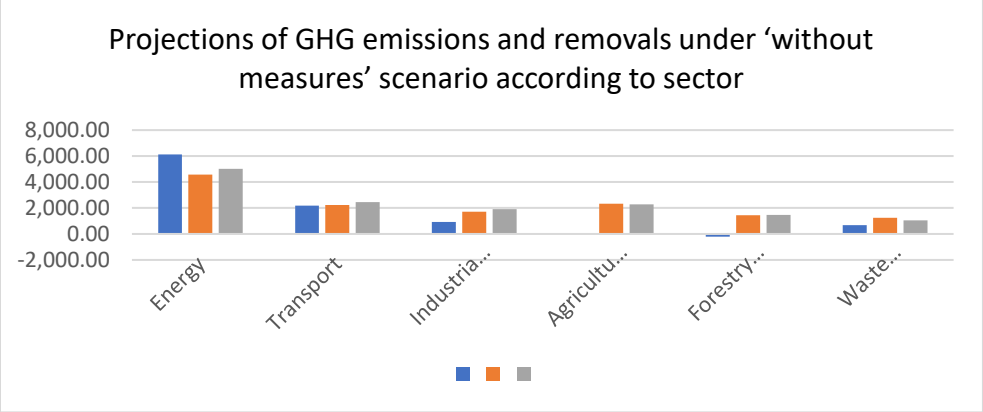

Figure 17: Projections of GHG emissions and removals under '*without measures*' scenario according to sector

The Energy sector overwhelmingly dominates total emissions. Even in the more recent projections, it accounts for roughly half of total national emissions, underscoring the need for deep decarbonization through cleaner power generation, fuel substitution, and improved efficiency. Most sectors display increasing emissions over time, reflecting growth in activity levels under the "no additional measures" assumption.

Agriculture and IPPU show particularly strong upward trends, suggesting rising production intensity and expanding activity. LULUCF shifts dramatically from a small sink to a significant source, implying deforestation, land-use change, or declining sequestration capacity. Waste emissions also increase moderately, driven by urbanization and population growth.

Table 18: Cross-Sectoral Trends in GHG Emissions (Without Measures Scenario)

Sector	Initial Level (Blue)	Mid-Term (Orange)	Long-Term (Gray)	Trend Direction	Share of Total (Initial)	Cross-Sectoral Insights
Energy	6,000 kt CO_2-eq	4,500 kt CO_2-eq	5,000 kt CO_2-eq	▼ then slight ▲	~49%	Dominant sector; initial decrease due to improved efficiency, then rebound linked to growing demand. Key mitigation focus.
Transport	2,000 kt CO_2-eq	2,100 kt CO_2-eq	2,300 kt CO_2-eq	▲ steady rise	~16%	Moderate but steady increase; needs shift to electric mobility and better fuel standards.
Industrial Processes	1,000 kt CO_2-eq	1,700 kt CO_2-eq	1,900 kt CO_2-eq	▲ continuous	~8%	Rising trend, reflecting industrial growth; potential for process efficiency and alternative materials.
Agriculture	2,300 kt CO_2-eq	2,400 kt CO_2-eq	2,400 kt CO_2-eq	▲ slight increase	~19%	Emissions remain high; livestock and fertilizer use dominate. Mitigation through improved practices.
Forestry / LULUCF	-200 kt CO_2-eq (sink)	1,200 kt CO_2-eq	1,100 kt CO_2-eq	▲ major increase	~–2% → ~10% share	Shift from carbon sink to source due to deforestation; major concern for land use policy.
Waste Management	700 kt CO_2-eq	1,000 kt CO_2-eq	1,000 kt CO_2-eq	▲ stable high	~6%	Growth linked to urbanization; quick wins via methane capture and recycling.

Energy alone likely represents around 40–50% of projected total emissions, with Agriculture, Transport, and IPPU making up most of the remainder. The transition of LULUCF from sink to source adds further pressure on total national emissions. Without intervention, overall GHG emissions are projected to rise steadily across nearly all sectors, nullifying potential gains from technological progress or efficiency improvements.

Key factors likely driving these trajectories include continued dependence on fossil fuels, increased transport demand, industrial growth, agricultural intensification, deforestation, and inadequate waste management infrastructure. The absence of meaningful mitigation measures, such as renewable energy expansion, reforestation, or efficiency standards, explains the sustained emission growth across all sectors.

2.6.1.3.2. Projections according to gas

The graph below presents projected emissions of the main greenhouse gases — CO_2, CH_4, N_2O, and HFCs — including and excluding contributions from the LULUCF (Land Use, Land-Use Change, and Forestry) sector. The chart covers three time periods, indicated by different colored bars, showing how these gases are expected to evolve under a baseline scenario with no additional mitigation measures.

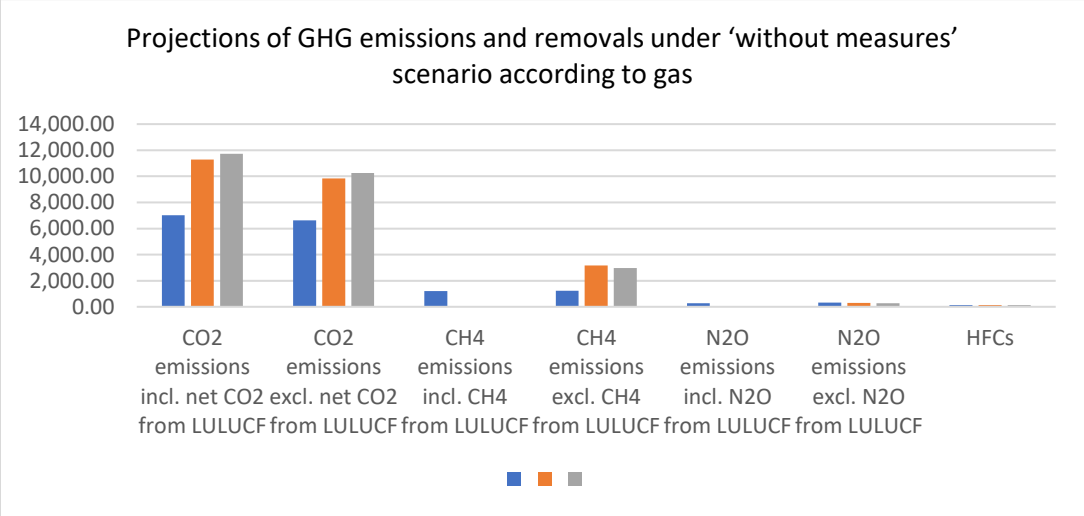

Figure 18: Projections of GHG emissions and removals under '*without measures*' scenario according to gas

Carbon dioxide remains the largest contributor to total GHG emissions in Albania across all projected years. Emissions of CO_2, including net contributions from LULUCF, range roughly between 7,000 and 12,000 kilotons CO_2-equivalent depending on the year. Over time, CO_2 emissions show a strong increasing trend. The difference between including and excluding LULUCF illustrates that this sector acts as a net carbon sink, partially offsetting overall emissions. This pattern reflects the continued dominance of fossil fuel combustion in the energy and transport sectors, while LULUCF provides only limited mitigation through carbon sequestration.

Methane emissions are considerably lower than CO_2 but remain a significant secondary contributor, ranging from 1,000 to 3,000 kilotons CO_2-equivalent. The main sources of CH_4 are agriculture, including livestock enteric fermentation and manure management, and the waste management sector. Methane shows a modest upward trend under the "without measures" scenario, reflecting limited improvements

in agricultural and waste management practices. LULUCF has negligible impact on CH_4 emissions or removals.

Nitrous oxide emissions are relatively small, amounting to a few hundred kilotons CO_2-equivalent. They primarily originate from agricultural soils through fertilizer application and manure spreading. A slight increase over time is projected, in line with expected growth in agricultural activity. Similar to CH_4, LULUCF has minimal influence on N_2O emissions.

Hydrofluorocarbons remain at negligible levels, barely visible on the chart, indicating that emissions from refrigeration and air-conditioning currently play a minor role in Albania's national inventory. HFCs are stable and low but may rise in the future if refrigerant demand increases without regulation.

Table 19: Cross-Gas Trends under the 'Without Measures' Scenario

Gas Category	Approx. Emissions (Base Year)	Approx. Emissions (Mid-Year)	Approx. Emissions (End-Year)	Share of Total (End-Year)	LULUCF Role	Trend Description
CO_2 incl. LULUCF	7,000 kt	11,000 kt	12,000 kt	~70%	LULUCF acts as sink (reducing net CO_2)	Strong growth in fossil fuel use; energy sector dominant
CO_2 excl. LULUCF	6,500 kt	10,000 kt	10,200 kt	~60%	Excludes forest absorption	Rising trend; slower than incl. LULUCF due to stable removals
CH_4 incl. LULUCF	1,200 kt	2,800 kt	3,000 kt	~18%	Negligible	Moderate increase due to agriculture and waste
CH_4 excl. LULUCF	1,200 kt	2,800 kt	3,000 kt	~18%	None	Practically identical to "incl." values
N_2O incl. LULUCF	200 kt	300 kt	400 kt	~3%	Minimal	Slow but steady increase from agriculture
N_2O excl. LULUCF	200 kt	300 kt	400 kt	~3%	None	Same as above
HFCs	<100 kt	<100 kt	<100 kt	<1%	None	Stable, low emissions from refrigerants
TOTAL (approx.)	8,700 kt	14,500 kt	15,500 kt	100%	–	Aggregate GHGs grow nearly 80% over projection period

Overall, CO_2 dominates total emissions, accounting for more than 70% of the GHG profile even when LULUCF removals are considered. Methane is the fastest-growing gas in relative terms, highlighting the challenges of mitigating emissions from agriculture and waste management. LULUCF continues to act as an important but limited carbon sink, underscoring the need for stronger forest management and afforestation policies. Nitrous oxide and HFCs play a minor role in total emissions but should not be overlooked given their high global warming potentials.

In terms of policy, energy decarbonization remains the top mitigation priority, with emphasis on renewable energy generation, energy efficiency, and reduced transport fuel use. Forestry and land-use management should be enhanced to increase carbon sequestration capacity. Mitigation in agriculture requires modernization of livestock and fertilizer practices, while reforms in the waste sector, including landfill gas capture and recycling initiatives, can deliver rapid reductions in methane emissions.

Note: More detailed information can be found in CTF Table 9 (Information on projections of greenhouse gas emissions and removals under a 'without measures' scenario), which has been submitted electronically together with this BTR. This table is also annexed to this BTR.

2.6.2. Information on models used for projections calculations

The calculation of GHG emissions projections in Albania follow the respective provisions of 2006 IPCC Guidelines for National Greenhouse Gas Inventories and 2019 Refinement to the 2006 IPCC Guidelines.

GHG emission projections are calculated using the following models:[17]

- Long-range Energy Alternatives Planning System (LEAP)
- Price-Induced Market Equilibrium System (PRIMES)
- Scenario-based Life Cycle Emissions Data (SLED)

These models combine historical data with assumptions about future scenarios like the "With Existing Measures" (WEM) and "With Additional Measures" (WAM) pathways. These projections are built on methodologies recommended by the IPCC, which use emission factors and global warming potentials to convert different gases into a common unit, CO_2 equivalent (CO2e). The Ministry of Environment coordinates this work, which involves detailed data collection and analysis across sectors such as energy, industry, and waste.

A brief description of each model is provided below.

- ***Long-range Energy Alternatives Planning System (LEAP)***

The Long-range Energy Alternatives Planning system, is a software tool developed by Stockholm Environment Institute (SEI) and is used for energy policy analysis and climate change mitigation assessment. LEAP can be used to track energy consumption, production and resource extraction in all sectors of an economy. It can be used to account for both energy sector and non-energy sector greenhouse gas (GHG) emission sources and sinks. In addition to tracking GHGs, LEAP can also be used to analyze emissions of local and regional air pollutants. LEAP is used by countries undertaking integrated resource planning, GHG mitigation assessments, and Low Emission Development Strategies (LEDS), especially in the developing world.[18]

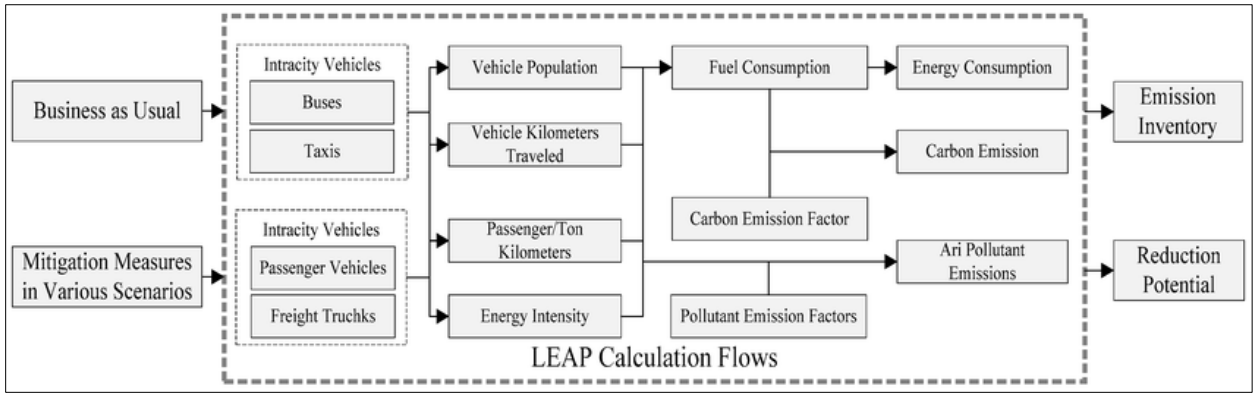

Figure 19: The Long-range Energy Alternatives Planning System (LEAP) model framework
Source: https://www.researchgate.net/publication/310839439/figure/fig1

[17] Enhancement of the Nationally Determined Contribution under the Paris Agreement - Additional potential of energy efficiency for the enhancement of Albania's NDC 2030. MoE Albania, April 2022

[18] https://ndcpartnership.org/knowledge-portal/climate-toolbox/long-range-energy-alternatives-planning-system-leap

- ***Price-Induced Market Equilibrium System (PRIMES)***

The PRIMES (Price-induced market equilibrium system) model is being developed by E3Modelling, a spin-off of the E3MLab at National Technical University of Athens (NTUA). The model is suited for medium-term and long-term (up to 2070) projections in 5-year steps and covers all EU Member States, and CEFTA (except Lichtenstein) and candidate countries.[19]

The PRIMES model (Price-Induced Market Equilibrium System) is a large scale applied energy system model that provides detailed projections of energy demand, supply, prices and investment into the future, covering the entire energy system including emissions. The distinctive feature of PRIMES is the combination of behavioural modelling (following a micro-economic foundation of optimisation by agent or sector) with engineering aspects, covering all energy sectors, and with market equilibrium. The model includes a detailed representation of instruments for policy impact assessment related to energy markets, technology adoption and climate mitigation, including market drivers, standards, and targets by sector or overall. It simulates the EU Emissions Trading System in its current form (changes can be simulated). It handles multiple policy objectives, such as GHG emissions reductions, energy efficiency, and renewable energy targets, and provides pan-European simulation of internal markets for electricity and gas.

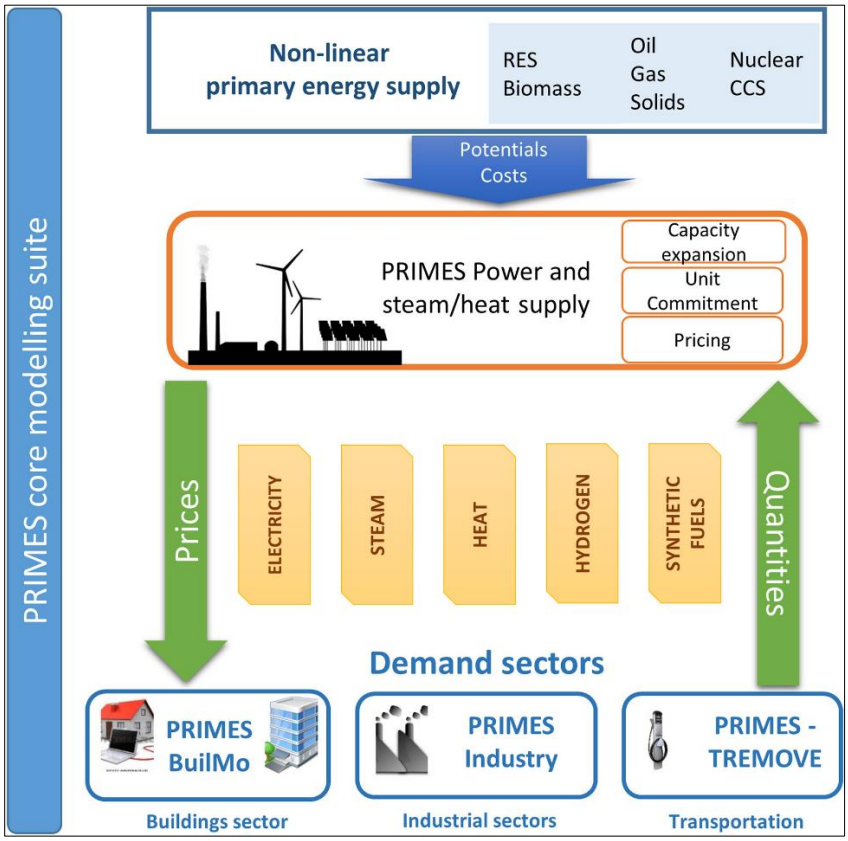

Figure 20: The PRIMES modelling suite

Source: https://www.ricardo.com/en/services/energy/energy-and-economic-modelling

[19] https://web.jrc.ec.europa.eu/policy-model-inventory/explore/models/model-primes/

- ***Scenario-based Life Cycle Emissions Data (SLED)***

Scenario-based life cycle emissions data analyzes the environmental impact of a product or service across its entire life cycle under different possible future conditions. This method uses hypothetical "scenarios", such as different policy choices, technological advancements, or climate futures to explore a range of potential outcomes and assess their associated greenhouse gas emissions. It is a valuable tool for risk management and long-term planning in sustainability and business strategy.[20]

The analysis is built upon the Life Cycle Assessment (LCA) framework, which evaluates all stages of a product's life, from raw material extraction to manufacturing, distribution, use, and end-of-life (disposal or recycling. Instead of using a single set of future assumptions, multiple scenarios are developed. These scenarios can vary factors like future policies, market demand, occupant behavior, or climate change impacts. Data for each scenario is collected for every stage of the life cycle. This includes energy usage, material inputs, transportation distances, process emissions, and waste data from suppliers and manufacturers. Greenhouse gas emissions are calculated for each stage under each specific scenario. This can include emissions from electricity, fuel, and other processes throughout the entire life cycle. The results from each scenario are compared to understand how different future conditions can lead to a range of environmental impacts and emissions levels.

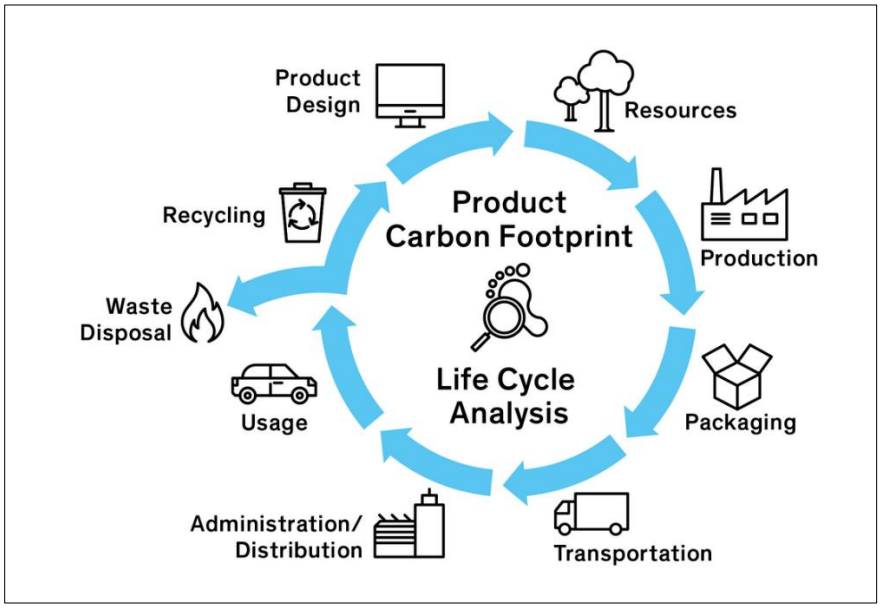

Figure 21: Life Cycle Analysis

Source: https://www.myclimate.org/en/get-active/corporate-clients/product-carbon-footprints-pcf-and-life-cycle-assessments-lca-myclimate

[20] https://ecochain.com/blog/life-cycle-assessment-lca-guide/

3. Impacts, Risks and Vulnerabilities

3.1. Current and projected climate trends[21]

3.1.1 Current Climate Trends

Temperature observations between 1951 and 2020 in Albania show interannual changes of annual average temperatures (Figure 22:). Three distinct periods can be observed, namely an increase in annual average temperature from 1951 until 2020, 1971 until 2020 and 1991 until 2020. Across the country, observations show a clear increase in surface air temperature: temperature trends in 1991-2020 were higher than the temperature trends for in 1951-2020.

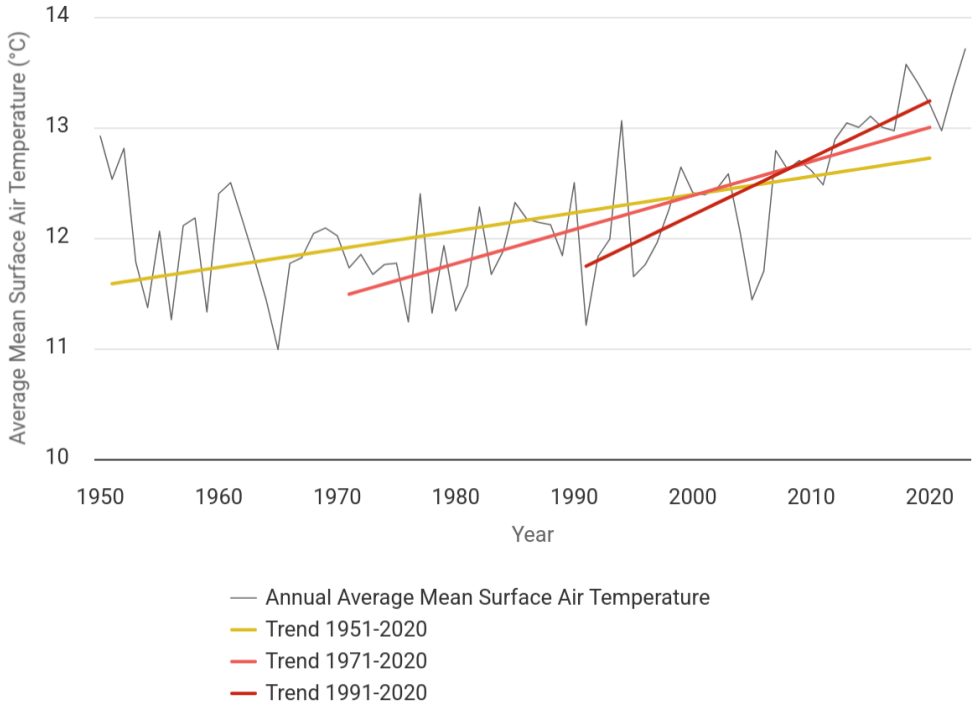

Figure 22: **Average mean surface air temperature annual trends with significance of trend per decade (1951-2023).**

Source: Climate Change Knowledge Group, 2021.

Precipitation observations do not exhibit a definitive trend (Figure 23**:**). Since the 1950s, a slight decline in the mean annual precipitation has been recorded; however, this decrease is not statistically significant. Conversely, the northern section of the coastal zone has experienced an increase in the number of rainy days per year[22]. Overall, while seasonal precipitation patterns show no substantial variation, an increase in rainfall intensity has been noted. Additionally, data from the Emergency Events Database highlight that floods have constituted the most frequent

[21] Albania's National Adaptation Plan – (2026-2036), under the UNDP NAP Project, (July 2024)
[22] Hodnebrog et al., 2019

hydrometeorological hazard in Albania over the past two decades, although no discernible trend regarding their frequency has been identified[23].

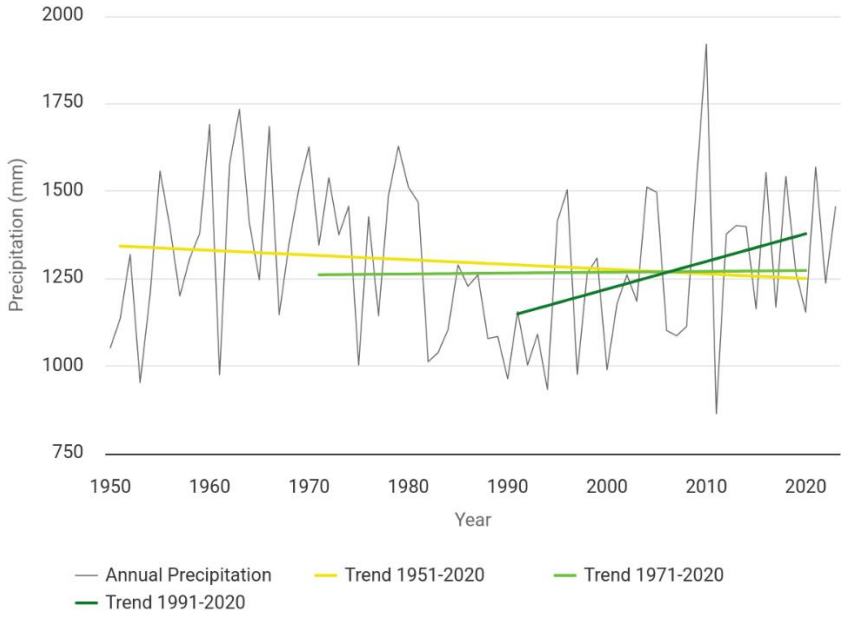

Figure 23: Precipitation annual trends with significance of trend per decade (1951-2023).
Source: Climate Change Knowledge Group, 2021.

Albania has been subject to **sea level rise**. As illustrated in 24, an upward trend was observed between 1993 and 2004. This was followed by a three-year period during which the sea level rise anomaly showed a decline, before resuming an average increase between 2007 and 2015[24].

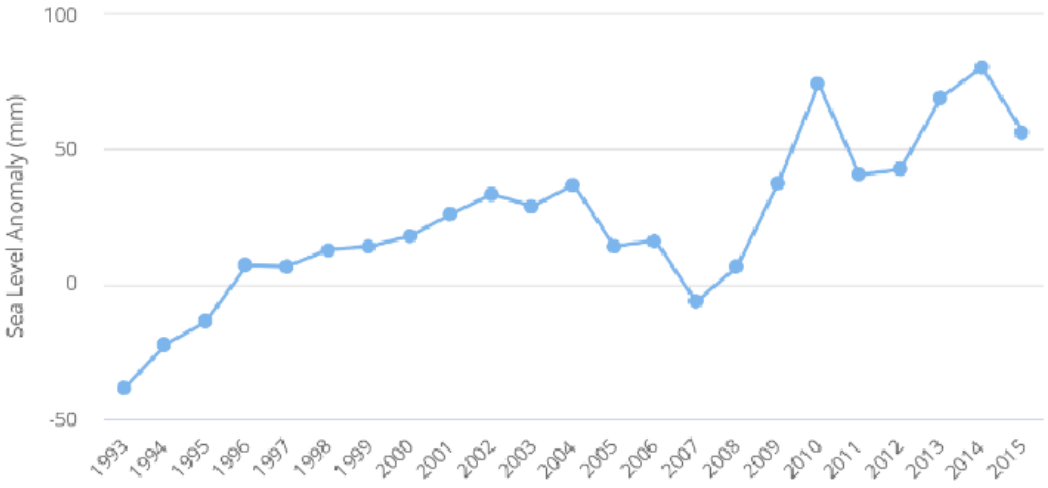

Figure 24: Albania's sea level rise anomaly (in mm) between 1993 – 2015.
Source: Climate Change Knowledge Group, 2021.

[23] World Bank Group (WBG), 2021
[24] Albania's National Adaptation Plan – (2026-2036), under the UNDP NAP Project, (July 2024)

3.1.2 Climate projections

Climate change scenarios for Albania are developed[25] through downscaling of global Shared Socio-economic Pathways (SSPx-y69) scenarios for temperature and precipitation, at a resolution 1*1 km, with the year 2005 (average of the period 1996-2015) used as reference. The analysis focused on the period 2021-2040 (with 2030 as centre), 2041-2060 (2050 centre) and 2081-2100 ("long term"), for Low (SSP1-1.9), Medium (SSP2-4.5) and High (SSP5-8.5) radiative forcing levels (equivalent to increases in temperature and extreme weather events).

At the national level, Albania's socioeconomic context has been analysed under the same SSP framework to assess potential vulnerabilities, adaptive capacity, and sectoral implications[26]. Albania's fragile economy, natural disaster risks, poverty, and inadequate infrastructure make it highly vulnerable to climate change. Environmental challenges like deforestation, poor watershed management, pollution, and unregulated coastal development, along with low climate awareness, further complicate adaptation efforts. The country´s economy has shifted from raw materials and industry to a service-led structure, maintaining steady growth annually, driven by private sector performance, exports, and infrastructure investment. Furthermore, Albania's population has declined since the 1960s due to social reforms and high emigration rates. With growth rates stagnant, the population is projected to decline further, reaching an estimated 2.75 million by 2031. The following gives the SSP scenarios for Albania[27]:

Table 20: SSP scenarios for Albania

SSP1	**Sustainability – Taking the Green Road (Low challenges to mitigation and adaptation)** Under this SSP, the sustainable path the world is embracing will affect the dynamics of economic development and environmental quality in every country. International support and integration policies will ensure the implementation of green policies in Albania. Albania will face more education investments, more healthcare supply, moderate to high economic growth, shifted toward human well-being, and less inequality. Due to a more educated population, the country will face lower population growth. Population in total will decline throughout the century. Due to a lower level of inequality, more people would be able to travel for leisure, thus affecting tourism sector. Lower resources intensity and lower population will imply lower demand for water. Management of water resources are also expected to improve. Stronger regulation on environment will impact also agriculture sector. Agriculture will experience improvements in productivity due to application of best practices in the sector and the improvements in technology. High sustainability means less food consumption, therefore again affecting agriculture production.
SSP2	**Middle of the Road (Medium challenges to mitigation and adaptation)** As the world follows a path in which trends do not shift markedly from historical patterns, Albania will experience similar social, economic, and technological developments as the ones it experiences today. GDP composition does not change, making the country highly reliant on service sector, and less on agriculture

[25] Albania's National Adaptation Plan – (2026-2036), under the UNDP NAP Project, (July 2024)

[26] National and Sectorial Scenario Development Report. Prepared in the frame of the UNDP NAP Project. January 2023.

27 National and Sectorial Scenario Development Report. Prepared in the frame of the UNDP NAP Project. January 2023

	and industry. Albania remains a service economy, with activities mostly concentrated in financial services, hospitality, retail, and less in health, human services, information technology and education. Less efforts in environmental management, will lead to further degradation of environmental systems. Few efforts to achieve sustainability goals will affect management of resources. This path will cause moderate economic growth, higher population growth compared to SSP1, similar inequality levels to the ones experienced today. Population in total will decline throughout the century. The implication in different sectors is expected as follows: Water demand will increase due to the higher number of populations compared to SSP1. Tourism sector might be affected by the higher population, but on the other hand, the persisting inequality among the population will affect tourism demand. The combined impact of these two driving forces on tourism is uncertain. Less emphasis and developments in technology will affect agricultural production, lowering agricultural production yield.
SSP3	**Regional Rivalry – A Rocky Road (High challenges to mitigation and adaptation)** Under such scenario, stronger levels of nationalism will lead to strong constrains in international collaboration. For a country like Albania, highly reliant on international support, this will cause a substantial impact on economic development and economic growth. Slow economic development, with low rates of growth, causing even more inequality, are some of the highlights of the future under this scenario. Low investments in education, technology and healthcare and few environmental actions will strongly the wellbeing of the population. A less educated population will lead to a higher rate of population growth, compared to other scenarios. Higher needs for food and water, accompanied with more disregard toward the environment, will cause resources exploitation. Less technological development will impact the production levels in agriculture sector, which on the other hand have to comply the needs of a rising population. Low level of economic development on the other hand will affect consumption, by making it lower. Tourism sector will face decline due to the rise of poverty and inequality among regions.
SSP4	**Inequality – A Road Divided (Low challenges to mitigation, high challenges to adaptation)** This scenario sees a world with rising inequality. Education and healthcare access are reserved to only one part of the population. This causes high stratification among the country. This will highly affect Albania, a country currently suffering from the increasing stratification of the population. The jeopardized social cohesion might cause high political instability and conflicts. Fragmentation is also observed in the manner of implementation of different policies, for instance in environmental field. Population will decline among the rich and increase among the poor.
SSP5	**Fossil-fueled Development – Taking the Highway (High challenges to mitigation, low challenges to adaptation)** This scenario will see growth in all sectors in Albania, high investment in education and healthcare, causing less inequality, decline of population, high levels of economic growth, and increase in environmental action. The declining population will cause lower demand for water. High technological development will increase production yield in agriculture. Tourism will be negatively affected by the decline in population, but positively affected by the high economic growth rates and lower inequality levels. The overall effect on tourism will result from the combined effects of population decline and economic growth.

See below**Error! Reference source not found.Error! Reference source not found.** for some key de scriptions of the above scenarios[28]:

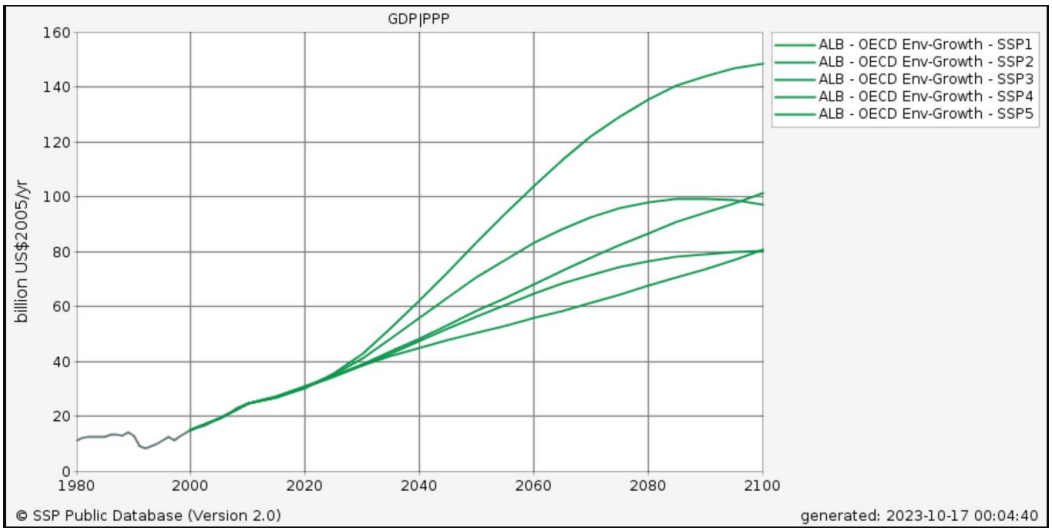

Figure 25: Albania Baseline scenarios for GDP

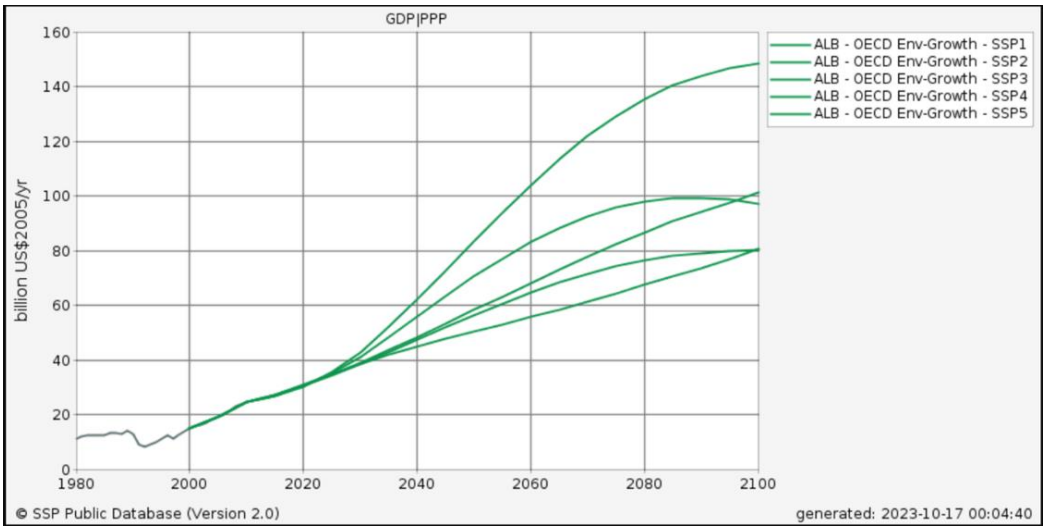

Figure 26: Albania Baseline Scenarios for Population

Temperature

Projected annual changes in mean temperature relative to the reference climatological period (1996–2015) are expected to reach up to 0.8°C (ranging from 0.5°C to 1.1°C) by 2030 and 1.3°C (ranging from 0.8°C to 1.9°C) by 2050. Under the intermediate scenario SSP2-4.5, temperature increases by 2100 are projected to range between 1.4°C and 3.1°C annually, and between 1.9°C and 3.9°C during the summer. The high and very high emission scenarios, SSP3-7.0 and SSP5-8.5, project that annual and summer temperatures could rise by up to 4.6°C (ranging from 3.2°C to 6.8°C) and 6.0°C (ranging from 4.1°C to 8.9°C), respectively, by 2100. All SSPs forecast lower temperature increases in winter and spring relative

[28] SUPPORT TO FILLING GAPS IN Climate Change Adaptation Data and Risk Analysis National and Sectoral Scenario Development Report. Baastel, January 2023

to summer and autumn, with the most pronounced warming expected during summer under the aggressive scenarios SSP3-7.0 and SSP5-8.5 (Baastel, 2024a).

To visualize these projections, figure[29] below presents the mean annual temperature changes under the SSP2-4.5 and SSP5-8.5 scenarios, for 2050 and 2100, illustrating the magnitude and spatial distribution of expected warming across Albania.

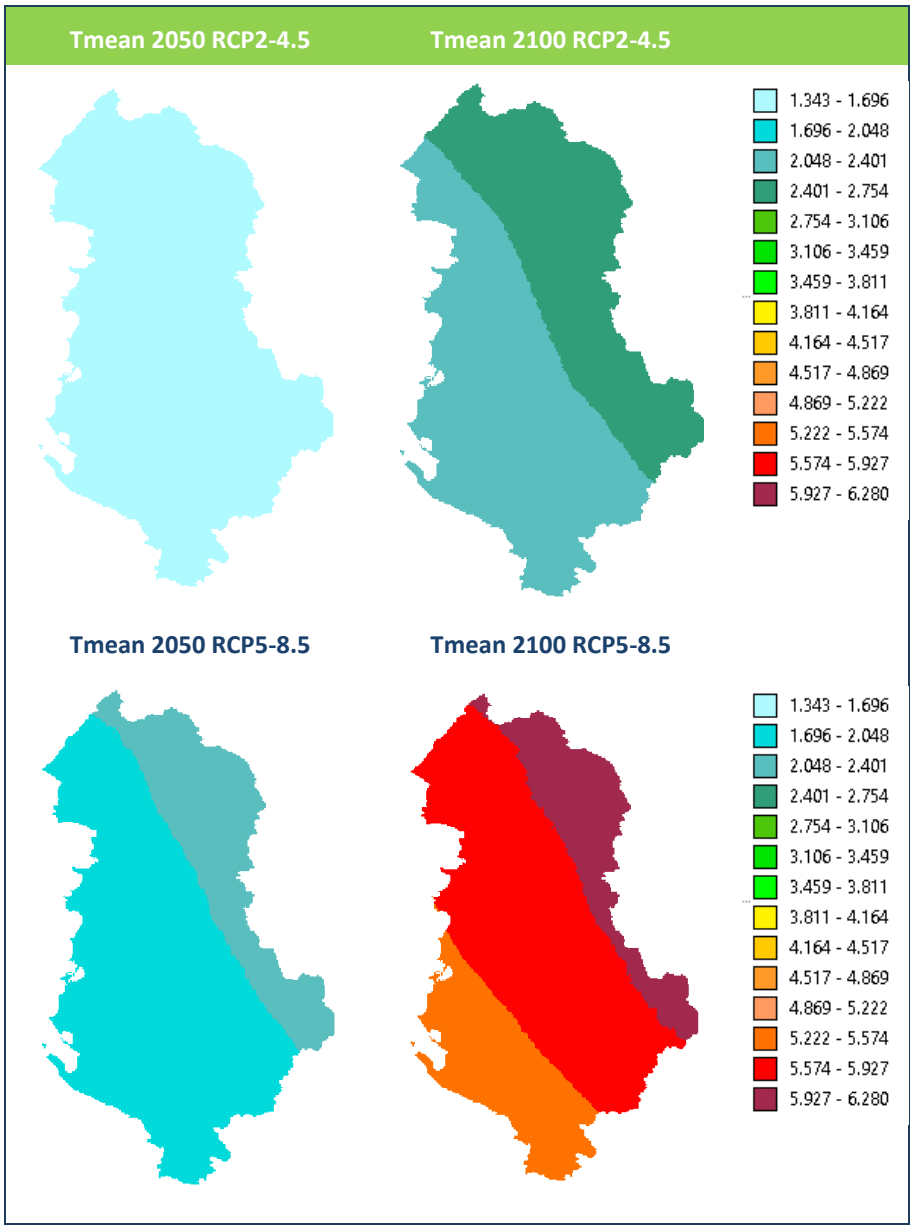

Figure 27: Mean Annual Temperature changes under SSP2-4.5 and SSP5-8.5 scenarios

[29] SSPx-y, x-refers to the Shared Socioeconomic Pathway (respectively SSP1 to SSP5) and y- to the radiative forcing level (respectively 1.9, 2.6, 4.5, 6.0 and 8.5 W/m²) in 2100

Seasonal variations in temperature change are also notable. Figure 28 below presents the projected temperature changes for 2050 across different seasons, highlighting the greater warming expected during summer and autumn compared to winter and spring.

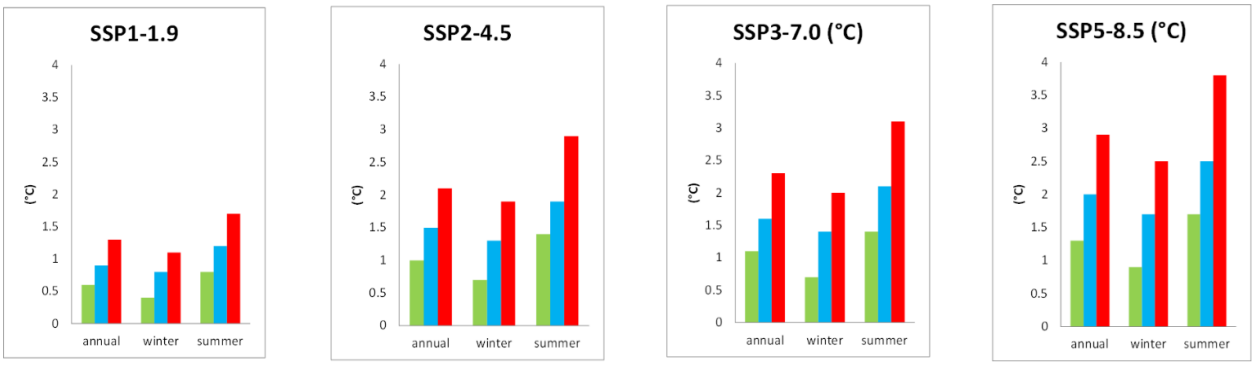

Figure 28: Projected temperature changes for 2050 in different seasons

Projected changes in maximum and minimum temperatures exhibit trends consistent with those of mean temperature. Under the intermediate scenario (SSP2-4.5), annual maximum temperatures are expected to increase by approximately 1.6°C (ranging from 1.1°C to 2.7°C) by 2050, and by 2.5°C (ranging from 1.6°C to 4.1°C) by 2100. The most aggressive scenario (SSP5-8.5) anticipates greater increases in maximum temperatures, particularly during summer months, potentially reaching 2.8°C (ranging from 1.8°C to 4.6°C) by 2050. Additionally, projections indicate that high-percentile temperatures (95th percentile) are likely to rise at a faster rate than mean temperatures, especially in summer. The concurrent rise in minimum temperatures further suggests that the intensity of heat waves will increase, with both the frequency and duration of such events expected to grow, particularly under the SSP5-8.5 scenario.

The number of hot days (defined as days with maximum temperatures ≥35°C) is projected to increase, while the number of cold (minimum temperature <0°C) and very cold days (minimum temperature <-5°C) is expected to decline across all climatic zones under all scenarios. These trends are particularly pronounced under the SSP3-7.0 and SSP5-8.5 scenarios, relative to the reference period.

Absolute maximum and minimum temperatures are projected to rise under all SSP scenarios. Consequently, the return periods of extreme maximum temperatures are anticipated to decrease significantly, while the return periods of extreme minimum temperatures are expected to increase markedly across the Albanian territory.

Precipitation[30]

All SSPs indicate a probable decline in both annual and seasonal precipitation relative to the 1995–2015 baseline across all projected time horizons up to 2100. The high-emission scenario SSP5-8.5 forecasts the most significant percentage reductions in precipitation, with annual and summer values projected to decrease by up to -5.8% (ranging from -32.7% to +17%) and -17.6% (ranging from -56.2% to +16.9%) respectively by 2050. In contrast, the lowest reductions in precipitation percentages are projected under

[30] The Fourth National Communication of Albania on Climate Change, 2022

SSP1-1.9 and SSP1-2.6, except during the summer months, where declines of up to -8.1% (-25.7% to +7.8%) and -10.2% (-32.5% to +9.5%) are anticipated. Differences between seasons for precipitation are less distinct. Figure 29 below illustrates these seasonal contrasts, emphasizing the variability and uncertainty of precipitation changes across different regions and time horizons.

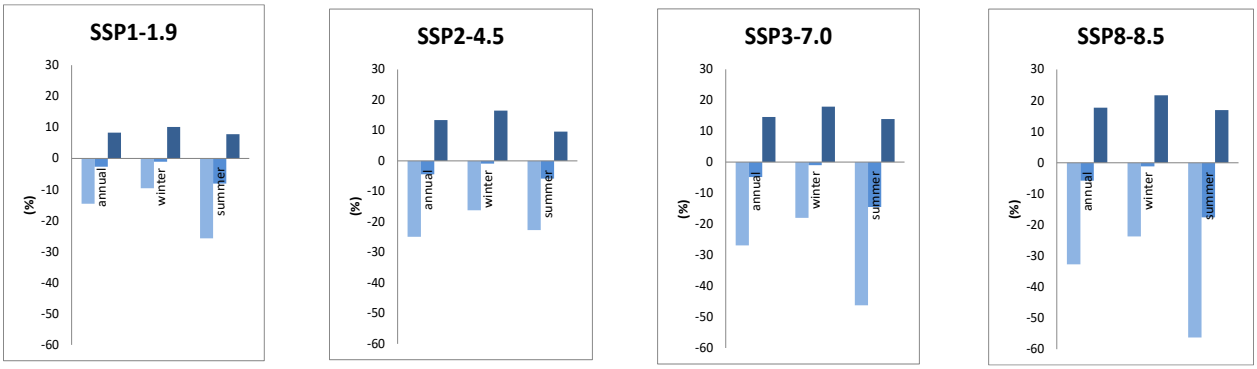

Figure 29: Seasonal differences for precipitation

The pronounced reduction at the 5th percentile of projected changes suggests a likely increase in drought frequency, while the substantial rise at the 95th percentile indicates a heightened risk of intensified heavy precipitation events. Analyses conducted across various scenarios and time horizons (2030, 2050, 2100), as well as for one to three consecutive days, reveal that the return periods for maximum precipitation levels are expected to shorten throughout Albania. For example, in the Elbasan area, an extreme precipitation event of approximately 145 mm/day, historically occurring once every 100 years, is projected to occur once every 70 years by 2050.

This trend is further illustrated in figure below, which presents the projected return periods for one-day maximum precipitation, showing that extreme rainfall events are expected to become more frequent, intense, and of longer duration.

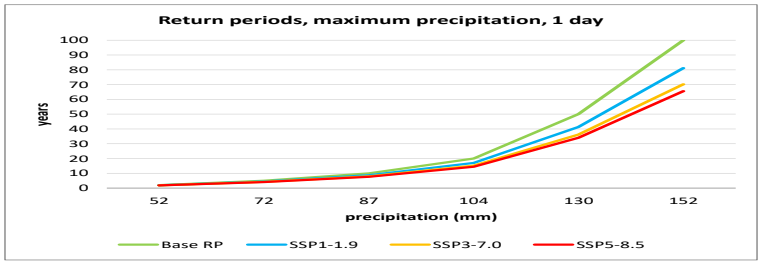

Figure 30: Return periods, maximum precipitation, 1 day

Sea level rise[31]

All SSPs project an increase in sea level. Under the intermediate SSP2-4.5 scenario, sea level rise in the Durrës area is projected to reach approximately 24 cm (ranging from 6 to 30 cm) by 2050, and 65 cm (ranging from 17 to 83 cm) by 2100, relative to the 1995–2015 baseline period.

[31] The Fourth National Communication of Albania on Climate Change, 2022

The projected extent of coastal inundation is shown in figure below, highlighting the zones likely to be affected by a 0.33 m sea level rise, indicated in blue[32].

Figure 31: Coastal Zones that are likely to be flooded with 0.33m sea level rise

Other climatic variables[33]

The frequency and duration of cold conditions are projected to decrease, alongside a reduction in the number of heating degree days. Conversely, cooling degree days are expected to increase, reflecting higher energy demand for cooling. These changes are particularly pronounced under the SSP3-7.0 and SSP5-8.5 scenarios.

Overall, there is strong consensus across all scenarios regarding the direction of projected climate changes, despite variations in their magnitude. Specifically, all scenarios indicate an increase in annual temperatures, a reduction in annual precipitation, a rise in sea levels, and a heightened occurrence of extreme events such as intense precipitation, droughts, and heatwaves. The magnitude of these changes escalates over time, with more significant shifts projected for 2050 compared to 2030, and for 2100 compared to 2050. Moreover, the degree of change is notably greater under more aggressive emissions scenarios,

For hazard severity assessments, it is essential to consider the range of scenarios. The lowest severity ratings are based on the most optimistic scenario (SSP1-1.9) for the year 2030, while the highest severity ratings are derived from the more extreme scenarios, typically applying the SSP5-8.5 projections for 2050. This approach highlights both the potential progression of climate hazards and the critical influence of emission pathways on future conditions.

[32] Advancing Albania's planning for medium and long-term adaptation through the development of a National Adaptation Planning (NAP) process.
[33] The Fourth National Communication of Albania on Climate Change, 2022

The projected changes align with the observed trends in temperature rise, sea level increase, and the heightened frequency of intense rainfall events. When comparing observed and projected changes in climate variables in Albania, two primary differences emerge: (i) an intensification of the observed trends in the projections, reflected in higher temperatures, greater sea level rise, and more intense heavy rainfall; and (ii) increased clarity regarding certain variables, particularly annual precipitation, where observations remain inconclusive, but all scenarios consistently project a decline. A third significant distinction lies in the nature of the data: while observations are derived from actual measurements, projections are based on model simulations under specific assumptions, inherently introducing a degree of uncertainty. Nevertheless, it is noteworthy that, for Albania, despite variations in the magnitude of change depending on the scenario, all scenarios generally converge in the direction of the projected changes.

To complement the detailed analyses presented above, the following table summarizes Albania's observed and projected climate trends, offering an overview of temperature, precipitation, sea level rise, and extreme events across various scenarios and timeframes.

Table 21: Summary of observed and projected climate change in Albania[34].

<table>
<tr><th>Observed climate trends</th><th colspan="4">Projected climate changes</th></tr>
<tr><td colspan="5">Temperature</td></tr>
<tr><td>Annual temperature: increase but unknown degree</td><td>Annual temperature: increase</td><td>SSP1-1.9:
2030: 0.8°C
2050: 0.9°C</td><td>SSP2-4.5:
2030: 0.8°C
2050: 1.5°C</td><td>SSP5-8.5
2030: 1°C
2050: 2°C</td></tr>
<tr><td colspan="5">Rainfall</td></tr>
<tr><td>Annual rainfall: no conclusive observations</td><td>Annual rainfall: decrease</td><td>SSP1-1.9:
2030: 2.4%
2050: 2.7%</td><td>SSP2-4.5:
2030: 2.7%
2050: 4.4%</td><td>SSP5-8.5
2030: 3.6%
2050: 5.8%</td></tr>
<tr><td colspan="5">Sea level</td></tr>
<tr><td>Increase</td><td>Increase</td><td>SSP1-1.9:
2030: 11cm
2050: 20cm</td><td>SSP2-4.5:
2030: 11cm
2050: 24cm</td><td>SSP5-8.5
2030: 11cm
2050: 28cm</td></tr>
<tr><td colspan="5">Extreme weather events</td></tr>
<tr><td>Frequency and intensity of drought: no information</td><td>Frequency and intensity of drought: increase</td><td colspan="3">High reduction at the 5% percentile level (of precipitation).</td></tr>
<tr><td rowspan="2">Frequency and intensity of heavy rains: no information on frequency, increased intensity</td><td rowspan="2">Frequency and intensity of heavy rains: increase</td><td colspan="3">Return periods of days with > 100mm of precipitation:</td></tr>
<tr><td colspan="2">SSP2-4.5:
2050: 16,7</td><td>SSP5-8.5
2050: 15,9</td></tr>
<tr><td rowspan="2">Frequency and intensity of heat waves: no information</td><td rowspan="2">Frequency and intensity of heat waves: increase</td><td colspan="3">Average number of heat waves/a year:</td></tr>
<tr><td>SSP1-1.9:
2030: 3
2050: 3</td><td>SSP2-4.5:
2030: 4
2050: 4</td><td>SSP5-8.5
2030: 4
2050: 4</td></tr>
<tr><td rowspan="2">Frequency and intensity of very cold days: no information</td><td rowspan="2">Frequency and intensity of very cold days: decrease</td><td colspan="3">Number of instances with Tmin < -5°C</td></tr>
<tr><td>SSP1-1.9:
2030: 24
2050: 24</td><td>SSP2-4.5:
2030: 24
2050: 18</td><td>SSP5-8.5
2030: 24
2050: 16</td></tr>
</table>

[34] CLIMATE RISK ASSESSMENT OF THE Urban Development SECTOR. ALBANIA NATIONAL ADAPTATION PLANNING: SUPPORT TO FILLING GAPS IN CLIMATE CHANGE ADAPTATION DATA AND RISK ANALYSIS. Baastel, July 2024 (Also included in report for other sectors: griculture, tourism).

3.2. Observed and potential impacts of climate change, including sectoral, economic, social and/or environmental vulnerabilities[35]

The following chapters describe in detail the impacts and associated vulnerability under the projected climate change scenarios in the relevant areas of interest. The analysis is mainly based on the scenarios described above.

Climate impacts and vulnerabilities in Albania have been assessed across five priority sectors: agriculture and forestry, tourism, urban development, energy, and transport. These sectors are part a broader group of priority sectors for Albania's National Strategy for Sustainable Development and European Integration, and are considered as priority sectors in the context of the NAP due to their vulnerability and specific risks related to climate change. These findings are derived from the sectoral Climate Risk Assessments (CRAs) conducted under UNDP's NAP support and summarized in the national Implementation Plan (Baastel, 2024).

Agriculture and Forestry

Agriculture remains central to Albania's economy, contributing 18.6% of GDP and employing about 25% of the population, with smallholder farms (average size 1.2 ha) dominating production. The country's agriculture spans four agro-ecological zones (AEZs)—Lowland, Intermediate Hill, Southern Highlands, and Northern/Central Mountains—each with distinct crop and livestock systems. Agricultural production in Albania is diverse, encompassing both seasonal and permanent crops. The main cereals grown include wheat, maize, and oats. Field crop production also features significant quantities of vegetables, potatoes, and white beans, as well as forage crops. Among permanent crops, the most important are fruit trees olives, and vineyards. The most important crops, by area covered, are summarized in the table below.

Table 22: Area of different crops, 2022

Crop	Area (000 ha)
Wheat	54.3
Maze	56.6
Oats	15.0
Potatoes	9.9
Vegetables	33.8
White beans	13.0
Forage crops	217.7
Fruit trees	20.9
Olives	54.7
Vineyards	11.0

Source: Adapted from INSTAT, "Regional Statistical Yearbook 2023"

[35] Albania's National Adaptation Plan – (2026-2036), under the UNDP NAP Project, (July 2024)

Livestock is a key sector for Albania's economic and social development, contributing significantly to food production. It includes cattle, sheep, goats, pigs, equidae, poultry, and bees. In 2022, cattle made up 42.2% of the total livestock population, followed by sheep and goats (32.4%), poultry (11%), equidae (7.7%), and pigs (6.7%). Beekeeping is also growing in importance, with many farmers across the country engaged in apiculture. In 2022, Albania produced a total of 970,168 tonnes of milk, of which 85% came from cows, 7.9% from sheep, and 7.1% from goats. The average yield was 3,114 kg per cow, 63 kg per sheep, and 129 kg per goat. Meat production reached 139,856 tonnes in live weight, with cattle contributing 40%, sheep and goats 34.5%, poultry 14.8%, and pigs 10.7%. Egg production total 1.67 billion pieces, while honey production amounted to 3,263 tonnes, highlighting the growing importance of poultry and apiculture within Albania's agricultural sector.

Climate Risks:

Risk assessments show a steady rise in vulnerability across all zones and subsectors, with risk levels escalating by 2050 under all scenarios. The Lowland and Intermediate Hill zones are the most exposed, facing very high risks from heatwaves, water scarcity, soil erosion, and flooding, while the Southern Highlands and Mountainous zones show moderate but increasing risk levels.

Crops are more vulnerable than livestock, particularly temporary crops (forages, cereals, vegetables), which face the highest risk ratings under aggressive emission pathways. Permanent crops (fruit trees, citrus, grapes, olives) also face elevated risks due to water stress and heat extremes, though certain highland areas may benefit from milder winters. In February 2015, Albania experienced extreme rainfall of 200 millimeters over three days, causing severe flooding that damaged around 10,000 hectares of farmland, along with greenhouses and key agricultural infrastructure, particularly in the southern and southeastern regions, including Vlorë, Fier, Lushnjë, Berat, Korçë, and Gjirokastër. While the livestock sector was less directly affected, subsequent feed shortages negatively impacted animal production. In the livestock sector, bovines and horses are most at risk, with vulnerability intensifying under heat and water stress. Pig and poultry farming faces moderate but increasing risks due to reliance on controlled environments and feed imports.

Forestry systems face mounting pressure from wildfires, pests, and habitat degradation, particularly in southern and central Albania, where summer droughts are expected to intensify.

Without targeted adaptation—such as improved irrigation, drought-resistant crop varieties, and sustainable land management—agricultural productivity and rural livelihoods will face substantial losses by mid-century.

Tourism

Tourism has emerged as a key economic driver, contributing 17.4% of GDP and employing roughly 20% of Albania's workforce. Visitor numbers have surged over the last two decades, with Albania ranked among the top three fastest-growing global destinations by UNWTO in 2023. Coastal tourism is the main driving force of this sector, with the rural and nature tourism steadily becoming more important. The tourism sector is expected to grow further, in part proMoEd by the construction of new important tourism infrastructure, focused mainly on the coastal regions.

Climate Risks:

Tourism is highly climate-sensitive, particularly the sun-and-sea, ecotourism, and cultural heritage segments. Risk assessments show a consistent increase in risk ratings toward 2050, even under best-case scenarios.

- Ecotourism holds a very high risk in both near- and long-term projections, due to its dependence on natural ecosystems and biodiversity.
- Sun-and-sea and coastal tourism are threatened by sea level rise, erosion, and saltwater intrusion, endangering beaches, coastal infrastructure, and cultural heritage sites.
- Urban and cultural tourism face high risks from heat stress, water shortages, and infrastructure degradation during peak seasons.

While economic growth has improved infrastructure, there is concern that rapid tourism expansion without reinvestment in resilience may amplify future vulnerability. Adaptive actions—such as coastal protection, diversification of tourism offerings, and sustainable visitor management—are vital for sectoral resilience.

Urban Development

Albania's urban population has grown rapidly, now exceeding 62% of total inhabitants, concentrated in the Tirana–Durrës corridor, and is projected to reach 78.2% by 2050. Cities and urban centers are thus playing an increasingly important role in the country's socio-economic sphere, while other regions remain rural and more fragmented, with generally lower quality human capital. Urban expansion has often occurred in risk-prone areas, with limited drainage infrastructure and informal settlements increasing exposure.

Climate Risks:

Urban vulnerability assessments identify four main climatic zones—Mediterranean Field, Hilly, Pre-Mountainous, and Mountainous. Under future scenarios, all zones experience marked increases in risk:

- Present risks, related to frequent and longer rainfalls, temperature extremes and sea level rise, taken into consideration for different sub-sectors such as sun-and-sea, ecotourism, cities & art and cultural heritage are currently low to moderate, but by 2050, risk levels rise to high or very high across all zones.
- The coastal and lowland zones (Tirana, Durrës, Vlorë, Fier) are particularly exposed to flooding, storm surges, and sea level rise.
- Urban subsectors—residential, social, productive, and supply networks—are all projected to face very high risks, with critical infrastructure (water, waste, and transport systems) most affected.

Urban heat islands, inadequate drainage, and outdated building stock exacerbate vulnerabilities, especially for marginalized communities. Adaptation priorities include urban green infrastructure, flood protection, improved spatial planning, and early warning systems.

Energy

The energy sector is dominated by hydropower (95% of generation), with limited diversification into solar and wind energy. This heavy dependence on hydrological systems exposes Albania to climate variability and drought risk. Severe droughts in 2017 and 2022 significantly reduced river flows, leading to substantial declines in hydropower generation. During these events, the country had to rely on energy imports to meet demand, with 2017 requiring up to 80% imported electricity and 2022 resulting in approximately €60 million spent on additional energy procurement.

Climate Risks:

All energy subsectors are projected to experience rising risk levels:

- Hydropower, transmission, and fuelwood face very high risks by 2050 due to reduced water availability, extreme precipitation, and temperature stress.
- Oil, gas, and coal sectors face flooding and sea level rise risks affecting coastal refineries and storage terminals.
- Wind and solar power, though currently minimal, are less vulnerable (rising from "very low" to "moderate" risk), presenting an opportunity to enhance resilience through diversification.

Adaptation measures—such as modernizing transmission infrastructure, expanding renewable energy, and integrating water management in energy planning—are critical for long-term energy security.

Transport

Albania's transport sector encompasses road, railway, maritime, and air transport, with road transport dominating both passenger and freight movement. The sector is critical for connectivity, tourism, and trade. The transport sector relies primarily on the road network, with a total length of about 18,000 km, for the transportation of both goods and passengers. Railway on the other hand is underutilized, with only 214 km of the total of 416 km of the railway network still being operational. Maritime transport is the main way of transporting goods from and to Albania, while Air transport is the fastest growing way of transporting, mainly passenger, with an increase of 212% in the period 2022-2024.

Climate Risks:

Climate projections indicate worsening risks across all subsectors, particularly under high-emission pathways:

- Road and railway transport currently face moderate risk, but are projected to reach very high risk under the worst-case scenario due to flooding, erosion, and landslides.
- Maritime transport is highly exposed to sea level rise and storm surges, threatening major ports such as Durrës, Vlorë, and Shëngjin.
- Air transport faces moderate risk, mainly from heat extremes and infrastructure stress.

While planned investments (e.g., in road and rail modernization) will improve resilience, the pace of adaptation must accelerate to match rising exposure.

3.2.1 Approaches, Methodologies, and Tools

Albania's vulnerability and risk assessments were carried out using sectoral Climate Risk Assessments (CRAs) under UNDP and EU4Green support. These assessments employed:

- SimClim AR6 and CMIP6 climate models for temperature and precipitation projections;
- A risk rating framework combining exposure, sensitivity, and adaptive capacity indicators for each subsector and AEZ;
- Cross-sectoral validation with national statistics (INSTAT), hydrometeorological data (IGJEUM), and socioeconomic baselines;
- Scenario analysis under SSP1-1.9 (best-case), SSP2-4.5 (intermediate), and SSP5-8.5 (worst-case) pathways for 2030 and 2050 horizons.

Uncertainties arise mainly from the limited historical data coverage, model resolution constraints, and incomplete adaptive capacity information at local level. To address these, Albania's National Climate Information System (NCIS) is being developed to consolidate sectoral data and improve consistency in future climate analyses.

Across all sectors, Albania faces escalating climate risks driven by rising temperatures, altered precipitation, and increasing extremes. Vulnerabilities are most pronounced in lowland agricultural zones, coastal tourism areas, and urban centres, where socio-economic concentration amplifies exposure. By 2050, without enhanced adaptation investments and stronger cross-sectoral governance, Albania's key economic systems—agriculture, tourism, energy, and transport—will experience severe productivity and infrastructure losses. Strengthening adaptive capacity through data systems, local planning, and financial mechanisms remains central to ensuring long-term climate resilience.

3.3. Approaches, methodologies and tools, and associated uncertainties and challenges[36]

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- A risk rating framework combining exposure, sensitivity, and adaptive capacity indicators for each subsector and AEZ;
- Cross-sectoral validation with national statistics (INSTAT), hydrometeorological data (IGJEUM), and socioeconomic baselines;
- Scenario analysis under SSP1-1.9 (best-case), SSP2-4.5 (intermediate), and SSP5-8.5 (worst-case) pathways for 2030 and 2050 horizons.

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[36] Albania's National Adaptation Plan – (2026-2036), under the UNDP NAP Project, (July 2024)

3.4. Framework for climate change adaptation

3.4.1 National circumstances relevant to adaptation actions

The Republic of Albania is situated in Southeast Europe, occupying the western part of the Balkan Peninsula, bordered by Montenegro to the north, Kosovo to the northeast, North Macedonia to the east, and Greece to the south. The country has a 476 km coastline along the Adriatic and Ionian Seas, forming part of the Mediterranean basin. Albania covers a total area of 28,748 km², with about 70% of its territory mountainous and an average elevation of 708 meters above sea level.

The country's varied topography and geology give rise to rich ecosystems, divided into three main ecological zones — coastal plains, hilly sub-mountainous, and mountainous zones — and 13 sub-zones. Albania's Mediterranean climate is characterized by hot, dry summers and mild, wet winters, with continental influences in the inland and southeastern regions. The mean annual air temperature is 12.4°C, and average annual precipitation is 933 mm.

Albania is endowed with abundant water resources, with an estimated annual total flow of 39.2 billion m³, of which 95% drains into the Adriatic Sea. These hydrological resources are critical for hydropower generation, irrigation, and ecosystem maintenance. Forests and pastures account for nearly 50% of the national territory, while agricultural land covers about 26%. The country's biodiversity is remarkable: it hosts around 3,200 vascular plant species and 15,600 animal species, including 32 endemic plant species and 150 subspecies unique to Albania.

Climate observations from 1951–2020 show a consistent increase in air temperature, while precipitation patterns display regional variability. Annual mean temperature has already risen by 1.8°C since the 1960s and future projections indicate that it could rise by an additional 0.3°C by 2050 and up to 3.9°C by 2100 under intermediate to high-emission scenarios (SSP2-4.5, SSP5-8.5). Sea level along the Albanian coast has risen by approximately 10 cm since 1993 and level rise along the Adriatic coast is expected to reach 24 cm by 2050, further threatening low-lying coastal areas such as Durrës, Lezha, and Vlora. These trends increase the risks of floods, droughts, and heatwaves, particularly affecting agriculture, water resources, and infrastructure.

As of January 2023, Albania's population was 2,761,785, marking a 1.1% decrease compared to 2022 due to outward migration and demographic aging. The median age is 38.8 years, reflecting a gradually aging society. The youth dependency ratio declined slightly to 23.8%, while the old-age dependency ratio rose to 24.4%. The sex ratio of the population is 98 males per 100 females.

Urbanization continues to intensify, with Tirana accounting for 33.5% of the population, followed by Durrës (10.5%) and Fier (9.8%). Population decline in rural and mountainous areas increases vulnerability to climate impacts due to labor shortages, reduced agricultural productivity, and weakened community-based adaptation capacities.

According to the Human Development Index (HDI), Albania scored 0.789 in 2022, ranking 74th globally, signifying a high level of human development. The Gender Inequality Index (GII) value of 0.116 places

Albania 34th out of 166 countries, reflecting notable progress in gender equality. However, women remain underrepresented in leadership positions and overrepresented in unpaid care work, which limits their resilience to climate shocks.

3.4.2 National Economic Indicators

From one of the poorest countries in Europe, Albania has transformed into an upper-middle-income country with a GDP of 23 billion USD and GDP/capita of 8300 USD in 2023[37]. This economic growth has been associated with a transition from a planned economy based on raw materials, agriculture and industry, into a more diverse economy largely supported by the private sector. Following an expansion of 3.9% in 2023, real GDP growth is projected to average around 3.5% in 2024–2029, driven by domestic consumption, tourism, and construction activity[38]. Over the last three decades social indicators have also improved in Albania. Albania's Human Development Index (HDI) value[39] for 2023 was 0.81 — which put the country in the very high human development category — positioning it at 71 out of 193 countries and territories, though still some 21.7% of Albanians lived below the national poverty line[40]. Unemployment reached a historically low 8.8% in 2024, but unemployment amongst the youth was 19.1%.

Climate change threatens to reverse these gains by exacerbating economic shocks, particularly for low-income households that are less equipped to recover from extreme weather events. During the last 33 years the economic loss caused by floods was estimated at $2.3 billion[41]. The socio-economic progress of Albania has been recently hampered by two shocks. In November 2019 the country was hit by a devastating earthquake, measuring 6.3 on the Richter scale (the strongest in 30 years), that caused 51 fatalities, affected over 200,000 people and led to losses equivalent to an estimated 7.5% of GDP. And in the midst of the reconstruction efforts the COVID-19 crisis took hold, putting even more pressure on the Government's budget and response, as it forced Albania to put key economic sectors in lockdown[42]. Potentially further worsening this situation, currently a tightening in global economic and financial conditions could hamper Albania's access to external market financing, including for climate finance.

The economy is vulnerable to continuing unfavourable weather conditions[43], that could particularly affect marginalized and low-income groups who spend a higher proportion of their income on essential goods. This situation could exacerbate food insecurity and deepen existing inequalities for women, elderly populations, and coastal and rural communities. Distinct gender disparities in employment exist between women and men: At the national level with women are employed at a lesser degree than men, 52.8% vs. 67.7% as of 2023[44]. In agriculture**,** more women are employed (40.1% of the total female workforce) than men (28.7% of the total male workforce), as opposed to most other sectors where men dominate the work

[37] IMF: 2024 ARTICLE IV CONSULTATION—PRESS RELEASE; STAFF REPORT; AND STATEMENT BY THE EXECUTIVE DIRECTOR FOR ALBANIA, 2025
[38] Ibid.
[39] HDI considers life expectancy at birth, education, gross national income per capita, etc.
[40] Ibid.
[41] The Future of Water in Agriculture in Albania: A Broad Sector Rethinking. World Bank. 2014
[42] Report on socio-economic scenarios. Prepared under UNDP NAP Project. 2023.
[43] Ibid.
[44] World Bank Gender Data Portal, "Albania Economy Profile", 2023

force, including construction (13.5% men vs. 0.6% women) and energy/utilities (4.3% men vs. 0.9% women)[45].

3.4.3 Sectoral socio-economic context and outlook

This section presents the current situation, vision, recent progress and challenges for the main economic sectors in Albania, with special reference to the 5 NAP priority sectors[46]. This is based on the sectoral analysis undertaken in the frame of the UNDP NAP Project and compared with the sectoral governmental vision as given in the NSDEI III, 2022-2030. Besides the specific economic challenges, these sectors also face specific climate related risks and challenges, that are further detailed in Chapter *4.3: Climate Risks Assessment at Sectoral Level* (for the 5 NAP priority sectors).

Agriculture, including livestock, remains a vital sector in Albania, employing nearly 34% of the workforce and contributing 16.8% to GDP in 2021. Albania has 696,000 hectares of agricultural land, divided into four Agro-Ecological Zones (AEZ): Lowland, Intermediate Hill, North & Central Mountains, and Southern Highlands. Field crop production is primarily concentrated in the lowlands, with some presence in other agro-ecological zones (AEZs). Livestock distribution varies across regions: bovines and horses are found in all four AEZs while pig and poultry farming is concentrated in the lowlands and intermediate hill zone. The sector is predominantly composed of small, family-run farms (85%), with an average farm size of 1.2 hectares. National and international market demand for agricultural, livestock and forestry products will likely continue to grow, provided the important investments in irrigation, drainage and flood protection (rivers and sea) are made and increased water demand has been satisfied.[47] The small size of the farms, land fragmentation and unclear property rights remain the main challenges for the sector. Climate change threatens agricultural productivity through increased frequency of extreme weather events, droughts, and floods, see Section 4.3.1 for details, and Chapter 5 for identified adaptation measures.

Forests cover approximately 39% of Albania's land area and are a crucial source of firewood for rural households. However, forest areas have declined from 1.385 million hectares in 1938 to 1.051 million hectares in 2018. The forestry sector faces significant climate-related challenges, including increased frequency of forest fires, shifts in species distribution, and pest and disease outbreaks. Between 2007 and 2019, approximately 337,800 hectares of forest were burned, representing 33% of the national forest area. Illegal logging and inadequate forest management further exacerbate these challenges. Strengthening forest management capacity and enhancing reforestation efforts are essential for mitigating the impact of climate change and ensuring the sustainability of forest resources

Tourism is a key driver of Albania's economy, contributing 24% to GDP in 2024 and employing 20% of the total of work force in Albania. The sector has shown remarkable post-pandemic recovery, with tourist numbers growing by 56% in 2023 and an additional 15% in 2024, reaching 11.7 million visitors. Coastal tourism is the main force of the industry, but with nature and rural tourism coming more to the fore. Tourism will be further proMoEd by the construction of new major tourism infrastructure, mainly in coastal

[45] Mainstreaming Gender into the National Adaptation Plan Process. Gender Action Plan. 2025.
[46] Agriculture, tourism, energy, transport, urban development.
[47] National and Sectoral Scenario Development Report. Prepared under UNDP NAP Project, 2023

areas. However, tourism is highly sensitive to climate change impacts, including rising sea levels, coastal erosion, and extreme weather events, as further detailed in Section 4.3.2. Adapting the tourism industry to climate change requires diversifying tourism products (e.g., cultural and eco-tourism) and improving climate-resilient infrastructure, see Chapter 5 for identified and prioritized adaptation measures in tourism.

Albania is endowed with a wide variety of **energy** resources ranging from oil and gas, coal, hydropower, natural forest biomass and other renewable energy (solar power, wind power, geothermal). In 2022, oil accounted for the largest share of supply of energy at 57%, followed by hydroelectricity generation (29%) and fuelwood (7%)[48]. The nation's objective of energy security is to ensure a stable, safe and quality supply of all energy production and supply systems, which means that energy must be available, accessible, affordable and acceptable in relation to the country's development. Climate extremes can affect and threaten this energy security through its supply and distribution, see also Section 4.3.3 for details, and this will need to be taken further into consideration for future energy policies and strategies.

Albania's **transport sector** relies heavily on its road networks, with a total length of 18,000 km and with increasing traffic loads for both goods and passengers. The volume of road traffic is projected to exceed the system's capacity in the near future, particularly on heavily travelled routes like the Tirana-Durres corridor and the Adriatic-Ionian highway. Heavy traffic already creates congestion problems in cities such as Tirana, Durres, Fier, Shkoder, etc. In contrast, the railway network remains underutilized, with 200 km of the 416 km main railway line not in operation. Maritime transport is the main mode of transport for goods to and from Albania, with 67.6 % of export goods and 51.6 % of import goods carried by sea in 2022[49]. Air transport grew by 212% in the period 2014-2022 (reaching 39,062 flights in 2022), and number of passengers by air increased from around 1.8 million passengers in 2010 to around 5.2 million passengers[50]. Climate change poses significant risks to transport infrastructure, including damage from extreme weather events and rising maintenance costs, see further Section 4.3.4 for details. Developing climate-resilient transport infrastructure and promoting sustainable transportation modes will be critical to adapting to these impacts, see Chapter 5.

Urban Development: Albania is currently divided into four regions, characterised by significant regional, economic, urban-rural, inter and intra-regional disparities. Cities and urban centres play an increasingly important role in the socio-economic environment. The Tirana/Durres Region is the most economically advanced, with other regions being less developed, more rural with fragmented settlements, and a lower quality of human capital. Urbanization is accelerating in Albania, with the urban population projected to reach 78.2% of total population by 2050. The on-going depopulation of rural areas affects certain services, e.g. access to health care, food and other basic supplies in these areas. Urban growth increases the demand for infrastructure and services, placing pressure on urban areas for its development. The General National Spatial Plan (GNP, 2016), represents a coordinated effort to spatial planning, and will shape Albania's future urban development trajectory. Because of its perceived vulnerabilities, substantial investment and efforts are needed for climate change adaptation, with major vital infrastructures in need

[48] SUPPORT TO FILLING GAPS IN Climate Change Adaptation Data and Risk Analysis. National and Sectoral Scenario Development Report. Prepared under UNDP NAP Project. January 2023
[49] National Strategy for Development and European Integration (NSDEI III - 2022-2030)
[50] NSDEI III (2022-2030)

to be climate-proofed, to increase the country's resilience to climate change impacts. See Section 4.3.5 for specific climate change risks affecting urban development and Chapter 5 for identified and prioritize adaptation measures.

Water resources are an important source of hydropower, producing around 90% of the country's electricity, provides irrigation for agriculture. Currently, 1 billion cubic meters of water is needed per irrigation season to irrigate 360,000 hectares. Extreme weather events pose risks to water quality and supply infrastructure, including for provision of water and sanitation for the population. Ensuring sustainable water management and improving irrigation efficiency are essential to meeting future water needs and adapting to climate variability[51].

The **industry sector** in Albania has recorded very positive developments during the last decade. Value added from industry (including construction) reached 26% of GDP in 2020. The imports to Albania increased from USD 4.41Billion in 2015 to USD 5.42Billion in 2020, mostly from Italy, China, Greece, Turkey and Germany. The exports from Albania have increased from USD 2.2 Billion in 2015 to USD 2.62 Billion in 2020, with top exports being footwear, clothes, crude petroleum and raw iron bars, mainly exported to Italy, Serbia, Germany, Spain, and Greece. Despite these positive trends, climate change poses several risks to the industrial sector, e.g. extreme weather events such as floods and droughts, can disrupt supply chains, damage infrastructure, and increase production costs. Strengthening climate resilience within the industry sector involves diversifying supply chains, improving energy efficiency, and investing in adaptive infrastructure

In 2019, the **services sector** (represented by the subsectors of trade, transport, commercial activities and telecommunication services) constituted about 50% of the GDP of the country. Since the early 2000s, Albania has become a leading destination for ICT services, with its resource availability, increasing attention to services, infrastructure and attractive investment incentives, and with Tirana as the main Information and Communications Technology (ICT) centre of Albania. This sector in Albania has seen steady growth, with, by the end of 2021 about 4,005 active enterprises operating in ICT. However, climate change can significantly affect service delivery and infrastructure, e.g. increased heatwaves and extreme weather events may disrupt telecommunication networks, while flooding and storms can damage logistical infrastructure.[52]

3.4.4 Adaptive capacity

Albania's adaptive capacity has been progressively strengthened through institutional, technical, and policy developments. The National Adaptation Plan (NAP, 2024–2036) provides a framework for prioritizing sectoral adaptation actions across water, agriculture, forestry, energy, transport, tourism, and urban development. Local Adaptation Plans (LAPs) have been prepared in eight municipalities (Durrës, Elbasan, Fier, Gjirokastër, Krujë, Kukës, Përmet, and Vlorë), linking national priorities to local realities and promoting community-based adaptation.

[51] The Fourth National Communication of Albania on Climate Change, 2022
[52] National Strategy for Development and European Integration 2022-2030 (2023)

Albania has implemented a comprehensive climate change adaptation strategy across multiple sectors, with 161 national-level and 356 local-level measures. Among these, a set of prioritized measures was identified, based on different selection criteria such as feasibility, social co-benefits and strategic alignment. In total, 66 measures were identified across the five priority sectors, namely 21 in agriculture and forestry, 11 in tourism, eight in energy, seven in transport, nine in urban development and ten cross-sectoral measures. Cross-sectoral actions focus on strengthening coordination, improving climate data systems, and piloting innovative finance mechanisms. In agriculture, priority measures target water management, nature-based solutions such as floodplain restoration, financial protection for farmers, and enhanced climate monitoring and invasive species management. Forestry measures emphasize ecosystem restoration, large-scale reforestation, establishment of drought-resistant nurseries, flood and erosion protection, and wildfire prevention, supported by Payment for Ecosystem Services schemes. In tourism, actions include climate-informed spatial planning, climate-proofing of facilities, policy reforms, ecosystem protection, and capacity-building initiatives. Urban development measures integrate climate risks into planning, strengthen infrastructure, develop flood response plans, and proMoE urban greening. Energy and transport measures focus on protecting infrastructure, enhancing system resilience, promoting efficiency, and incorporating nature-based solutions.

The Ministry of Environment (ME) leads national climate policy, through the Inter-Ministerial Working Group on Climate Change. The Institute of Geosciences (IGJEUM) manages hydrometeorological monitoring and early warning systems, while the National Civil Protection Agency (NCPA) coordinates disaster preparedness.

Despite progress, adaptive capacity remains constrained by data gaps, limited financing, and human resource shortages, especially at the local level. Efforts are ongoing to establish a National Climate Information System, integrate gender-responsive and nature-based approaches, and strengthen monitoring and evaluation (M&E) mechanisms for adaptation effectiveness.

3.4.5 Institutional arrangements

Albania's institutional framework for climate change adaptation is anchored in the Ministry of Environment (ME), which serves as the National Focal Point to the UNFCCC and has the overall mandate to coordinate and oversee climate policy. Within MoE, the Directorate for Climate Change and Environmental Agreements manages adaptation policy development, international reporting, and coordination with line ministries, development partners, and local authorities.

At the inter-ministerial level, the National Climate Change Committee (NCCC) functions as the country's primary coordination and policy-making mechanism for climate change. Chaired by the Minister of Environment, the NCCC includes representatives from the Ministry of Infrastructure and Energy (MIE), Ministry of Agriculture and Rural Development (MARD), Ministry of Finance, Ministry of Health and Social Protection, Ministry of Education, and other relevant institutions. It ensures policy coherence across sectors, validates national reports (such as the NDC, NAP, and BTR), and oversees progress on national climate targets.

Technical coordination is further supported by:

- The National Environment Agency (NEA) – responsible for environmental monitoring, data management, and reporting of environmental indicators relevant to adaptation;
- The Institute of Geosciences, Energy, Water and Environment (IGJEUM) – the national authority for meteorology, hydrology, and seismology, which provides climate data, forecasts, and early warning services;
- The National Civil Protection Agency (NCPA) – coordinating disaster risk reduction (DRR), emergency preparedness, and response planning;
- The Agency for the Administration of Protected Areas (AKZM) – overseeing biodiversity and ecosystem-based adaptation initiatives within protected areas.

Communication and coordination channels between institutions are formalized through memoranda of understanding, technical working groups, and inter-agency data-sharing mechanisms. A National Climate Information System (NCIS) is under development to integrate datasets from NEA, IGJEUM, and MoE into a unified platform that supports adaptation planning, monitoring, and evaluation.

Stakeholder engagement and consultation are integral to Albania's adaptation process. Broad participatory mechanisms have been established through the National Adaptation Plan (NAP) process, including sectoral consultation workshops, municipal roundtables, and public awareness campaigns. Civil society organizations, academia, and private-sector representatives participate through thematic working groups and project-based partnerships facilitated by UNDP, the EU, and the Energy Community Secretariat.

Governance

Adaptation governance in Albania follows a multi-level and cross-sectoral structure, ensuring vertical coordination from the national to the municipal level.

At the national level, the ME and NCCC provide policy direction and inter-ministerial coordination. Sectoral ministries are responsible for mainstreaming adaptation measures into their respective strategies and investment plans—such as agriculture (MARD), water management (National Water Agency), energy (MIE), infrastructure (Ministry of Infrastructure and Energy), and public health (Ministry of Health and Social Protection).

At the local level, municipalities bear the mandate for implementing adaptation measures in alignment with national strategies. They are responsible for land-use planning, infrastructure development, water and waste management, and local emergency preparedness. Under the NAP framework, Local Adaptation Plans (LAPs) have been developed for eight municipalities—Durrës, Elbasan, Fier, Gjirokastër, Krujë, Kukës, Përmet, and Vlorë—to integrate climate resilience into local development plans and budgeting processes.

Responsibilities across government levels are clearly delineated:

- **MoE**: overarching coordination, policy formulation, and international reporting;
- **Line ministries**: sector-specific implementation and monitoring of adaptation actions;
- **Municipalities**: implementation of localized measures, stakeholder engagement, and data collection at community level;

- **Civil society and academia**: support in awareness-raising, research, and participatory adaptation planning;
- **Private sector**: investment in resilient infrastructure, renewable energy, and insurance solutions.

Adaptation governance is reinforced through horizontal integration mechanisms (e.g., joint working groups, shared data platforms) and vertical mechanisms (e.g., municipal adaptation committees feeding into the NCCC). The governance approach emphasizes transparency, accountability, and inclusiveness, in line with Article 7 of the Paris Agreement and Albania's EU accession obligations.

3.4.6 Legal and policy framework

Legal Frameworks

The cornerstone of Albania's climate governance is **Law No. 155/2020 "On Climate Change"**, which provides the legal basis for mitigation and adaptation policy, sets national targets for GHG reduction, and establishes institutional responsibilities for implementation. It mandates the preparation of the **National Adaptation Plan (NAP)** and the **National Inventory of Greenhouse Gases**, and defines monitoring, reporting, and verification (MRV) requirements in line with the Enhanced Transparency Framework.

Complementary legislation includes:

- **Law No. 10 431/2011 "On Environmental Protection"** – providing the overarching framework for sustainable resource use, environmental monitoring, and pollution control;
- **Law No. 81/2017 "On Protected Areas"** – governing the conservation and restoration of ecosystems, contributing to nature-based adaptation;
- **Law No. 57/2020 "On Forests"** – promoting sustainable forest management, carbon sequestration, and ecosystem resilience;
- **Law No. 7/2017 "On the Promotion of Renewable Energy"** – supporting transition to clean energy and diversification of the energy mix;
- **Law No. 107/2014 "On Territorial Planning and Development"** – ensuring climate-resilient spatial planning and urban development;
- **Law No. 9244/2004 "On Agricultural Land Protection"** – regulating land use and soil conservation measures.

Together, these laws integrate climate adaptation objectives into environmental management, energy transition, agriculture, and land-use planning, while aligning Albania's legislation with the **EU climate acquis**, particularly the **Governance Regulation (EU) 2018/1999**.

Policy Frameworks

At the policy level, Albania has adopted a set of strategies that collectively guide adaptation planning:

- National Strategy on Climate Change (2019) – providing the overarching vision for mitigation and adaptation;
- National Adaptation Plan (2024–2036) – outlining priority adaptation measures and implementation arrangements across key sectors;

- National Energy and Climate Plan (NECP 2024) – setting targets for renewable energy, energy efficiency, and climate resilience in energy systems;
- National Strategy for Development and Integration (NSDI) – embedding climate action within the broader sustainable development agenda;
- Strategy on Agriculture, Rural Development and Fisheries (2021–2027) – focusing on sustainable farming, agro-forestry, and food-system resilience;
- Forest Policy Document 2030 and National Tourism Strategy 2024–2030 – promoting nature-based solutions and ecosystem-based tourism adaptation;
- National Strategy on Gender Equality (2021–2030) – ensuring gender mainstreaming and inclusive participation in adaptation efforts.

These frameworks are complemented by sectoral action plans and municipal LAPs, which operationalize adaptation actions at local level.

Regulations serve to operationalize Albania's primary climate legislation by setting out sector-specific rules, procedures, and technical requirements. Examples include:

- **DCM No. 889 of 2022** – defining the structure and responsibilities for the national greenhouse gas inventory system and MRV procedures;
- **Forthcoming by-laws under Law 155/2020** on climate change– expected to define institutional mandates for NAP implementation, national adaptation indicators, and coordination mechanisms among ministries.

These regulatory instruments ensure that adaptation objectives are integrated into planning, budgeting, and reporting processes at all governance levels.

Albania's institutional, governance, and legal frameworks together establish a comprehensive system for climate adaptation planning and implementation. The ongoing operationalization of the **National Adaptation Plan (2025–2036)**, coupled with legislative alignment to the **EU climate acquis**, will further strengthen the country's capacity to anticipate, plan for, and respond to the impacts of climate change.

3.5. Adaptation priorities and barriers

3.5.1 Domestic priorities and progress towards those priorities

Albania's domestic climate priorities are guided by a set of strategic documents and policy frameworks that aim to advance low-emission development, enhance resilience to climate impacts, and align national planning with EU accession commitments. The overarching vision for climate action is outlined in the National Strategy for Climate Change (NSCC, 2019–2030), which sets national objectives for mitigation and adaptation and integrates climate considerations into sectoral and territorial planning. The NSCC is complemented by Law No. 155/2020 on Climate Change, which establishes the legal basis for greenhouse gas emission reduction, adaptation planning, transparency arrangements, and institutional coordination.

In alignment with national climate objectives and the Paris Agreement, the National Determined Contribution (NDC) was updated in 2021, setting a target to reduce GHG emissions by 20.9% below BAU by 2030. The revised NDC currently under consultation reflects increased ambition, strengthened adaptation commitments.

On adaptation, Albania prepared and will approve within December 2025 will approve its National Adaptation Plan (NAP) 2023–2030, which represents the first comprehensive national framework dedicated to building resilience to climate change. The NAP identifies priority sectors—including water resources, agriculture, forestry, biodiversity, coastal zones, infrastructure, tourism, and health—and outlines enabling measures related to data systems, finance, institutional capacity, and governance. The NAP is designed to support multi-level implementation and coordination and provides the basis for integrating adaptation into national budgeting cycles and municipal development planning.

Implementation progress reflects increasing awareness of climate risks and systematic efforts to mainstream adaptation across sectors. Local adaptation planning has begun across several municipalities, where vulnerability assessments and prioritized local adaptation measures are being developed, costed, and aligned to medium-term budget programs. These efforts are supported by ongoing donor-financed programs that strengthen capacities for climate risk assessment, early warning systems, nature-based solutions, and sustainable land and water management. Recent initiatives include the expansion of the national hydrometeorological monitoring network, restoration projects in wetlands and river systems such as the Vjosa River, and infrastructure resilience upgrades.

However, progress remains constrained by limited financial resources, uneven institutional capacities at the local level, and the need for stronger inter-ministerial coordination. While the Climate Change Law and the NAP establish roles for the Inter-Ministerial Working Group on Climate Change and local government units, operational mechanisms for monitoring, reporting, and verifying progress need further development. Similarly, sustained funding will be required to implement sectoral adaptation roadmaps and support municipalities in translating adaptation priorities into bankable projects.

To address these gaps, Albania is strengthening the integration of climate priorities into strategic investment frameworks, disaster risk reduction strategies, and the medium-term budget process. Efforts are also under way to expand access to international climate finance, including through the Green Climate

Fund and multilateral development partners, particularly for resilience-building, ecosystem restoration, and climate-resilient infrastructure.

Overall, Albania has established a clear strategic direction for climate mitigation and adaptation and is progressing toward operationalization through legal reforms, national and local planning frameworks, and increased institutional capacity. Continued advancement will require further development of financing mechanisms, coordination structures, and monitoring and evaluation systems to support effective implementation and long-term climate resilience.

3.5.2 Barriers, Challenges and Gaps in Adaptation

1. Institutional and Coordination Barriers

Despite the establishment of the Law on Climate Change (2020) and its implementing regulation, institutional coordination across ministries and agencies remains a persistent challenge.

- Fragmented mandates among line ministries and agencies hinder integrated planning, while climate responsibilities often overlap with broader environmental or disaster management functions.
- The Inter-Ministerial Working Group on Climate Change (IMWGCC), envisioned as a key coordination mechanism, has not been very active, leading to weak inter-sectoral dialogue.
- Local-level capacities are especially limited: municipalities lack designated climate focal points, technical expertise, and financial autonomy to prepare, cost, and implement adaptation actions.
- Data sharing and vertical coordination between national and local institutions remain weak, complicating the integration of local vulnerabilities and priorities into national adaptation planning.

These barriers constrain the operationalization of multi-level governance and delay mainstreaming adaptation into planning and budgeting cycles.

2. Technical and Data Gaps

Adaptation planning and implementation are further limited by insufficient data, technical tools, and human capacity.

- Climate data fragmentation persists between the Institute of Geosciences (IGEO), NEA, and other specialized agencies, with limited interoperability and open access.
- Monitoring and evaluation (M&E) frameworks for adaptation are not yet established. Albania lacks standardized indicators, baseline data, and methodological guidance to track adaptation progress across sectors and municipalities.
- Sectoral vulnerability assessments remain uneven in quality and coverage, with some sectors (such as tourism and water) better assessed than others (health, biodiversity).
- Limited use of GIS and digital platforms for spatial analysis and decision-support tools constrains local-level risk mapping and evidence-based adaptation.

The absence of a national adaptation information system limits the country's ability to systematically evaluate risks, identify hotspots, and monitor resilience outcomes.

3. Financial and Economic Barriers

Insufficient financing remains one of the most significant barriers to advancing adaptation implementation.

- Public funding for adaptation is not systematically tracked or earmarked within the state budget.
- Adaptation measures identified under the NAP and LAPs often lack a dedicated financing mechanism.
- The private sector remains largely uninvolved in adaptation investment due to limited awareness of climate risks and lack of financial incentives.
- Access to international climate finance is improving but national readiness to mobilize, absorb, and report on such funds remains limited due to capacity and procedural gaps.

Additionally, there is limited understanding within the Ministry of Finance on integrating climate risk into fiscal planning and budgetary frameworks, although progress has begun.

4. Legislative and Policy Barriers

While Albania has a robust legal basis through the Law no 155/2020 on Climate Change and related sectoral acts, a number of regulatory gaps persist:

- Incomplete alignment with the EU Climate Acquis, particularly the EU Adaptation Strategy (2021) and Governance Regulation (2018/1999) regarding adaptation tracking and policy coherence;
- Insufficient enforcement capacity for integrating climate risk screening into Environmental Impact Assessments (EIA) and Strategic Environmental Assessments (SEA).

These gaps limit the translation of high-level adaptation objectives into enforceable and measurable action.

5. Awareness and Stakeholder Engagement Challenges

Awareness and engagement across government, private sector, and civil society remain uneven.

- Many decision-makers at the municipal and sectoral level still perceive adaptation as a secondary environmental issue rather than a developmental or economic priority.
- Public and community engagement mechanisms in adaptation planning remain ad hoc, and there are few participatory processes for local communities to co-design or monitor adaptation measures.
- Knowledge-sharing platforms between government, academia, and local NGOs are underdeveloped, leading to duplication of efforts and missed opportunities for synergy.

These challenges contribute to limited ownership and sustainability of adaptation actions beyond externally funded projects.

6. Environmental and Socio-Economic Limits to Adaptation

In addition to institutional and financial barriers, Albania faces soft and hard adaptation limits arising from biophysical and socio-economic conditions:

- Soft limits include insufficient human and institutional capacity to anticipate, design, and sustain adaptation measures, particularly in mountainous, reMoE, or low-income areas.
- Hard limits emerge in environmentally constrained systems—such as coastal zones subject to erosion and sea-level rise, or river basins prone to recurrent flooding—where feasible engineering or nature-based solutions may not fully offset long-term risks.
- Persistent rural poverty and outmigration further erode adaptive capacity, as communities face reduced labour availability and declining traditional knowledge related to land and water management.

These systemic constraints underscore the urgency for integrated resilience-building approaches that combine social protection, ecosystem restoration, and economic diversification.

3.6. Adaptation Strategies, Policies, Plans, Goals and Actions to Integrate Adaptation into National Policies and Strategies

3.6.1 Barriers, Implementation of adaptation actions in accordance with the global goal on adaptation

Albania recognizes adaptation as a core pillar of its national climate response and an essential component of sustainable and resilient development. In line with Article 7, paragraph 1 of the Paris Agreement, Albania has undertaken systematic actions to enhance adaptive capacity, strengthen resilience, and reduce vulnerability to climate change across sectors and levels of governance. Adaptation is guided primarily by the *National Adaptation Plan (NAP)as an integrated part of the National Climate Change Strategy*, and the *Law No. 155/2020 on Climate Change*, which collectively provide the strategic and legal foundation for integrating climate risks into national planning, budgeting, and sectoral development policies.

The NAP establishes priority adaptation needs in sectors most vulnerable to climate impacts, including water resources, agriculture, forestry, biodiversity, coastal zones, tourism, public health, and infrastructure. It is complemented by the *Disaster Risk Reduction Strategy 2023–2030*, the *National Civil Protection Plan*, the *National Biodiversity Strategy and Action Plan*, and the *National Integrated Water Resources Management Strategy*, which incorporate climate risk and resilience measures.

Albania has made progress in implementation through targeted investments and capacity-building programs supported by national funds and international partners. Key actions include the expansion and modernization of hydrometeorological monitoring and early warning systems, restoration of watersheds and wetlands, climate-smart agriculture initiatives, erosion and flood control infrastructure, and pilot nature-based solutions in coastal and urban areas. Municipalities are increasingly engaged in adaptation planning, with several local adaptation plans and costing exercises completed or underway, advancing the localization of NAP priorities.

Capacity-building and technical assistance programs implemented with support from UNDP, the Green Climate Fund, the European Union, the World Bank, GIZ, and other partners have contributed to institutional strengthening, data and risk assessment improvements, and mainstreaming of climate resilience into development planning. Albania does not currently submit a standalone Adaptation Communication; instead, information on adaptation is integrated into National Communications, NDCs, Progress Report and this Biennial Transparency Report. The implementation of the NAP, alongside ongoing reforms to integrate climate resilience into public investment and municipal planning systems, represents the primary pathway for Albania to advance the global goal on adaptation and ensure long-term climate-resilient development.

3.6.2 Adaptation goals, actions, objectives, undertakings, efforts, plans, strategies, policies, priorities, programmes and efforts to build resilience

Albania is implementing a wide range of adaptation measures across sectors identified as most vulnerable to climate change impacts, in line with the *National Adaptation Plan (NAP) 2019–2030*. These measures are focused on enhancing resilience of ecosystems, infrastructure, communities, and key economic sectors, while strengthening institutional capacities and governance at both national and local levels. The NAP

prioritizes adaptation in the sectors of water resources, agriculture, forestry and biodiversity, coastal and marine ecosystems, public health, tourism, infrastructure, and disaster risk management. It also includes cross-cutting priorities such as climate data and monitoring systems, nature-based solutions, local adaptation planning, and improved access to climate finance

Table 23: List of the 15 Albanian NAP PAs and 31 Goals

Subject area	Rationale/main goals	Potential substantial elements
No. 1: Steering of the adaptation process in Albania	● Ensure process character of NAP beyond adaptation of NAP document. ● Ensure implementation of measures envisaged in the NAP document. ● Ensure necessary adjustments of NAP process based on experiences.	● Delegate powers to the Ministry responsible for climate change, the Ministry of Tourism and the Environment. ● Ensure regular meetings of IMWGCC for general steering and on selected key topics for each session. ● Develop overall process roadmap including timelines, responsibilities, and resources. ● Regular review and update of NAP process. ● Link with M&E and reporting mechanism.
No. 2: Overarching mainstreaming initiative	● Climate change adaptation is reflected in NSDI and sector strategies. ● Climate change adaptation is being proMoEd in accession assistance in line with the EU climate policy objectives.	● ProMoE mainstreaming concepts and tools (climate proofing, climate lens, climate sensitive, strategic environmental assessment, etc.). ● Coordinate mainstreaming pilots in Albania. ● Climate change adaptation mainstreaming in NSDI implementation. ● Climate change adaptation mainstreaming into the Instrument for Pre-Accession Assistance (IPA) process.
No. 3: Climate finance readiness	● Successfully access Albania's public budget for financing NAP implementation. ● Gain indirect or direct access to GCF funding for Albania's NAP implementation.	● Setting up a climate finance unit. ● Develop strategic framework. ● Climate budgeting/labelling pilots. ● ProMoE access to climate finance. ● Ensure learning and innovation.
No. 4: Implementation monitoring system	● Assess progress toward the climate resilience objectives. ● Establish RBM.	● Overall concept of RBM system. ● Gap analysis of existing M&E systems. ● Institutional setup for M&E. ● Operationalize M&E system with regular reporting.
No. 5: Public information and involvement initiative	● Capacity building of relevant public institutions on climate change adaptation. ● Raising awareness and involvement of civil	● Capacity building for public institutions. ● Outreach through educational institutions. ● Civil society outreach and involvement. ● Extension of information for relevant economic sectors.

	society on climate change adaptation.	
No. 6: Initiative for capacity building on climate change adaptation	• Support through targeted trainings to raise the knowledge and personal skills of actors and stakeholders involved in the NAP process. • The development of institutional structures, regulations, and policies in selected sectors of the NAP process are supported by donors and institutions of excellence.	• Assess training needs and elaborate training plan. • Conduct trainings. • Selected measures of institutional capacity building.
No. 7: Climate-resilient irrigation, drainage and flood protection	• Calculation of water needs and supply potential for crops with consideration of climate change. • Infrastructure improvement and maintenance for irrigation and flood protection.	• Recalculate irrigation needs in a changing climate. • Assess flood risks. • Select PAs on flood risk management based on the above-mentioned assessments. • Training.
No. 8: Integrated water resources management	• Climate change adaptation measures are adequately reflected in the implementation plan and process for pilot River Basin Management Plans (RBMPs) and will be also part of the new RBMPs.	• Mainstreaming of climate change adaptation into the RBMPs. • The implementation process for the RBMPs will be designed in a way that climate change is adequately reflected during implementation.
No. 9: Adaptation in agriculture sector	• Adaptation to climate change in agricultural sector through farm protection, crop yield management, information systems and livestock management.	• Adapted agricultural practices and infrastructure. • Improved information services for farmers.
No. 10: ProMoE implementation of adaptation strategy for health sector	• Apply best approaches for vector control, public health measures and preparedness for extreme events (heat waves).	• Public awareness and training. • Capacity building for health institutions.

No. 11: Integrated Cross-Sectoral Plan for the Coast (ICPC)	• ProMoE adaptation in coastal areas through local plans.	• Introducing and adapting the EU instruments and policies relevant to coastal areas' ecosystems and biodiversity. • Enforcement of legislation related to construction in the coastal area. • Improve the management of coastal areas. • Erosion control. • Buildings and climate change. • Concrete pilot projects.
No. 12: Initiative for municipal adaptation	• Municipalities are capacitated for local climate change adaptation plans.	• Provide a guide that would facilitate the municipalities with simple know-how on how to integrate climate change adaptation into the city planning. • Trainings, advisory services. • Pilot measures for local adaptation measures.
No. 13: Adaptation in tourism	• Integrated tourism sector objectives and plans reflecting climate change impacts are being developed.	• Provide the necessary legal basis, general or sectoral strategies, action plans etc. which will include the appropriate policies and measures. • Prepare a sectoral strategy taking in consideration climate issues. • Support local and national sectors dealing with climate change.
No. 14: Upgrading civil defence prepare redness and DRR	• Increase the capacity of the Albanian general directorate for civil emergencies to prevent and respond to climate-related disaster management.	• Develop a regional flood hazard map following EU flood directive. • Preparation of a floods early warning system and its integration into the European flood awareness system (EFAS). • Cost-benefit analysis, prioritization, and financing of measures in strengthening flood warning systems. • Awareness/visibility/communication: improve flood awareness of the public by informing on the risk, early warning systems and the plan to follow in case of an emergency. • Support Albania in preparing for membership to the Union Civil Protection Mechanism (EUCPM). • Support to IGEWE for the strengthening of hydrometeorological network and services.
No. 15: Building the resilience of the Kune-Vaini lagoon system (KVLS) through ecosystem-based adaptation (EbA)	• The climate change effects into the KVLS will be addressed through an integrated suite of adaptation interventions including EbA.	▪ Increase the capacity of government and local communities living nearby the KVLS to adapt to climate change using an integrated suite of adaptation interventions, including EbA. ▪ Build the climate resilience of the KVLS using demonstration of best practice and concrete EbA and other adaptation interventions. ▪ Increase awareness of local and national stakeholders to climate change risks and the potential of EbA to increase the resilience of local communities to climate change.

In water resources, adaptation efforts focus on integrated water resource management, strengthening monitoring networks for hydrological and meteorological data, improving flood and drought preparedness, upgrading irrigation systems, restoring wetlands and river basins, and enhancing watershed management. A major national initiative includes modernization of the early warning and forecasting systems to improve the detection of hydrometeorological hazards. In agriculture, measures include supporting climate-resilient crop varieties, introducing drought-resistant cultivars, expanding efficient irrigation techniques, promoting soil conservation and erosion control, and developing climate-smart agricultural extension services for farmers. Work is also ongoing to reduce vulnerability in livestock systems and prevent land degradation, especially in rural mountain areas.

In forestry and biodiversity, adaptation priorities aim to strengthen conservation and restoration of ecosystems to enhance their role in carbon sequestration, watershed protection, and habitat resilience. The establishment of the Vjosa Wild River National Park and restoration of degraded forest areas are key milestones. Reforestation, erosion control measures, and expansion of protected areas continue to be implemented, along with community-based landscape management in vulnerable watersheds. Coastal and marine adaptation efforts address climate-related erosion, saline intrusion, and sea-level rise, through integrated coastal zone management, dune and wetland restoration, and the use of nature-based solutions for shoreline protection, particularly in low-lying Adriatic coastline areas such as Vlora and Durres.

In public health, measures include strengthening surveillance systems for vector-borne and heat-related illnesses, improving emergency response systems, and integrating climate risk considerations into health infrastructure planning. In tourism, actions focus on sustainable tourism planning, preservation of natural and cultural heritage sites, and diversification of tourism activities to reduce seasonal climate vulnerability in coastal areas. Infrastructure resilience initiatives include risk-informed territorial planning, climate-proofing of public infrastructure, flood defense infrastructure upgrades, and promotion of green urban spaces and cooling solutions in cities.

Disaster risk reduction and civil protection are central to Albania's adaptation agenda, guided by the *National Civil Protection Law* and the *National Strategy for Disaster Risk Reduction 2023–2030*, which align with the Sendai Framework. These frameworks proMoE risk assessment, contingency planning, local preparedness, and community engagement. Municipalities are increasingly engaged in adaptation planning, supported by national programs that help develop local adaptation plans, vulnerability assessments, and detailed costing of priority actions. Several municipalities, including Elbasan, Vlorë, and Durrës, have developed or are in the process of finalizing local adaptation action plans, while efforts are ongoing to mobilize finance for implementation.

International cooperation and climate finance play an important role in advancing these adaptation priorities. Albania is implementing adaptation-related programmes supported by the Green Climate Fund, the Global Environment Facility, the EU IPA programs, UNDP, the World Bank, GIZ, and bilateral donors. These programmes contribute to institutional strengthening, knowledge-sharing, community-based adaptation, and demonstration of nature-based and resilient infrastructure solutions. Overall, Albania's actions aim to progressively reduce vulnerability, strengthen resilience to climate risks, and integrate adaptation into sustainable development and territorial planning at all levels.

3.6.3 Best available science, gender perspective, and indigenous, traditional and local knowledge integrated into adaptation

Albania's adaptation planning and implementation are informed by the best available climate science, socio-economic data, and locally grounded knowledge systems. The *National Adaptation Plan (NAP 2023–2030)* and related sectoral and local adaptation assessments rely on climate projections developed by the Institute of Geosciences, Energy, Water and Environment (IGEWE), hydrometeorological data from the National Environmental Agency, and vulnerability analyses prepared with the support of international partners. These data sources provide the scientific and analytical foundation for assessing climate risks related to floods, droughts, heatwaves, sea-level rise, and biodiversity loss, and guide the selection of priority adaptation measures. In parallel, local and community-level knowledge plays an important role, particularly in agriculture, forestry, water resource management, and coastal area planning. Traditional land-use practices, watershed stewardship by rural communities, and local coping mechanisms for seasonal climatic variation have been incorporated into the development of local adaptation plans in several municipalities.

Albania has established a comprehensive legal and institutional framework for gender equality, key instruments include the *Law on Gender Equality in Society (2008)*, the *Law on Protection from Discrimination (amended 2020)*, and the *Electoral Code* provisions ensuring gender quotas in decision-making roles which supports the integration of gender considerations into climate and adaptation policies.. Gender-responsive budgeting has been institutionalized through amendments to the *Organic Budget Law* and the integration of gender budgeting into the Albanian Financial Management Information System (AFMIS), enabling national and local governments to track gender-related expenditures. At the local level, *Law No. 68/2017 on Local Self-Government Financing* mandates municipalities to include gender considerations in planning and public spending cycles. However, while these frameworks represent solid progress, challenges persist, including limited enforcement, uneven institutional capacity, and insufficient gender-disaggregated data specific to climate vulnerability and adaptation outcomes.

In the climate policy sphere, *Law No. 155/2020 on Climate Change* assigns the Ministry of Environment as the national authority for climate policy and UNFCCC reporting, but does not explicitly mandate gender mainstreaming in climate change strategies. This gap has highlighted the need to more systematically integrate gender analysis and gender-disaggregated climate data into adaptation planning. Strengthening collaboration with women's civil society organizations, local community groups, and academic institutions has been identified as a priority to ensure adaptation measures reflect differentiated climate impacts on women and men, particularly in rural, coastal, and mountain communities where livelihood resilience is closely linked to natural resource management.

With the support on UNDP project "Advancing Albania's planning for medium and long-term adaptation through the development of a NAP process", Albania aims to enhance the integration of gender-sensitive vulnerability assessments, expand climate-related gender data in national monitoring systems, and formalize participation of women's groups and local knowledge holders in adaptation planning and decision-making. These efforts are expected to improve the effectiveness, inclusiveness, and equity of adaptation actions across sectors and governance levels.

3.6.4 Adaptation actions and/or economic diversification plans leading to mitigation co-benefits

In Albania, several adaptation actions contribute directly to mitigation co-benefits, particularly in the sectors of agriculture, forestry, biodiversity conservation, water resource management, and sustainable tourism. Many of these measures enhance resilience while simultaneously strengthening natural carbon sinks, reducing energy use, and promoting more climate-efficient land management. In agriculture, the promotion of climate-resilient crop varieties, efficient irrigation technologies, and soil conservation practices—such as reduced tillage, sustainable pasture management, and erosion control—helps preserve soil moisture, increase soil organic carbon, and reduce nitrous oxide emissions. Ongoing efforts to support climate-smart agriculture, including pilot projects on drought-resilient crops and integrated pest management, are improving productivity while lowering greenhouse gas (GHG) emissions compared to conventional methods.

In the forestry and biodiversity sector, adaptation measures such as large-scale reforestation, restoration of degraded landscapes, and improved forest governance support both ecosystem resilience and increased carbon sequestration. The establishment of the *Vjosa Wild River National Park* and ongoing afforestation and forest rehabilitation initiatives in watershed areas contribute to enhanced carbon sink capacity, protection of ecosystem services, and prevention of soil erosion and landslides. These efforts also support biodiversity conservation, ecological connectivity, and sustainable rural livelihoods, which are important for long-term resilience and reduced land-use pressure. Measures to reduce wildfire risk through improved monitoring, community engagement, and sustainable forest management further help preserve carbon stocks and avoid emissions from forest loss.

Adaptation actions in the water and coastal sectors, including wetland restoration, river basin management, and nature-based coastal protection (e.g., dune and lagoon restoration), strengthen natural flood and erosion buffers while maintaining carbon-rich ecosystems such as wetlands and riparian habitats. In urban areas, green infrastructure measures—such as expanding tree canopy coverage, creating urban green corridors, promoting permeable surfaces, and enhancing energy efficiency in buildings—reduce heat island impacts and concurrently reduce energy consumption and associated emissions.

Sustainable tourism development, particularly the promotion of eco-tourism and the protection of natural and cultural heritage sites, supports economic diversification while reducing the environmental footprint of the tourism sector. Transitioning toward more resilient and low-emission tourism models contributes to both adaptation and mitigation goals, especially in coastal and protected areas that are highly climate-sensitive.

Overall, Albania's adaptation actions are increasingly aligned with its mitigation objectives, recognizing that resilient ecosystems, climate-smart land management, and sustainable resource use are mutually reinforcing. Strengthening coordination between adaptation and mitigation planning—particularly in the implementation of the National Adaptation Plan and the National Energy and Climate Plan—will further enhance these synergies and support a more climate-resilient, low-carbon development pathway.

3.7. Adaptation Progress on implementation of adaptation

3.7.1 Adaptation Implementation of the adaptation actions

Albania recognizes the need to reduce vulnerability to climate change and has taken significant steps to operationalize its national adaptation priorities in line with the global goal on adaptation under Article 7 of the Paris Agreement. The implementation of adaptation actions is guided primarily by the *National Adaptation Plan (NAP) 2023–2030*, which provides a structured framework for coordination across national and local institutions, priority sectors, and cross-cutting support systems. Since the adoption of the NAP, Albania has moved from fragmented, project-based adaptation efforts toward a more integrated, programmatic approach that incorporates climate risk considerations into national development policies, territorial planning, and budget processes.

Implementation is supported through multi-year climate resilience programs, many of which are co-financed by international partners. UNDP, with financial support from the Green Climate Fund's Readiness Programme, has played a central role in strengthening institutional capacity for adaptation planning and monitoring, supporting the development of local adaptation plans and costing exercises in priority municipalities. The World Bank has supported disaster risk management and early warning system modernization efforts, while the European Union and bilateral partners such as GIZ have provided technical and financial assistance to advance adaptation in agriculture, water management, urban resilience, and civil protection.

At the municipal level, practical implementation has accelerated through the preparation of vulnerability assessments, prioritization of local adaptation measures, a The Government has emphasized the need to expand this work to all municipalities, including securing financing for those that have not yet undertaken local adaptation planning. 14 other municipalities will start drafting their LAPs in 2025.

National implementation efforts also include strengthening hydrometeorological monitoring networks, modernizing early warning and forecasting systems, restoring degraded ecosystems (including river basins and coastal wetlands), enhancing forest management and reforestation, improving irrigation and water efficiency, piloting climate-smart agricultural practices, and advancing nature-based and green infrastructure solutions in urban and coastal areas. These actions are increasingly accompanied by measures to reinforce disaster preparedness under the *National Civil Protection Plan* and the *National Disaster Risk Reduction Strategy 2023–2030*, which align adaptation and emergency risk management.

To ensure effective long-term implementation, Albania is developing systems for monitoring, evaluation, and learning (MEL) for adaptation, supported by ongoing GCF Readiness and UNDP technical assistance. This system aims to track progress in reducing vulnerability, measure effectiveness of implemented measures, and inform iterative updates to policies and investment priorities. Overall, Albania is transitioning toward a more systematic, coordinated, and evidence-based implementation of adaptation actions that strengthens resilience while supporting national development and EU accession objectives.

3.7.2 Integrating adaptation into national plans and strategies

Albania has taken significant steps to formulate, update, and align national plans, programmes, and sectoral strategies with the objectives of climate change adaptation. Following the approval of the *National Strategy for Climate Change (NCCS 2019–2030)* and the *National Adaptation Plan (NAP 2023–*

2030), the integration of climate resilience into development planning has become a core principle across national and local governance. This process is complemented by the monitoring of climate change mainstreaming across *15 Priority Adaptation Areas (PAs)*, using a methodology that assesses the degree to which climate adaptation considerations are embedded in legislation, project planning, resource allocation, and evaluation processes. Surveys and monitoring efforts are being carried out across key institutions—including the Prime Minister's Office, the Ministry of Infrastructure and Energy, the Ministry of Agriculture and Rural Development, the Ministry of Tourism and Environment, the National Civil Protection Agency, and the Water Resources Management Agency—following a standardized assessment framework (Annex G of the NAP).

Adaptation has also been integrated into Albania's *revised Nationally Determined Contribution (NDC 2021–2030)*, adopted through Council of Ministers Decision No. 581/2021. Unlike the initial NDC, the revised NDC includes a dedicated adaptation component and emphasizes the mainstreaming of climate resilience across major sectors and regions. The adaptation measures identified in the revised NDC are aligned with Albania's post-earthquake and COVID-19 green recovery strategies, particularly in rebuilding climate-resilient infrastructure, strengthening community preparedness, and ensuring that recovery supports environmentally sustainable and socially resilient development. The degree of integration of adaptation within the revised NDC is assessed as strong.

At the strategic planning level, the *National Strategy for Development and Integration (NSDI 2022–2030)* provides a coordinated framework linking climate change objectives with Albania's long-term economic transformation vision of "zero emissions and green economic growth." The NSDI calls for integrating climate measures into sectoral strategies and public budgeting, developing institutional mechanisms for cross-sector coordination, scaling nature-based solutions, and improving national systems for climate information and data sharing. The integration of adaptation into the NSDI is also evaluated as strong.

Sector-specific integration is progressing at different levels. The *Policy Document for Forests (2019–2030)* recognizes the role of forests in climate resilience, but the degree of explicit integration of adaptation measures was evaluated as weak, indicating the need for clearer guidance on ecosystem-based adaptation and forest restoration. The *Agriculture, Rural Development and Fisheries Strategy 2021–2027* similarly references climate action and sustainable natural resource management, but adaptation mainstreaming remains limited and was also assessed as weak. In contrast, the *National Strategy for Disaster Risk Reduction and Action Plan 2023–2030* demonstrates strong alignment with climate adaptation objectives, fully harmonizing disaster risk management with climate resilience and incorporating considerations for vulnerable groups in accordance with the Sendai Framework and EU civil protection standards.

Overall, Albania has established the institutional foundation for integrating adaptation into national and sectoral planning frameworks. The next phase of implementation will focus on ensuring consistent application at all governance levels, strengthening financing mechanisms and human resource capacities, expanding climate data systems, and scaling pilot adaptation measures into sustained national and local programmes.

3.7.3 Integrating Key achievements and results

Albania has made notable progress in advancing adaptation planning, capacity-building, and early implementation of resilience-building measures at both national and local levels. Through the NAP development process, Albania has completed national climate risk and vulnerability assessments in 15

Priority Adaptation Areas (PAs) and supported eight municipalities to develop Local Adaptation Plans, marking a significant step toward operationalizing adaptation at the subnational level. These local planning processes have demonstrated that, although climate data gaps remain, available national and municipal information is sufficient to carry out localized risk assessments and identify viable adaptation solutions. The experience has also highlighted the importance of sustained institutional capacity-building and dedicated budget allocation for the implementation of adaptation measures.

One of Albania's key achievements is the establishment of the Vjosa Wild River National Park (2023), the first of its kind in Europe, which protects an entire free-flowing river system and serves as a flagship example of ecosystem-based adaptation. The park contributes to flood risk reduction, biodiversity conservation, sustainable ecotourism development, and the long-term climate resilience of local communities. Albania has also expanded reforestation and forest restoration programs in erosion-prone watersheds, including in Kukës, Dibër and Korçë regions, and has strengthened community-based fire management to reduce forest fire risk and restore degraded forest areas. **T**he SIDA founded "ADAPT: Nature-based solutions for resilient societies in the Western Balkans" is an initiative, started in 2020, and foreseen to be completed in 2023, with the aim to increase ecosystem and community resilience to climate change and disaster risks by applying Nature-based solutions in the Western Balkan countries. ADAPT further provides solutions for disaster risk reduction, increases knowledge and awareness of nature-based disaster risk reduction solutions among decision makers, natural resource managers and local communities and scale-up activities. It offers opportunities to analyze national ecosystem management and biodiversity policy from a climate change perspective, and adaptation indicators, which will have implications for the actions taken in the Albanian Alps, related to the revision of policy and institutional arrangements, accounting to a value of $ 500,000.

Coastal protection and wetland restoration initiatives are being planned, such as the Narta Lagoon and Divjakë-Karavasta restoration efforts, to help increase natural buffer capacity against sea-level rise.

A key achievement in enhancing climate resilience and biodiversity protection is the ongoing UNEP Project to strengthen the effective management of the Albanian Alps National Park "Achieving biodiversity conservation through effective management and enhanced resilience to climate change in the existing protected area of the North Albanian Mountainous Region". The project supports adaptive management planning, climate vulnerability assessments, and stakeholder capacity-building to safeguard ecosystems and community livelihoods in one of Albania's most climate-sensitive mountainous regions. Through this effort, climate change scenarios have been assessed, management plans updated to incorporate resilience measures, and local institutions equipped with the knowledge and tools necessary to sustainably manage natural resources and reduce overexploitation pressures. This work contributes both to biodiversity conservation and to strengthening the resilience of rural communities that depend directly on mountain ecosystems.

Significant progress has also been made in disaster risk reduction and early warning systems. Under national modernization programmes, The ALBAdapt programme aims to foster Albania's climate resilience by strengthening its climate information services, implementing a multi-hazard early warning system, and promoting climate-informed investment decisions. By enhancing the National Meteorological and Hydrological Service (NMHS), establishing a National Framework for Climate Services (NFCS), and

empowering communities to take timely action through a people-centered early warning system, the programme will contribute to a more resilient future. Additionally, by catalyzing private sector involvement, identifying and implementing EbAs and Eco-Disaster Risk Reduction (eco-DRR) measures, and supporting informed climate-related investments, ALBAdapt will further strengthen Albania's adaptive capacity towards tangible climate action. The programme will focus on national-scale improvements in hydrometeorological services and early warning systems. Additionally, it will prioritize EbA measures and Forecast-based Actions (FbAs) in coastal counties.

UNDP project Integrated climate-resilient transboundary flood risk management in the Drin River Basin, has strengthened flood risk management across national and local levels through targeted trainings.This event suppoorted in enhanced regional readiness through hands-on modules on early warning systems, data-driven risk analysis, coordination, and anticipatory action, by translating global expertise into local impact.

Resilience Strengthening in Albania -RESEAL Project: Phase II is being implemented with Ministry of Defence/National Civil Protection Agency/Local Government Units and aims Deepening systemic resilience and operational readiness at national and local levels; Institutional and operational capacities scaled up for disaster preparedness and response; Regional and international partnerships reinforced Albania’s leadership in DRM; Alignment with EU standards and Sendai Framework priorities, supporting Albania’s EU accession goals; Inclusive governance ensuring cross-sectoral engagement and Reduction of vulnerabilities in high-risk areas in Albania

In agriculture, pilot initiatives on climate-smart farming—including drip irrigation, drought-resilient crop varieties, soil conservation, and organic farming certification—have improved water efficiency and strengthened food system resilience in drought-affected areas such as Fier and Korça. In urban environments, municipalities such as Tirana, Vlorë, and Shkodër have implemented green infrastructure solutions, including expanded tree canopy, recreation green corridors, and permeable surfaces to reduce heat stress and stormwater impacts.

A key achievement in climate-resilient agriculture and water management is the implementation of the *Agricultural Development and Climate Change Adaptation Project*, funded by the World Bank. The project has supported the rehabilitation, modernization, and expansion of irrigation and drainage systems in several vulnerable agricultural regions, including Divjaka, Konispol, Fier, Vlorë, Dimal, and Berat. Major results include the completion of pressure irrigation for 500 ha in Divjaka, revitalization of irrigation for approximately 4,000 ha in the Terbufi plain, modernization of drainage systems linked to hydropower infrastructure, and upgrades using existing and new water sources to improve climate resilience. The project has also advanced institutional reform in the irrigation sector by transferring infrastructure management responsibilities to municipalities, establishing Water User Organizations for community-based irrigation services, and developing the national Irrigation and Drainage Information Management System (IWIS) to centralize data on performance, maintenance, and planning. These measures have strengthened local water governance, improved efficiency in water use, enhanced protection against drought and floods, and increased the adaptive capacity of farming communities under changing climate conditions.

Taken together, these results show that Albania is transitioning from planning to implementation and scaling of adaptation measures. The experience has demonstrated three key lessons: (1) localized climate risk assessments are feasible and actionable when supported by targeted data and technical guidance; (2) sustained institutional capacity-building is necessary to maintain continuity in adaptation planning across government levels; and (3) securing dedicated national and external financing is essential for translating adaptation priorities into long-term, scalable implementation.

3.8. Monitoring and Evaluation of Adaptation Actions and Processes

Albania recognizes that effective monitoring and evaluation (M&E) of adaptation actions is essential to track progress, support evidence-based decision making, and ensure that adaptation measures reduce vulnerability and build resilience over time. In the context of the *National Adaptation Plan (NAP 2023–2030)*, Albania has developed a national adaptation M&E framework that will enable systematic assessment of adaptation actions across the Priority Adaptation Areas (PAs). This framework has been developed with support from UNDP and the Green Climate Fund (GCF) Programme "Advancing Albania's planning for medium and long-term adaptation through the development of a NAP process" and is designed to align with the Enhanced Transparency Framework under the Paris Agreement.

The M&E approach will include sector-specific and cross-cutting indicators to measure progress in reducing climate risks, improving adaptive capacity, and enhancing resilience at the national and local levels. It will rely on regularly updated data from key institutions, including the Institute of Geosciences (IGEWE), INSTAT, the National Environmental Agency, the Water Resources Management Agency, the National Agency for Protected Areas, and local government units. Local adaptation planning processes already underway in several municipalities provide a foundation for establishing municipal-level reporting structures that will feed into the national system. The planned national *Climate Information and Services Platform* under the NSDI 2022–2030 will further support data sharing and inter-institutional coordination.

Currently, M&E is carried out mainly through project-based reporting under donor-supported adaptation programs, ecosystem restoration, nature-based coastal solutions, and climate-resilient agriculture. These project-level monitoring systems have yielded important lessons on data needs, institutional responsibilities, and the practicality of adaptation indicators, which are now being used to shape the national M&E framework.

The next phase of work involves operationalizing the national adaptation M&E framework, establishing reporting cycles linked to government planning and budgeting timelines, and strengthening institutional capacities for data analysis and interpretation. Once in place, the national M&E system will allow Albania to assess progress in implementing the NAP, support iterative policy updates, and contribute adaptation-related information to future Biennial Transparency Reports, National Communications, and NDC updates under the UNFCCC.

3.9. Cooperation, Good Practices, Experience and Lessons Learned

Albania has actively engaged in international, regional, and bilateral cooperation to strengthen its adaptation capacity, improve access to climate data and modeling, and exchange good practices on climate resilience. As adaptation is still an evolving policy domain, cooperation has been particularly important for developing methodological frameworks for vulnerability assessment, advancing institutional capacity, and mobilizing financial and technical support. Albania maintains close cooperation with donors, the European Union, tand other multilateral and bilateral partners that support adaptation planning, disaster risk reduction, sustainable ecosystem management, and nature-based solutions.

A key pillar of cooperation has been the NAP process, supported under UNDP-GCF R, which facilitated stakeholder engagement, sectoral risk assessments, development of local adaptation plans, and the design of a monitoring and evaluation framework. The knowledge exchanges and training workshops conducted through the NAP Global Network, EU4Green, and GIZ programmes have enabled Albania to learn from the adaptation experiences of European and neighboring Western Balkan countries, particularly in areas such as local adaptation planning, integration of nature-based solutions, and alignment of adaptation policy with EU accession requirements.

In the field of ecosystem-based adaptation, Albania has partnered with IUCN, UNESCO, the EU, and WWF to implement major conservation and restoration initiatives, including the establishment of Vjosa Wild River National Park and the development of integrated management plans for protected areas in the Albanian Alps. These projects have demonstrated the value of participatory governance, combining scientific data with local knowledge, and linking conservation outcomes with climate resilience and sustainable tourism.

A significant achievement in advancing climate-resilient water and disaster risk management is the implementation of the UNDP-supported project “Integrated Climate-Resilient Transboundary Flood Risk Management in the Drin River Basin.” The project strengthens cooperation among Albania, Montenegro, and North Macedonia to reduce flood risks in one of the region’s most climate-sensitive river systems. Key actions include developing a basin-wide flood risk assessment, modernizing hydrometeorological monitoring networks, improving early warning systems, and enhancing data sharing among national agencies. The project has also supported community-level preparedness, nature-based solutions for flood mitigation, and the integration of climate risk considerations into river basin management plans. By addressing both upstream and downstream vulnerabilities, the project contributes to safeguarding livelihoods, infrastructure, and ecosystems across the Drin Basin, while improving regional coordination and resilience to extreme weather events intensified by climate change.

4. Support needed and received

This section describes the support that Albania has provided domestically and received from international sources in addressing GHG emissions and climate change. It covers budgetary allocations by the Albanian government toward climate-related actions, as well as foreign funding, investments, and projects that assist Albania's mitigation efforts.

4.1. Domestic Budget Support for Climate Action

Although Albania is a developing country with no formal obligation to provide climate finance internationally, it has been allocating domestic resources to tackle climate change challenges. In recent years, the government's budget has increasingly reflected climate priorities, directing funds toward mitigation projects, sustainable energy, and resilience. Notably, Albania has begun integrating climate considerations into its mid-term budget planning and public financial management. For example, the government has earmarked budget funds for renewable energy development and energy efficiency in public infrastructure. This includes co-financing large renewable energy projects – such as offering public land and regulatory support for utility-scale solar parks – and funding subsidy schemes for small renewable installations (like solar water heaters for households). The Energy Efficiency Fund, established by law, is backed by state budget contributions to support efficiency upgrades in buildings and municipal services (e.g. improving insulation and efficient lighting in schools and hospitals).

A significant portion of domestic support is delivered through policy incentives rather than direct spending. For instance, the government provides tax exemptions and reduced tariffs for clean technology and renewable energy equipment, effectively subsidizing the uptake of these low-carbon solutions. Customs duties have been removed for the import of solar panels and wind turbines, and electric vehicles enjoy a lower excise tax, encouraging consumers to choose cleaner options. Additionally, Albania's carbon tax revenues (generated from the carbon tax on fossil fuels) are funneled into environmental and climate programs. While the carbon tax's primary purpose is to discourage emissions, it also creates a stream of funding; in practice, a share of this revenue has been used to finance forest protection efforts and efficient public transport initiatives (such as purchasing cleaner buses).

Another example of domestic support is the commitment of funds for reforestation and afforestation campaigns. Each year, the government designates budget for planting trees on degraded lands, both to absorb CO_2 and to reduce flood risks. These programs, often run by the Ministry of Environment, illustrate Albania's use of domestic public finance for emission reduction in the LULUCF sector. Similarly, the government has invested in waste management improvements (e.g. constructing compliant landfills and recycling centers), recognizing that better waste infrastructure will cut methane emissions.

It's also important to note the government's role in facilitating climate-friendly investments. Through sovereign guarantees and public-private partnerships, Albania has enabled major renewable energy projects that contribute to GHG mitigation. For instance, the government provided a guarantee for the first large-scale solar farm (Karavasta 140 MW) which helped mobilize private investment for this project. In essence, while Albania's public budget is limited, the state has played a catalytic role by mainstreaming climate action into national expenditures and creating financial mechanisms that drive mitigation. This domestic support demonstrates Albania's commitment to the climate agenda through its own resources, complementing the larger contributions coming from international support.

(While exact figures of government spending on climate change vary by year, the trend is increasing. The preparation of key strategies – like the NCCS and NDC – was supported by a combination of domestic funds and donor grants (greenclimate.fund). Moreover, the Albanian government has pledged to continue raising the share of the budget dedicated to green growth and climate action as it aligns with EU accession requirements for environmental investment.)

4.2. International Support and Climate Projects in Albania

International climate finance and technical assistance have been pivotal in advancing Albania's GHG emission reduction efforts. As a lower-middle-income country and EU candidate, Albania has received support from multilateral funds, bilateral donors, and development institutions for climate change mitigation and related projects. Below are some of the key sources and examples of international support that Albania has benefited from:

- **Global Environment Facility (GEF):** The GEF has funded a series of enabling activities and projects in Albania focused on climate change. Notably, the preparation of Albania's National Communications and Biennial Update Report (BUR) to the UNFCCC was supported by GEF grants implemented through UNDP (thegef.org). For example, the First Biennial Update Report (BUR1) project (2019–2021) was backed by about USD 0.9 million from the GEF (thegef.org). These funds helped Albania build its GHG inventory system, analyze mitigation scenarios, and compile reports on climate actions (www4.unfccc.int). GEF support has also extended to mitigation projects on the ground – such as a past project promoting solar water heaters for households (to reduce electricity use for hot water) and a project on energy efficiency in public buildings, both of which achieved direct emissions savings and created models for scaling up with domestic funding.

- **Green Climate Fund (GCF):** The GCF, as a major global climate fund, has provided readiness and project support to Albania. A prominent initiative is the GCF-funded project **"**Climate Change MRV System for Albania" (approved in 2022), aimed at establishing a comprehensive national system for measurement, reporting, and verification of emissions and mitigation actions (greenclimate.fund). Through a GCF grant of approximately USD 1.2 million, a project led by the Urban Research Institute in collaboration with UNDP is supporting efforts to establish a national MRV system, with a focus on improving data availability and reporting practices for GHG emission (greenclimate.fund).

  Additionally, the GCF has supported Albania's **National Adaptation Plan** development (which includes consideration of mitigation co-benefits in sectors like agriculture and water (greenclimate.fund). Looking ahead, Albania is preparing to seek larger-scale GCF investments for mitigation, with energy sector proposals (such as grid modernization and solar farms) under discussion. In parallel, the GCF is supporting Albania's most significant adaptation initiative to date—**ALBAdapt: Climate Services for a Resilient Albania**, with a contribution of EUR 26.7 million. This large-scale project, co-financed by the German and Swiss governments and implemented with support from GIZ, aims to enhance climate information services, strengthen early warning systems, and proMoE climate-resilient investments. With a total budget of EUR 34.5 million (approximately USD 37 million) and a timeframe from 2024 to 2030, ALBAdapt will establish a national framework for climate services, upgrade hydrometeorological infrastructure, develop a multi-hazard early warning system, and pilot nature-based adaptation measures across vulnerable areas (giz.de). GCF as well, through its **Readiness and Preparatory Support Programme**, the GCF approved in 2022 a grant of EUR 475,725 to further strengthen Albania's engagement with the Fund. Implemented by GIZ, the project focused on enhancing the outreach and

visibility of the National Designated Authority (NDA), supported the direct access process by building the capacities of the nominated national entities to meet GCF accreditation standards, and developed a roadmap to engage the financial sector more effectively in climate finance.

The GCF is supporting the **Global Programme for Energy Efficiency in Buildings (PEEB Cool)** project with a total budget for Albania 1 Mio. EUR. The Partnership for Energy Efficiency in Buildings (PEEB) is a multi-country initiative dedicated to transforming the building sector. Through financing mechanisms and policy advisory services, PEEB supports the design and operation of resilient and energy-efficient buildings. PEEB Cool, a dedicated funding window, is supported by the Green Climate Fund (GCF), Agence Française de Développement (AFD), and the German Federal Ministry for Economic Affairs and Climate Action (BMWK).

- **European Union (EU) Assistance:** As part of the EU integration process, Albania benefits from the EU's financial instruments. The **Instrument for Pre-Accession Assistance (IPA)** has a dedicated envelope for environment and climate. Under IPA funding, the EU has financed technical assistance to align Albania's climate policies with the EU acquis. For instance, the **EU4Climate regional program** (funded by the EU and implemented by UNDP) has worked with Albania to update its climate legislation (contributing to drafting the Climate Change Law and secondary regulations) (greenclimate.fund). The EU has also provided investment grants through the **Western Balkans Investment Framework (WBIF)** for green infrastructure – including upgrades to transmission lines to integrate renewables and rehabilitation of hydropower plants to improve their efficiency and safety (thus sustaining Albania's renewable generation capacity). Moreover, in 2020 Albania joined the EU's Green Agenda for the Western Balkans; since then, the European Commission has earmarked funds for regional projects like solar power development and building renovation for energy efficiency. These grants and concessional loans (channeled via institutions like EBRD and EIB) are enabling multi-million-Euro renewable energy investments (e.g., a 12 MW floating solar plant was supported by EBRD and the EU) and urban transport improvements (such as electric buses co-financed by EU funds in Tirana).

- **Bilateral Donor Projects:** Several individual countries have supported Albania's climate-related endeavors. The German Federal Ministry for Economic Cooperation and Development (BMZ) and the German Federal Ministry for the Environment, Nature Conservation Nuclear Safety and Consumer Protection (BMUV), together with other partners, launched the global NDC Partnership (NDCP). Further the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH has supported selected members of the NDCP including Albania in their efforts to implement their NDCs and to make them more ambitious. The project cofinanced by GCF , NDC Assist II, in Albania has a budget of 625.519,61 EUR, and is focuses on strengthening the capacities of government and actors of the global NDCP and the private sector for the financing and implementation of the NDCs, with special consideration for gender-sensitive aspects Germany, through GIZ and KfW, has been a leading bilateral supporter. A GIZ-implemented project (2020–2023) on modernizing solid waste management introduced climate-friendly waste practices in Albanian municipalities (giz.degiz.de). With a budget of around €7.8 million, this project helped set up recycling and composting systems that *directly* reduce methane emissions from waste, and it strengthened municipal capacities for sustainable waste services (giz.de). Germany has also provided loans and grants via KfW for energy efficiency in public buildings and for expanding distribution of solar photovoltaics. Another example is the support from Italy and the Czech Republic for afforestation and reforestation projects in rural Albania – these projects supply expertise and funding to plant tens of thousands of trees, enhancing carbon sinks and engaging local communities in forest management. Switzerland and Sweden have funded projects on urban traffic management and air quality in Tirana, indirectly contributing to lower emissions by

reducing traffic congestion and promoting cycling. The United States, through USAID, has worked on electricity market reforms and regional energy connectivity, which, while not directly labelled as climate finance, facilitate greater use of Albania's clean energy resources across the region.

- **Multilateral Development Banks:** The World Bank and European Bank for Reconstruction and Development (EBRD) have both invested in Albania's energy transition, often blending climate objectives with development. The World Bank's financing for the Dam Safety and Energy Project helped secure Albania's large hydropower dams, ensuring the longevity of its renewable energy backbone. The EBRD, on the other hand, financed the landmark Karavasta Solar Park (140 MW) with a loan and also supported the government in conducting competitive auctions for renewables (enercee.net). By lowering the cost of capital, these institutions make clean energy projects more bankable. EBRD has supported financially the development of the project "Green City Action Plan of Tirana" that aims to enable people to enjoy a healthy and high quality life in a green, resilient and inclusive Tirana that makes smart use of resources. One of the thematic areas that the project was focused was on "Climate Change Resilience & Adaptation". The GCAP aligns with Tirana's 2016 TIRANA2030 plan and supports Albania's climate goals, including reducing CO2 emissions by 20.9% by 2030. These efforts also contribute to global frameworks like the Paris Agreement and UN Sustainable Development Goals. For residents and visitors alike, these changes promise a healthier, greener, and more liveable city. EBRD and EIB have also provided credit lines to local banks for on-lending to businesses and homeowners for energy efficiency improvements (for example, the GEFF – Green Economy Financing Facility in Albania). Such programs have enabled hundreds of energy-saving investments like efficient machinery, insulation, and solar water heaters, cumulatively cutting emissions and costs for energy users.

Overall, the support received by Albania in the climate change domain is significant and multifaceted, spanning grants for capacity building, technical assistance for policy reform, and investments in low-carbon infrastructure. International funding has catalyzed many of the policies and projects described in Section 1. For instance, the drafting of the Climate Change Law and Strategy was backed by EU IPA funds and UNDP expertise (greenclimate.fund), and the ongoing implementation of the MRV system and NAP is funded by GCF and bilateral donors (greenclimate.fund). This external support not only provides financial resources but also transfers knowledge and technology.

Importantly, Albania has also started to **mobilize private sector investment** in response to these supportive policies and public funds. The renewables auctions (supported by World Bank/EBRD) attracted international renewable energy developers, and the presence of co-financing from donors often brings in private co-investment. For example, the €4.8 million GIZ waste project triggered local governments to invest their own funds in new waste collection equipment, multiplying the impact (giz.de).

In summary, Albania's climate change mitigation efforts are backed by a combination of domestic commitment and international solidarity. The government's budgetary support, though modest, signals ownership of the climate agenda, while international climate finance and projects have filled critical gaps – from building institutional capacity to funding transformative projects like large-scale solar power and modern waste management. Going forward, continued support will be needed to help Albania fully achieve its 2030 NDC target and embark on a path toward carbon neutrality by mid-century. The partnership between Albania and its international supporters serves as a model of how global climate finance can be effectively utilized at the national level to drive real reductions in GHG emissions and foster sustainable development.

5. Improvements in reporting over time

Improvements in reporting over time is one of the key concepts relating to transparency under the Paris Agreement.[53]

In this report, improvements include more efficient and improved review processes, with lessons learned from previous years being applied to subsequent reviews. The operationalization of reviews has evolved, gaining efficiency with experience. This progress is also seen in strengthened national reporting systems, by identifying and filling data and information gaps from reviews, which allows to enhance the monitoring, evaluation, and learning systems for more comprehensive future reports.

In preparation of this report effort is made to incorporate the lessons learned and relevant recommendations coming from the other reporting processes such as the Albania First NDC (revised), National Communications, NID, NECP, etc. Albania will strive to improve its Biennial Transparency Report continuously. Improvements in reporting of greenhouse gas emission inventories are described in the National Inventory Document, Chapter 10.

[53] Decision 1/CP.21, paragraph 92, https://unfccc.int/documents/9097.

Annexes

Annex 1: Common reporting tables

Common reporting tables for the electronic reporting of the national inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases are submitted as separate Excel files.

Annex 2: Methodology applied for the identification of GHG emissions from international aviation and navigation in the scope of the EU NDC

International Aviation

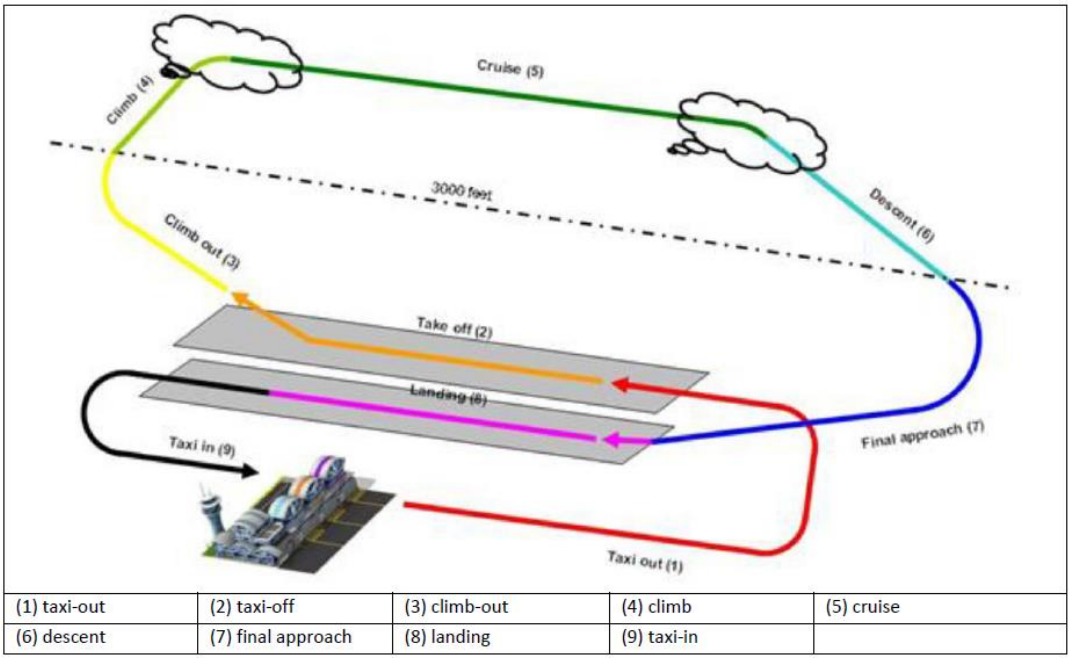
As described in the 2006 IPCC Guidelines, the CRT category *International Aviation (International bunkers)* includes emissions from flights that depart in one country and arrive in a different country.[54] Also, International navigations include take-offs and landings for these flight stages. It is *good practice*, that emissions from domestic navigation are reported separately from international navigation and it is *good practice* to apply the definition presented in the following table.

Table 24: Criteria for defining international or domestic *Aviation*

Criteria for defining international or domestic navigation (applies to individual legs of journeys with more than one take-off and landing)		
Journey type between two airports	**Domestic**	**International**
• Departs and arrives in same country	Yes	No
• Departs from one country and arrives in another	No	Yes

Source: 2006 IPCC Guidelines, Volume 2, Chapter 3: Mobile Combustion, 3.6.1.3 Choice of activity data, TABLE 3.6.

Furthermore, the flight is composed of several distinct phases of flight as presented in the figure below.[55]



(1) taxi-out	(2) taxi-off	(3) climb-out	(4) climb	(5) cruise
(6) descent	(7) final approach	(8) landing	(9) taxi-in	

Figure 32: Typical phases of flight

Source: NID Albania, 2024

[54] NID Albania, 2024

[55] EMEP/EEA air pollutant emission inventory guidebook 2023, Chapter Aviation 1.A.3.a, Page 7, Figure 3–3 Typical phases of flight.

Albania has three international airports and several airfields. The number of passengers carried by international aviation but also the international freight transport increased but was also subject to considerable fluctuations. The drop in 2020 is due to worldwide COVID pandemic.

GHG emissions from combustion of fuel in *international aviation* amounted to:

- 205.43 kt CO_2 equivalent in the year 2005.
- 124.57 kt CO_2 equivalent in the year 2022.

Data on fuel consumption or flight movements for period 1990 – 1998 are currently not available and therefore GHG emissions were not estimated.

GHG emissions from *international aviation* decreased by -39.4% % in the period 2005 – 2022, which is mainly caused by decreasing activities in freight transport.

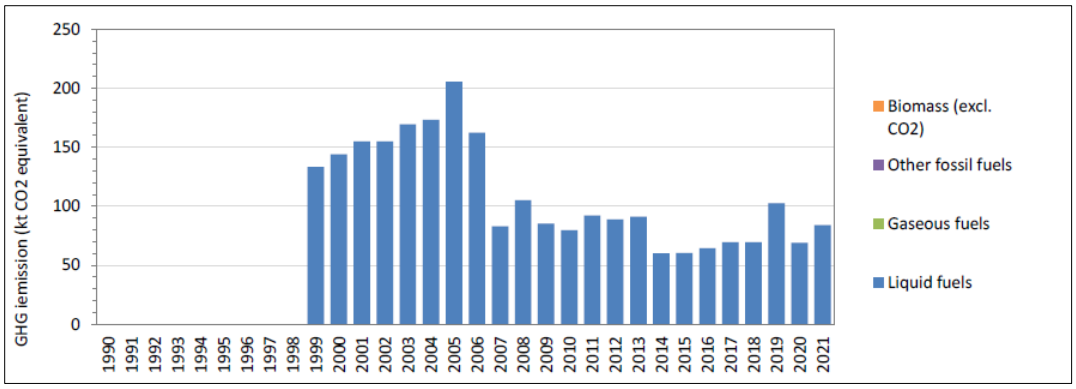


Figure 33: GHG emissions from International Bunkers: International aviation

Source: NID Albania, 2024

The figure below depicts the choice of methods for estimating the emissions from international aviation.

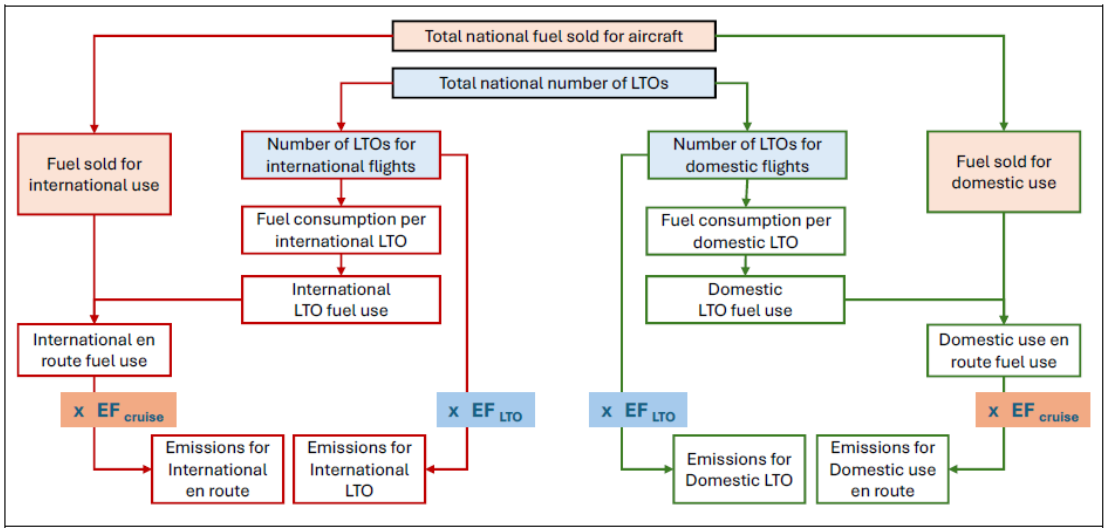


Figure 34: Estimation of aircraft emissions using the Tier 1 and Tier 2 methodologies (EMEP/EEA 2023)

Source: NID Albania, 2024

For estimating the CO_2, CH_4 and N_2O emissions the 2006 IPCC Guidelines Tier 2 approach[56] has been applied:

Equation 3.6.2: Aviation equation (2) (2006 IPCC GL, Vol. 3, Chap. 3.6.1.1)

$$Total\ Emissions_{GHG,\,fuel} = LTO\ \ emissions_{\ GHG,fuel} + Cruise\ emissions_{GHG,\,fuel}$$

Equation 3.6.3: Aviation equation (3) (2006 IPCC GL, Vol. 2, Chap. 2)

$$LTO\ Emissions_{GHG} = number\ of\ LTOs \times EF\ LTO_{\mathrm{GHG,\,fuel}}$$

Equation 3.6.4: Aviation equation (4) (2006 IPCC GL, Vol. 2, Chap. 2)

$$LTO\ Fuel\ consumption_{\ fuel} = number\ of\ LTOs \times LTO\ fuel\ consumption_{\ \mathrm{fuel}}$$

Equation 3.6.4: Aviation equation (4) (2006 IPCC GL, Vol. 2, Chap. 2)

$$Cruise\ emissions_{GHG,fuel} = (Total\ fuel\ consumption - LTO\ Fuel\ consumption) \times EF\ cruise_{\mathrm{GHG,fuel}}$$

Figure 35: Approach applied for estimating the emissions from International Aviation

Source: NID Albania, 2024

Where:

Total emissions $_{GHG,\,fuel}$ = emissions of a given GHG by type of fuel (kg GHG)
LTO emissions $_{GHG,\,fuel}$ = emissions for LTO of a given GHG by type of fuel (kg GHG)
Cruise emissions $_{GHG,\,fuel}$ = emissions for cruise of a given GHG by type of fuel (kg GHG)
Fuel consumption $_{fuel}$ = amount of fuel combusted (TJ)
LTO fuel consumption $_{fuel}$ = amount of fuel combusted (kg/LTO)
EF LTO $_{GHG,\,fuel}$ = default emission factor for LTO of a given GHG by type of fuel (kg GHG/LTO)
EF cruise $_{GHG,\,fuel}$ = default emission factor for LTO of a given GHG by type of fuel (kg GHG/TJ)
GHG = CO_2, CH_4, N_2O
Fuel = jet kerosene, aviation gasoline

International Navigation

As described in the 2006 IPCC Guidelines, the CRT category *International Water-borne Navigation (International bunkers)* includes emissions from fuels used by vessels of all flags that are engaged in international water-borne navigation.[57] The international navigation may take place at sea, on inland lakes and waterways and in coastal waters. This category includes emissions from journeys that depart in one country and arrive in a different country. The category exclude consumption by fishing vessels (see here Other Sector - Fishing). It is *good practice*, that emissions from domestic navigation are reported separately from international navigation and it is *good practice* to apply the definition presented in the following table.

[56] Source: 2006 IPCC Guidelines, Volume 2: Energy, Chapter 3: Mobile Combustion - 3.6.1.1 Methodological issues - Choice of method

[57] NID Albania, 2024

Table 25: Criteria for defining international or domestic water-borne navigation

Criteria for defining international or domestic water-borne navigation (applies to each segment of a voyage calling at more than two ports)		
Journey type between two ports	**Domestic**	**International**
• Departs and arrives in same country	Yes	No
• Departs from one country and arrives in another	No	Yes

Source: 2006 IPCC Guidelines, Volume 2, Chapter 3: Mobile Combustion, 3.5.1.3 Choice of activity data, TABLE 3.5.4.

Albania stretches for 380 km along the coastline including four commercial ports, two petroleum port and five tourism ports. However, all ports except the petroleum ports are mainly used in the touristic sector and presented below. Durrës is the busiest and largest seaport in the country, followed by Vlorë, Shëngjin and Sarandë. The principal ports serve a system of ferries connecting Albania with islands and coastal cities in Croatia, Greece, and Italy.

Furthermore, small number of international navigations (mainly fishery and touristic) takes place on the:

- Shkodër lake to Montenegro
- Lake Ohrid to North Macedonia
- Large Lake Prespa to North Macedonia
- Small Lake Prespa to Greece

GHG emissions from international shipping are not well reported due to allocation of the fuel in the Energy balance. The emissions of fuels used in international navigation is included in Road transport.[58]

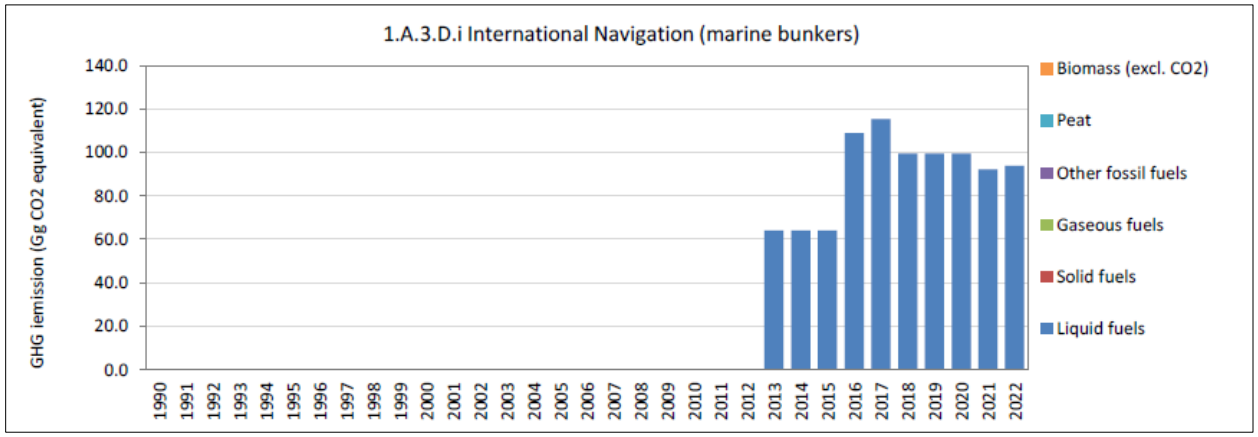


Figure 36: GHG emissions from *International Bunkers - International Navigation*

Source: NID Albania, 2024

For estimating the CO_2, CH_4 and N_2O emissions the 2006 IPCC Guidelines Tier 1 approach[59] has been applied:

[58] *Idem*

[59] Source: 2006 IPCC Guidelines, Volume 2: Energy, Chapter 3: Mobile Combustion - 3.5.1.1 Methodological issues - Choice of method

Equation 3.5.1: Water-borne navigation equation (2006 IPCC GL, Vol. 3, Chap. 3.5.1.1)

$$Emissions_{GHG,\,fuel} = Fuel\ Consumption_{fuel} \times Emission\ Factor_{GHG,\,fuel}$$

Equation 2.2: Total emissions by greenhouse gas (2006 IPCC GL, Vol. 2, Chap. 2)

$$Emissions_{GHG} = \sum_{fuel} emissions_{GHG,\,fuel}$$

Figure 37: Approach applied for estimating the emissions from *International Navigation*

Source: NID Albania, 2024

Where:

Emissions $_{GHG,\,fuel}$	= emissions of a given GHG by type of fuel (kg GHG)
Fuel consumption $_{fuel}$	= amount of fuel combusted (TJ)
Emission factor $_{GHG,\,fuel}$	= default emission factor of a given GHG by type of fuel (kg gas/TJ)
GHG	= CO_2, CH_4, N_2O
Fuel	= liquid fuels, e.g., Residual fuel oil, Gas/diesel oil