



D.T2.3.1 STUDY ON HOW TO REACH NEUTRALITY FOR CARBON OFFSETTING

Version n. 1; 09/2023

Airports of Puglia S.p.A.
Airports of Montenegro
Albanian Civil Aviation Authority



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INTRODUCTION

The Earth's climate has always been subject to fluctuations that are influenced by various factors such as the Earth's orbit, solar radiation, volcanic eruptions, etc.

Human activities have also significantly contributed to these changes, as they cause emission of fossil gases (GHGs) into the atmosphere.

The latest IPCC report of 2021 (AR6) confirms that the Earth's climate is warming (the average temperature on the Earth's surface has increased by about 0.6 °C in the last century) and that humans' influence on the climate system is evident. GHG emissions are leading to an increase in global average temperatures with effects on the climate (such as increased intensity of drought events, floods, and severe storms). In fact, models predict that, if anthropogenic GHG emissions are not reduced, global warming could exceed 2°C by 2050 and could exceed 4°C by 2100, compared to the pre-industrial era.

In order to combat climate change, actions have been developed at global level; in 2012, the amendment to the Kyoto Protocol included new commitments and reporting obligations by 2020, followed by the 2015 Paris Agreement which included a global commitment to limit the temperature increase to 2°C with the ambition to limit the increase to 1.5°C.

The Paris Agreement is a landmark in the multilateral climate change process because, for the first time, a binding agreement brings all nations together to combat climate change and adapt to its effects. In order to limit global warming to 1.5 degrees Celsius – a threshold the Intergovernmental Panel for Climate Change (IPCC) suggests is safe – carbon neutrality by 2050 is essential. This target, the Net-Zero 2050, is a crucial goal laid down in the Paris agreement signed by 195 countries, including the EU.

Carbon neutrality means having a balance between emitting carbon and absorbing carbon from the atmosphere in carbon sinks. In order to achieve net zero emissions, all worldwide greenhouse gas (GHG) emissions will have to be counterbalanced by carbon sequestration. The term carbon neutrality is also referred to the result of a process of quantifying, reducing and offsetting carbon emissions by products, services and organizations. Net Zero, on the other hand, has a more ambitious goal: to act on the entire value chain process, preferring reduction and removal activities instead of offsetting.

To face climate change, there are two broad categories of measures that can be implemented:

- Climate change mitigation: avoiding and reducing emissions of heat-trapping greenhouse gases into the atmosphere to prevent the planet from warming to more extreme temperatures.
- Climate change adaptation: altering our behaviour, systems, and—in some cases—ways of life to protect our families, our economies, and the environment in which we live from the impacts of climate change. The more we reduce emissions right now, the easier it will be to adapt to the changes we can no longer avoid.

Both are useful and indispensable: carbon emissions will never be completely eliminated, and it is therefore essential to activate adaptation strategies.

Although climate change action needs to be massively increased to achieve the goals of the Paris Agreement, the years since its entry into force have already sparked low-carbon solutions and new markets. More and more countries, regions, cities and companies are establishing carbon neutrality targets. Zero-carbon solutions are becoming competitive across economic sectors representing 25% of emissions. This trend is most noticeable in the power and transport sectors and has created many new business opportunities for early movers. By 2030, zero-carbon solutions could be competitive in sectors representing over 70% of global emissions.

The European Union has also adopted an ambitious package of measures to facilitate capital flows towards sustainable activities across the Union. By redirecting investor interest towards more sustainable technologies and businesses, the measures will be instrumental in making Europe climate neutral by 2050 and will make the EU a world leader in standard-setting sustainable finance. The package includes, inter alia, the Delegated Act on the climate aspects of the EU taxonomy, which aims to promote sustainable investment by better clarifying which economic activities contribute most to achieving the EU's environmental objectives.

In 2021, IPCC accounted for actual GHG emissions by sector, providing an overview of how human activities impact the environment:

- Fuel combustion: 75.7%
- Transport, including domestic aviation 25.8%
- Energy industries 24.1%
- Households, commerce, institutions and other 14.2%
- Production, industry and construction 11.6%
- Agriculture 10.3%
- Industrial processes 9.2%
- Waste management 3.1%

In this context, the aviation sector is responsible for 3-4% of global GHG emissions from energy consumption related to its activity.

The emission caused by aviation can be divided into two categories:

- Emissions resulting from airport activities (e.g. Energy to power infrastructure, manage, heat, cool buildings, etc.).
- Emissions from the use of fuel to power aircraft

Although emissions from the sector are not included in the 2015 Paris Agreement, the International Civil Aviation Organization (ICAO) has set itself the goal of reducing the impact of the sector by improving energy efficiency by 2% per year and stabilizing CO₂ emissions.

It also established a system of compensation for CO₂ for the fraction of emissions that would exceed the level reached in 2020 despite technical reduction measures taken at the same time.

With a massive 1.8 gigatons of CO₂ to mitigate in 2050 alone, carbon offsets have an important role to play in aviation's net zero goal.¹ This report was commissioned by Aeroporti di Puglia S.p.A. to illustrate how to reach neutrality for carbon offsetting in the aviation sector.

¹ https://airlines.iata.org/analysis/credible-carbon-offsets-vital-to-net-zero?_gl=1*12xa116*_ga*NzU1NzQ5MzcxLjE2ODQ0ODA2OTY.*_ga_PLLG1EY0X0*MTY4NDQ5Njc1NS4yLjAuMTY4NDQ5Njc1NS42MC4wLjA.&_ga=2.67668241.1487280788.1684480697-755749371.1684480696

1 INTERNATIONAL TECHNICAL AND REGULATORY NET ZERO FRAMEWORKS

1.1 Europe actions (fit for 55) and strategies towards carbon neutrality by 2050

The European Commission (EU) aims to be climate-neutral by 2050 – an economy with net-zero greenhouse gas emissions. This objective is at the heart of the European Green Deal and in line with the EU’s commitment to global climate action under the Paris Agreement.²

The transition to a climate-neutral society is both an urgent challenge and an opportunity to build a better future for all. All parts of society and economic sectors will play a role – from the power sector to industry, mobility, buildings, agriculture, and forestry.

The EU can lead the way by investing into realistic technological solutions, empowering citizens, and aligning action in key areas such as industrial policy, finance and research, while ensuring social fairness for a just transition. Implementation of the Paris Agreement requires economic and social transformation, based on the best available science.

As part of the European Green Deal, the Commission proposed on 4 March 2020 the first European Climate Law to enshrine the 2050 climate-neutrality target into law: REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law).

The European Climate Law³ writes into law the goal set out in the European Green Deal for Europe’s economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. Climate neutrality by 2050 means achieving net zero greenhouse gas emissions for EU countries as a whole, mainly by cutting emissions, investing in green technologies and protecting the natural environment. The law aims to ensure that all EU policies contribute to this goal and that all sectors of the economy and society play their part.

The objectives are:

- Set the long-term direction of travel for meeting the 2050 climate neutrality objective through all policies, in a socially fair and cost-efficient manner,
- Set a more ambitious EU 2030 target, to set Europe on a responsible path to becoming climate-neutral by 2050,
- Create a system for monitoring progress and take further action if needed,
- Provide predictability for investors and other economic actors,
- Ensure that the transition to climate neutrality is irreversible.

² https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2050-long-term-strategy_en#:~:text=The%20EU%20aims%20to%20be,net%2Dzero%20greenhouse%20gas%20emissions

³ https://climate.ec.europa.eu/eu-action/european-green-deal/european-climate-law_en
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119>

The EU Institutions and the Member States are bound to take the necessary measures at EU and national level to meet the target, considering the importance of promoting fairness and solidarity among Member States. The law includes measures to keep track of progress and adjust the actions, accordingly, based on existing systems such as the governance process for Member States' national energy and climate plans, regular reports by the European Environment Agency, and the latest scientific evidence on climate change and its impacts. Progress will be reviewed every five years, in line with the global stocktake exercise under the Paris Agreement.

The Paris Agreement works on a five-year cycle of increasingly ambitious climate action - or, ratcheting up - carried out by countries. Since 2020, countries have been submitting their national climate action plans, known as Nationally Determined Contributions (NDCs).

In their NDCs, countries communicate actions they will take to reduce their greenhouse gas emissions in order to reach the goals of the Paris Agreement. Countries also communicate in their NDCs actions they will take to build resilience to adapt to the impacts of climate change.

To better frame the efforts towards the long-term goal, the Paris Agreement also invites countries to formulate and submit long-term low greenhouse gas emission development strategies (LT-LEDS). LT-LEDS provide the long-term horizon to the NDCs. Unlike NDCs, they are not mandatory. Nevertheless, they place the NDCs into the context of countries' long-term planning and development priorities, providing a vision and direction for future development.

In this context the International Energy Agency (IEA) issued the world's first special report⁴ on the progress of Net Zero 2050. According to the IEA the operations conducted so far by governments to achieve zero emissions are not yet sufficient to reach this goal by 2050. For this reason, it has drawn up a complete path that will be able to guarantee the achievement of global carbon dioxide emissions and therefore limit the increase in global temperature to 1.5°C, while guaranteeing companies a stable and convenient energy supply.

Climate pledges by governments to date – even if fully achieved – would fall well short of what is required to bring global energy-related carbon dioxide (CO₂) emissions to net zero by 2050 and give the world an even chance of limiting the global temperature rise to 1.5 °C, according to the new report, Net Zero by 2050: a Roadmap for the Global Energy Sector.

The report is the world's first comprehensive study of how to transition to a net zero energy system by 2050 while ensuring stable and affordable energy supplies, providing universal energy access, and enabling robust economic growth. It sets out a cost-effective and economically productive pathway, resulting in a clean, dynamic and resilient energy economy dominated by renewables like solar and wind instead of fossil fuels. The report also examines key uncertainties, such as the roles of bioenergy, carbon capture and behavioural changes in reaching net zero.

“Our Roadmap shows the priority actions that are needed today to ensure the opportunity of net-zero emissions by 2050 – narrow but still achievable – is not lost. The scale and speed of the efforts demanded by this critical and formidable goal – our best chance of tackling climate change and limiting global warming to 1.5 °C – make this perhaps the greatest challenge humankind has ever faced,” said

⁴ <https://www.iea.org/news/pathway-to-critical-and-formidable-goal-of-net-zero-emissions-by-2050-is-narrow-but-brings-huge-benefits>

Fatih Birol, the IEA Executive Director. “The IEA’s pathway to this brighter future brings a historic surge in clean energy investment that creates millions of new jobs and lifts global economic growth. Moving the world onto that pathway requires strong and credible policy actions from governments, underpinned by much greater international cooperation.”

Building on the IEA’s unrivalled energy modelling tools and expertise, the roadmap sets out more than 400 milestones to guide the global journey to net zero by 2050. These include, from today, no investment in new fossil fuel supply projects, and no further final investment decisions for new unabated coal plants. By 2035, there are no sales of new internal combustion engine passenger cars, and by 2040, the global electricity sector has already reached net-zero emissions.

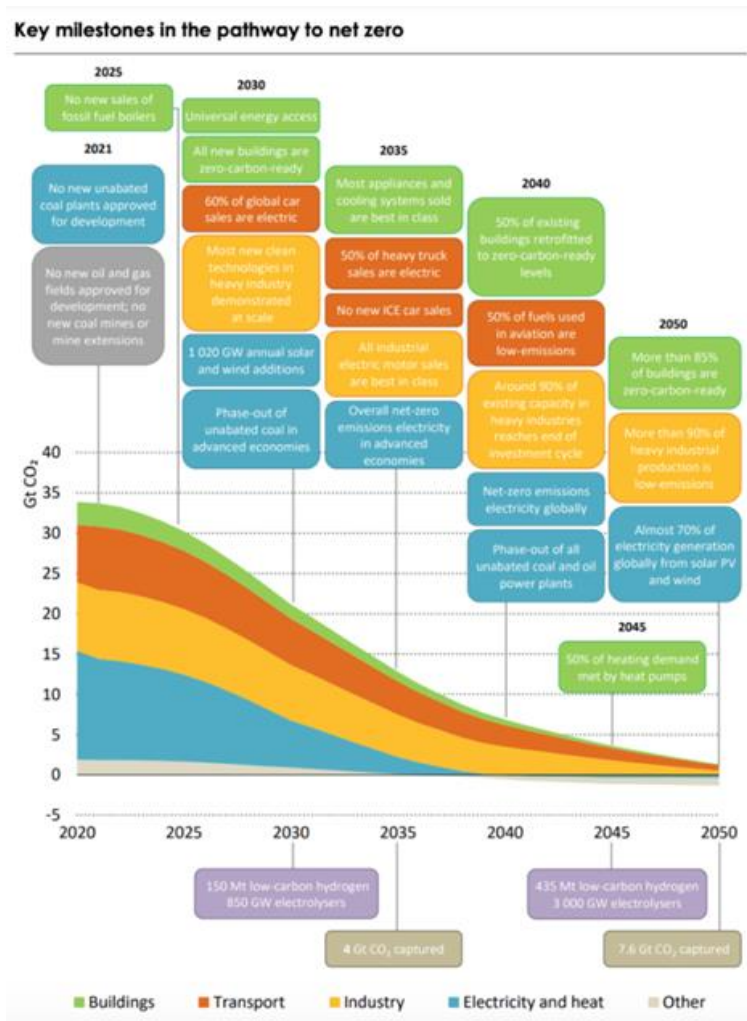


Figure 1 Source: IEA “Net Zero by 2050” report

There are multiple ways of removing CO₂ from the atmosphere, called also Negative Emissions Technologies (NETs), most of which fall into three broad categories: (1) nature-based solutions, (2) measures that aim to enhance natural processes, and (3) technology-based solutions.

Nature-based solutions include afforestation and reforestation. These involve the repurposing of land use by growing forests where there was none before (afforestation) or re-establishing a forest where there was one in the past (reforestation). Other nature-based solutions include restoration of coastal and marine habitats to ensure they continue to draw CO₂ from the air.

Enhanced natural processes include land management approaches to increase the carbon content in soil through modern farming methods. This can incorporate the addition of biochar (charcoal produced from biomass) to soils, where the carbon can remain stored for hundreds or thousands of years. Less developed approaches include enhanced weathering to accelerate natural processes that absorb CO₂ (for example, by adding very fine mineral silicate rocks to soils) or ocean fertilisation in which nutrients are added to the ocean to increase its capacity to absorb CO₂. Enhanced weathering and ocean fertilisation approaches require further research to understand their potential for carbon removal as well as their costs, risks and trade-offs.

Technology solutions include bioenergy with carbon capture and storage (BECCS) and direct air capture, which – as the name suggests – involves the capture of CO₂ directly from the atmosphere. Both of these solutions rely on geological storage of CO₂ for large-scale carbon removal and could play an important role in clean energy transitions.

In pathways limiting global warming to 1.5°C with limited or no overshoot, the IPCC found that agriculture, forestry and land-use measures could be removing between 1 billion and 11 billion tonnes of CO₂ per year by 2050. The potential amount of CO₂ removal from BECCS ranged from zero to 8 billion tonnes per year by then. To put this in context, global energy-related CO₂ emissions were 33 billion tonnes in 2018⁵.

1.2 Uptake and requirements of SBTi Net Zero standard

The Science Based Targets initiative (SBTi)⁶ is a global body enabling businesses and financial institutions to set ambitious emissions reductions targets in line with climate science. It is focused on accelerating companies across the world to halve emissions before 2030 and achieve net-zero emissions before 2050.

The initiative is a collaboration between four of the world's most respected environmental organizations: CDP, the United Nations Global Compact, World Resources Institute (WRI) and the Worldwide Fund for Nature (WWF), and is one of the We Mean Business coalition commitments.

The SBTi defines and promotes best practice in science-based target setting, offers resources and guidance to reduce barriers to adoption, and independently assesses and approves companies' targets.

The SBTi's Corporate Net-Zero Standard (also referred to as the 'Net-Zero Standard') contains guidance, criteria, and recommendations to support corporates in setting net-zero targets to be validated by the SBTi. The main objective of this standard is to provide a standardized and robust approach for corporates to set net-zero targets aligned with climate science. It is important to note

⁵ <https://www.iea.org/commentaries/going-carbon-negative-what-are-the-technology-options>

⁶ <https://sciencebasedtargets.org/net-zero>

that while the SBTi does provide some supplementary guidance on greenhouse gas (GHG) accounting, companies should refer to the suite of corporate Greenhouse Gas Protocol standards on this topic.

The SBTi defines and promotes best practice in science-based target (SBT) setting, offers resources and guidance to reduce barriers to adoption, and independently assesses and approves companies' targets. Companies can set:

- near-term science-based target, which must be in line with what the latest climate science says is necessary to meet the goals of the Paris Agreement (to limit global warming to well-below 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C);
- and net-zero science-based targets.

These targets must be aligned to the SBTi's Criteria and Recommendations and the Net-Zero Corporate Standard respectively.

The table below⁷ is a summary of the key (not exhaustive) target boundary, timeframe, method eligibility, and minimum ambition requirements for near and long-term SBTs.

Table 1 Summary of key SBTi requirements

			Scope 1 and 2			Scope 3			
Near-term science-based targets	Target boundary		95% coverage of scopes 1 + 2			If scope 3 >40% of total emissions: boundary to cover min. 67% of scope 3.			
	Target year		5 – 10 years from date of submission			5 – 10 years from date of submission			
	Method eligibility and minimum ambition	Method	Absolute Contraction	Physical Intensity Convergence	Renewable electricity (scope 2 only)	Absolute Contraction	Physical Intensity Convergence	Supplier or customer engagement	Physical Intensity Contraction and Economic Intensity
Eligibility and min. ambition		• 4.2% linear annual reduction (LAR)	• Depends on sector and company inputs (SDA)	• 80% RE by 2025 • 100% RE by 2030	• 2.5% LAR	• Depends on sector and company inputs (SDA)	• e.g. 80% of suppliers by emissions by 2025	• 7% year-on-year (both options)	
Long-term and net-zero science-based targets	Target boundary		95% coverage of scopes 1 + 2			90% coverage of scope 3			
	Target year		2050 or sooner (2040 for the power sector)			2050 or sooner			
	Method eligibility and minimum ambition	Method	Absolute Contraction	Physical Intensity Convergence	Renewable electricity (scope 2 only)	Absolute Contraction	Physical Intensity Convergence	Supplier or customer engagement	Physical Intensity Contraction and Economic Intensity
Eligibility and min. ambition		• 90% reduction (cross-sector pathway) • 80% reduction for FLAG • Other sector pathways vary	• Sector / commodity pathways vary	• 100% RE	• 90% reduction (cross-sector pathway) • 80% reduction for FLAG • Other sector pathways vary	• Sector / commodity pathways vary	• Methods are not eligible for long-term SBTs	• 97% reduction (both options)	

Not eligible 1.5°C ambition Well-below 2°C ambition

The SBTi promotes corporate climate action and encourages organizations from all sectors to demonstrate leadership by setting science-based emissions reduction targets. This includes financial institutions, joint ventures, cooperatives and state-owned enterprises. The SBTi is especially keen to welcome organizations in the highest-emitting sectors, who play a crucial role in ensuring the

⁷ <https://sciencebasedtargets.org/resources/files/Getting-Started-Guide.pdf>

transition to a net-zero economy. The exception is oil and gas companies as their targets cannot yet be officially validated⁸.

The SBTi does not currently assess targets for cities, local governments, public sector institutions (over 500 employees), educational institutions or non-profit organizations. However, we encourage these stakeholders to consider near-term SBT setting methods when developing targets independently. Cities can register their interest in setting targets through the Science Based Targets Network (SBTN). Public sector institutions with under 500 employees can submit targets through the small and medium-sized enterprises (SME) route.

Several sector-specific guidance and projects are available⁹: The Science-Based Target Aviation Guidance¹⁰ supports companies in the aviation sector to model science-based targets, based on the Sectoral Decarbonization Approach (SDA). This guidance provides indications on how airlines and users of aviation services should set targets aligned with a well-below 2°C ambition.

The rate and scale of aviation decarbonization is defined by the International Energy Agency's (IEA) Energy Technology Perspectives (ETP) 2020 report which models GHG reduction requirements for each sector based on a number of assumptions including forecasted sector growth, availability of mitigation levers and socio-economic factors. The impact of aviation non-CO₂ factors on warming is acknowledged but not included in quantitative target setting due to scientific uncertainty and lack of mitigation solutions. So, to raise awareness of non-CO₂ impacts of aviation, airlines are encouraged to participate in data sharing, collaboration and include non-CO₂ factors in other climate commitments.

1.3 Other initiatives: the Net Zero Guidelines

The International Organization for Standardization (ISO), the most important worldwide organization for the definition of technical standards, launched at COP27 the Net Zero Guidelines. The document tackles a major roadblock for a world where greenhouse gas emissions are reduced to the minimum and balanced by removals: the fragmented net zero governance landscape. The Guidelines provide a common reference for collective efforts, offering a global basis for harmonizing, understanding, and planning for net zero for actors at the state, regional, city and organizational level.

The Net Zero Guidelines set a common path for:

- the definition of “net zero” and related terms (greenhouse gas removals, offsetting, value chain, etc), clarifying the differences in scope between direct emissions, indirect emissions from purchased energy, and other indirect emissions arising from an organization’s activities
- high-level principles for all actors who want to achieve climate neutrality,
- actionable guidance on getting there as soon as possible, by 2050 at the very latest, and
- transparent communication, credible claims, and consistent reporting on emissions, reductions and removals.

⁸ <https://sciencebasedtargets.org/resources/files/SBTi-Corporate-Manual.pdf>

⁹ <https://sciencebasedtargets.org/sectors>

¹⁰ https://sciencebasedtargets.org/resources/files/SBTi_AviationGuidanceAug2021.pdf

The Guidelines build on the momentum of existing voluntary initiatives and increase their impact. Globally accepted “net zero” claims are easier to compare, create an ambition loop, and can be scaled through better regulation.

2 NATIONAL STRATEGIES TOWARDS NET-ZERO

2.1 Local policies and regulations, incentives for decarbonization, energy efficiency and sustainable mobility, strategies on carbon credits – ALBANIA

Introduction

The Republic of Albania is a signatory Party of the United Nations Framework Convention on Climate Change (UNFCCC), which was ratified by the Albanian Parliament in 1994.

In April 2016, Albania signed the Paris Agreement. In December 2017 the Albanian Parliament unanimously approved a resolution confirming the country's commitment to Agenda 2030 and achievement of the Sustainable Development Goals (SDGs).

In the June 2022 update to the first NDC (Nationally Determined Contribution) the Albanian authorities committed to decreasing total emissions by 20.9 percent by 2030 compared to the baseline, through improvement in energy efficiency in transport and residential units – through building insulation, more efficient industrial boilers and increased use of biofuels in transport, increase in the use of renewable energy, and penetration of natural gas. Albania also signed the Sofia Declaration on the Green Agenda for the Western Balkans in 2020, committing to carbon neutrality by 2050.

Commitments at local level

In line with global and regional commitments and national priorities, Albania has made progress on climate change mitigation and adaptation.

In 2014, the Albanian government established the Inter-Ministerial Working Group on Climate Change (IMWGCC), which coordinates all institutions involved in climate change processes and facilitates the integration of climate change into relevant new and existing policies, programs, and activities.

Besides the EU integration efforts and agenda, Albania is an active participant in multilateral organisations and agreements. Albania is a signatory Party of the United Nations Framework Convention on Climate Change (UNFCCC), which was ratified by the Albanian Parliament in 1994. Albania signed and ratified the Paris Agreement in 2016 and the Solidarity and Just Transition, Silesia Declaration in 2018. The country has pledged to an effective transition to low GHG emissions.

In December 2017, the Albanian Parliament unanimously approved a resolution confirming the country's commitment to Agenda 2030 and achievement of the Sustainable Development Goals.

In 2019, Albania became member to the Nationally Determined Contribution (NDC) Partnership, showing its commitment to ambitious implementation of its NDC under the Paris Agreement on Climate Change and the 2030 Sustainable Development Goals.

In July 2019, Albania approved a National Climate Change Strategy and corresponding national mitigation and adaptation plans. The country has implemented several mitigation and adaptation projects and studies.

In July 2020, Albania submitted its National Energy and Climate Plan (NECP) on Climate Change mitigation and Adaptation respectively for the period 2021-2030 to the Energy Secretariat for formal recommendations.

Albania is a member of the Energy Community and has made regional commitments through this forum. Under the Energy Community treaty, Albania is committed to endorsing EU rules related to climate action, and the country is a signatory of the 2020 Sofia Declaration, to work towards the 2050 target of a carbon- neutral continent together with the European Union thereby committing to continue alignment with the EU ETS and general promotion of carbon pricing.

In 2021, Albania revised enhancing the Nationally Determined Contribution (NDC) in an effort to reduce the GHG emissions from all economic sectors, i.e. achieving 20.9 percent reduction in 2030 compared to the Business-As-Usual Scenario. Suggested mitigation measures include increased use of renewable energy, building insulation, more efficient industrial boilers and increasing biofuel use in transport. The scope was limited in terms of both gases and sectors.

According to the national legislation in place, the NDC document is to be revised every five years, the next one in 2025, aiming to reach net-zero carbon emissions by 2050. However, these strategies do not specify expectations for the private sector contributions.

Albania ranks 6th in Climate Scope's ranking of the most attractive markets for energy transition projects investment.¹¹ Albania has one of the lowest emissions per capita in Europe in part due to hydropower-dominant electricity generation and in part due to limited levels of industrial manufacturing.

Political context

It can be summarized that there is policy and legislation in place for each of the five dimensions of the Energy Union.

National Energy Strategy for Albania

The Energy Strategy for Albania 2018-2030, as the core strategic document for the country's energy sector, is fully coherent with other national policies and strategies and the European Green Deal's objectives: Supplying clean, affordable and secure energy; Building and renovating, promoting a cleaner construction sector; Accelerating the shift to sustainable and smart mobility; Eliminating pollution through measures to cut pollution rapidly and efficiently. The five dimensions which the energy strategy supports are:

1. Energy security, based on diversification of energy resources;
2. Full integration in the regional market and later to the European one;
3. Energy efficiency which contributes to the moderation of demand;
4. Decarbonization of the economy;
5. Research, innovation and competition.

¹¹ <https://www.global-climatescope.org/results/>

The Albanian Energy Strategy is fully in line and in harmony with EU “Low-carbon Economy Roadmap” and promotes EE, RES and natural gas policies that promote a stable business climate which will encourage low-carbon investments for the period 2017-2030. As the analyses supporting this strategy shows, there is significantly greater GHG reduction potential in the Albanian energy system than the initial NDC commitment. Therefore, the energy strategy and the policy objectives it envisions are in-line with the increasing ambition goals of both the UNFCCC and the EU/Energy Community. Given the current status of Albania as a candidate country in accession to the EU, it is likely during the period covered by this strategy Albania will accede to the EU. For this reason, as well as required by its Energy Community membership, it is of great importance that the Energy Strategy is in line also with EU Climate Change Policy by ensuring that the energy policy objectives and the respective energy action plans identified in this document are supporting the levels of ambition expressed in EU CO2 reduction targets and climate change political goals.

Regulatory Framework

Following EU legislation and UN Conventions related to environmental protection to which Albania is party to, there are laws and by-laws as well as strategies and action plans regulating several issues, for example: regulating air pollution, biodiversity, and forestry. There is also a policy in place in carbon taxes. However, monitoring mechanisms to enable reporting on the scale of programs/plans implementations and verification are lacking. There are projects addressing the afforestation/deforestation’s Albania related goals, through which the whole supply chain linked to forest commodities is tackled, mainly focused on the needs for capacity building towards to forest sustainable management. There are efforts towards green procurement with the assistance of developing agencies, but they are not yet finalized adaptation measures especially related to coastal areas.

There is currently a law No 155/2020 “On climate change” which acts as the United Nation Climate Change Conference (UNFCCC) implementation law in Albania and covers requirements under the EU Emissions Trading System (ETS) Directive.

This law aims to contribute to the country's reduction of greenhouse gas emissions, to adaptation actions, and to global climate change efforts by ensuring obligations of the Republic of Albania to the UNFCCC are being met. It establishes a comprehensive legal and inter-institutional framework for climate action at the national level in line with EU regulations. It also recognises the climate emergency. This law requires all relevant ministries to mainstream climate change mitigation and adaptation issues into their legislation. There is a draft Decision of the Council of Ministers (DCM) “On monitoring and reporting GHG emissions and other information relevant to climate change at the national level”. The law regulates greenhouse gas emissions from stationary and mobile sources, by products and substances, and the conditions for capture and geological deposition of carbon dioxide.

Law No 124/2015 of 12.11.2015 “On energy efficiency” with amendments with Law No. 28, dt. 8.3.2021, in full approximation with the provisions on energy efficiency of the Directive 2012/27/EU and 2010/30/EU Directives.

Law 7/2017 on promotion of usage of renewable energy source partially approximated with Directive 2009/28/EU. In April 2023, Albania adopted amendments to its RES Law, partially transposing the Renewable Energy Directive (REDII).

Law 116/2016 on energy performance in buildings in full approximation with the provisions of the Directive 2010/31/EU.

Albania's National Strategy on Climate Change, National Action Plan on Mitigation (NAPM) and the National Adaptation Plan (NAP), published on 2019.

Draft of the National Energy and Climate Plan of the Republic of Albania, published on 2021.

The Albanian Energy Strategy is fully in line and in harmony with EU “Low-carbon Economy Roadmap” and promotes EE, RES and natural gas policies that promote a stable business climate which will encourage low-carbon investments for the period 2017-2030.

As the analyses supporting this strategy shows, there is significantly greater GHG reduction potential in the Albanian energy system than the initial NDC commitment. Therefore, the energy strategy and the policy objectives it envisions are in-line with the increasing ambition goals of both the UNFCCC and the EU/Energy Community.

Given the current status of Albania as a candidate country in accession to the EU, it is likely during the period covered by this strategy Albania will accede to the EU. For this reason, as well as required by its Energy Community membership, it is of great importance that the Energy Strategy is in line also with EU Climate Change Policy by ensuring that the energy policy objectives and the respective energy action plans identified in this document are supporting the levels of ambition expressed in EU CO2 reduction targets and climate change political goals.

Decarbonisation - GHG emissions and removals

Key policies are the INDC and the National Strategy for the Climate Change. INDC (Intended Nationally Determined Contributions) Though Albania is a country with a low-carbon economy, the INDC (Intended Nationally Determined Contributions) of Albania commits initially to reduce its CO2 emissions by 11.5 % as compared to the baseline scenario for the period 2016 to 2030. This reduction is equivalent to a CO2 emission reduction of 708 Gg by 2030. The emission trajectory of Albania allows a smooth trend for achieving 2 tons of GHG emissions per capita by 2050, which can be taken as a target for global contraction and convergence of greenhouse gas emissions. 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. Further in 2021, Albania revised enhancing the Nationally Determined Contribution (NDC) in an effort to reduce the GHG emissions from all economic sectors, i.e. achieving 20.9 percent reduction in 2030 compared to the Business-As-Usual Scenario. Suggested mitigation measures include increased use of renewable energy, building insulation, more efficient industrial boilers.

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.

An initial inventory of potential NAMAs (Nationally Appropriate Mitigation Action) in Albania was established with UNDP support (2013- 2014) and National Strategy for the Climate Change (2019-2030).

The National Strategy for the Climate Change (2020-2030) is aligned with the following key documents:

- Obligations under the Energy Community;
- National Strategy for Development and Integration – 2015-2020 (Albanian Council of Ministers, 2017)
- Albania's Economic Reform Programme (2020-2022);
- Albanian Renewable Energy Source Action Plan (NREAP) Draft of 2019;
- Third National Communication of the Republic of Albania under the United Nation Framework Convention on Climate Change (Tirana June 2016);
- The first National Determined Contribution (NDC) document pursuant to the achievement of the UNFCCC target, approved by DCM No. 762, dated 16.9.2015;
- The National Consolidated Renewable Energy Action Plan (NCREAP 2019 – 2020) (DCM No. 580 dated 31.7.2018) Most important policy measures are key laws creating the enabling framework conditions to increase the number of renewable energy plants for generating electricity.

Decarbonisation - Renewable Energy

Albania's RES Plan is the key policy and is harmonized in terms of goals, energy sector details and timeline with a number of other strategic and legal documents that are in force, adopted or drafted,

The Law No. 7/2017, On the Incentives for the Use of the Renewable Energy Resources Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources.

This law is partially approximated with the Directive 2009/28/EC of the European Parliament. It entered in full force and effects late in February 2017.

This law sets out several incentives for the operators producing the energy from renewables, as well as it envisages the right to apply with and obtain from ERE the guarantees of origin for each 1MWh of renewable energy produced. The law is relatively new and lacks important secondary legislation necessary for its application.

Law No. 9876, dated 14.02.2008 amended “On production, transport and trade of biofuels and other renewable fuels for transport” Directive 2003/30/EC → Directive has been repealed in EU and in the Energy Community, replaced by Directive 2009/28/EC; the Law no 7/2017 does not include relevant Articles (17 to 21) related to biofuels. The existing law on biofuels or a new law should be adopted in order to comply with the provisions of the new EU Directive 2009/28/EC on biofuels and address issues of measures to reach biofuel target, sustainability verification scheme and body etc.

The law 2019 “On production, transportation and trade of biofuels and other renewable fuels for transport” applies to the activities of production and use of biofuels and other renewable fuels used for internal combustion engines in transport, where the biodiesel and bioethanol levels are in accordance with Albanian standards. Starting from 2020 the minimum annual quantity of biofuels and other renewable fuels for transport in the market shall be not less than 10% of the amount consumed by transport in 2018 and 2019; biofuels produced from waste, non-food cellulosic materials and the resulting non-waste cellulosic materials shall be half the target level set for other biofuels.

Law No. 43/2015, dated 30.04.2015 “On power sector” sets out the main principles for the energy sector development, including RES power plants and the transmission and distribution networks. Law transposes the EU Directive 2009/72 on electricity and repealing the previous law on electricity (Law no. 40/2015, dated 22.05.2003). This law also includes the requirements and criteria for granting a license to carry out an activity in energy sector. The law also includes a number of specific provisions regulating the construction of a direct line or of a commercial interconnection line.

Energy Efficiency

The key policy document is the Albanian Energy Strategy. It defines the objectives and targets to increase the security of energy supply by diversification of electricity production, reduction of the level of technical and non-technical losses of power the network, increasing the EE in the whole energy system, by increasing the share of RES based on least cost planning followed by the reduction of the amount of energy imported, energy intensity improvement and GHG emissions reduction. Policy documents and key laws create the enabling environment for the implementation of energy efficiency measures. Revising the EE law and development of by-laws is an important policy measure as it facilitates the implementation of the legislation.

National Strategy of Energy No. 408 dated 31.7.2018 Setup objectives and targets for all energy sector, investments, and responsible institutions “On some amendments and additions of Law no. 124/2015 “On energy efficiency”, as amended Law no. 28/2021 The aim is the full approximation with the provisions of the Directive 2012/27/EU of the European Parliament. Law “On energy efficiency” No.124/2015 dated 12.11.2015 Partly Transposition of EE Directive 2012/27/EU.

The purposes of the law are: a) drafting national rules and policies for the promotion and improvement of energy efficiency with the aim of saving energy and increasing security of supply as well as removing barriers to the energy market; b) setting national energy efficiency objectives; c) increasing the competitiveness of operators.

Law “On the energy performance in buildings” No. 116/2016 dated 10.11.2016 Transposition of Directive 2010/31/EU (EPBD) This law aims to create the legal framework for improving the energy performance in buildings keeping into account the local and 18 climatic conditions of the country, interior comfort of buildings and cost effective. Secondary legislation not yet fully in place.

Law on “Energy consumption Information and on other products related to the energy” No. 68/2012 Needs to be recast according to the new EU Eco-design and Labelling Policy (Eco-design Directive 2009/125/EC and Energy Labelling Framework Regulation EU 2017/1369) Second and Third National Energy Efficiency Action Plan for Albania, 2017-2020 DCM No. 709 of 01.12.2017.

Law “For the approval of the Transport Strategy and Action Plan 2016- 2020” DCM No. 811 of 16.11.2016 where the main goal of the strategy is to have an efficient transport system which promotes economic development and upgrades the citizens’ quality of life.

The overall objective of the National Transport Strategy and Action Plan 2016-2020 is to further develop Albania’s national transport system, and in addition; to significantly improve its sustainability, interconnectivity, interoperability and integration with the international and European wider transport system and region. The Sustainable Transport Plan, “On approval of the Sectorial Strategy of Transports and the Action Plan 2016-2020” DCM No. 841 of 16.11.2016 The main goal of the strategy is to create basis for an efficient transport system which promotes economic development.

Further the adoption of an effective emissions trading system is recognised as a crucial step towards promoting carbon neutrality and reducing greenhouse gas emissions across the Energy Community as stated in the Energy Community’s Informal Ministerial Council Meeting on the implementation of the organisation’s Decarbonisation Roadmap (30 June 2023), in Albania.

Decarbonisation readiness of Albania

Governance (Regulation (EU) 2018/1999)

Albania has partially transposed the Governance Regulation. There is no institutional setup for the multilevel energy and climate governance required by the Regulation. The provisions of the Law on Climate Change include high-level references to the NECP and to the Long-term Strategy and ensure public participation in line with the Aarhus Convention. The Law also includes provisions related to the monitoring and reporting of GHG emissions to the UNFCCC, but the reporting frequency related to climate change adaptation planning and strategies should be amended from the current four years to two years in order to ensure compliance with the Governance Regulation. It is foreseen that the National Plan for Adaptation to Climate Change will be developed.

Electricity (Directive (EU) 2019/944 and Regulation (EU) 2019/941)

The Ministry should review the Power Sector Law with a view to identifying the amendments needed to transpose the Electricity Directive, with the support of the Secretariat. This Law requires substantial improvements in order to fully transpose customer empowerment and protection, energy poverty, smart metering, data management, allow storage and aggregation and define new tasks of the Distribution System Operator, Transmission System Operator and the National Regulatory Authority in line with the new Electricity Directive. Transposition of the Risk-preparedness Regulation should be addressed by the review of the Power Sector Law; however, the amendments are yet to be proposed by the Ministry. The obligation to designate a national governmental or regulatory authority as a competent Authority and notify without delay the Secretariat and the Security of supply Coordination Group in line with the Regulation within 2023.

Renewable Energy (Directive (EU) 2018/2001)

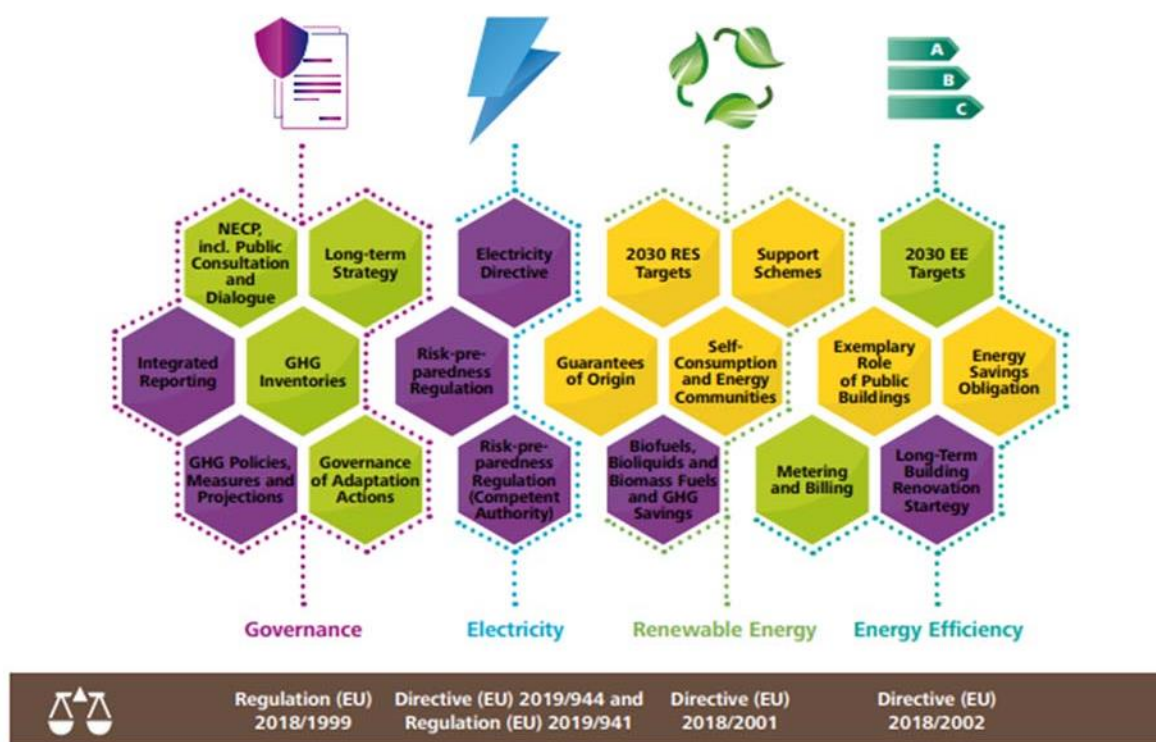
At the Ministerial Council held in December 2022, target of 52% of renewable energy share in gross final energy consumption by 2030 was adopted for Albania. Target is yet to be formally imbedded in the Albanian legal framework. Albania has drafted a Renewables Law with a view to transpose the Directive. The Law passed public consultation to be adopted 2023. Albania plans to amend the Law on biofuels in order to transpose the new requirements introduced by the Directive.

Energy Efficiency (Directive (EU) 2018/2002)

Albania has partly transposed the amended Energy Efficiency Directive. 2030 energy efficiency targets were adopted as part of the NECP, and contribution confirmed after adoption of 2030 targets at the 2022 Ministerial Council. Albania is yet to set the renovation targets for central government buildings and start working on the Long-Term Building Renovation Strategy as required by the Directive. The energy savings obligation (new targets until 2030) should be implemented via a new regulation.

Decarbonisation readiness of Albania is given in the figure below.

Decarbonisation readiness - 2021 Clean Energy Package transposition



Transposition status:

- Planning / no steps taken
- Drafting process
- Final draft / approval process
- Approved and published

Figure 2 Albania Decarbonisation readiness, Energy Community 2022

National GHG inventory and Targets

National greenhouse gas inventory Albania, as a Non-Annex I country to the United Nations Framework Convention on Climate Change (UNFCCC), has been developing an inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases (GHGs) emitted to or removed from the atmosphere since 1990 as part of its National Communications (NCs) on Climate Change. The national GHG inventory covers the years 2009-2019 and is consistent with the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines. Recalculations were not applied to years covered in previous national GHG inventories (2009-2016). The inventory includes estimates of GHGs from Energy, Industrial Processes and Product Use (IPPU), Agriculture, Land Use, Land Use Change and Forestry (LULUCF) and Waste as shown in Figure below. The inventory covers the following GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), and additional precursors and indirect greenhouse gases. To facilitate aggregate reporting of the GHG values, expressed as carbon dioxide equivalents (CO₂ eq.), as indicated in the Decision 17/CP.8, the global warming potentials (GWPs) values provided in the IPCC Second Assessment Report (temporal horizon 100 years) are used. The Tier 1 methods provided in the 2006 IPCC Guidelines are applied for all subsectors due to the absence of country specific emission factors.

Albania's submitted the Fourth National Communication to UNFCCC in September 2022¹².

The below table shows net emissions, including removals from LULUCF, for the years 2009 to 2019.

Table 2 Albania - GHG emissions and removals by year and sector

GREENHOUSE GAS EMISSIONS AND REMOVALS	Ref year for NDC	2009 (Base year)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Change from 2009 to latest reported year
	2016	CO ₂ equivalents (kt)											%
1. Energy	4778.93	4339.02	4346.70	4397.87	4138.85	4913.54	4633.59	4698.04	4778.93	5228.19	5321.95	5373.00	23.8%
2. Industrial Processes and Product Use	1019.89	1364.68	967.32	1124.81	1153.72	1244.83	1193.81	1105.50	1019.89	1209.98	1315.99	1341.65	-1.7%
3. Agriculture	2341.53	2236.31	2225.20	2259.20	2280.60	2296.52	2333.92	2346.72	2341.53	2341.53	2341.53	2341.53	4.7%
4. Land use, land-use change and forestry	1431.89	1593.69	1727.96	4484.11	5450.62	1429.17	1314.26	1386.65	1431.89	1431.89	1431.89	1431.89	-10.2%
5. Waste	838.98	620.90	660.25	705.45	747.13	783.78	801.40	821.05	838.98	854.64	871.47	881.56	42.0%
6. Other	133.65	74.63	80.42	82.12	83.03	86.07	103.53	128.54	133.65	121.21	126.28	122.33	63.9%
Total (including LULUCF)	10544.88	10229.23	10007.86	13053.55	13853.94	10753.91	10380.52	10486.50	10544.88	11187.44	11409.10	11491.95	12.3%

¹²

https://unfccc.int/sites/default/files/resource/Fourth%20National%20Communication%20of%20Albania%20to%20the%20UNFCCC_EN.pdf

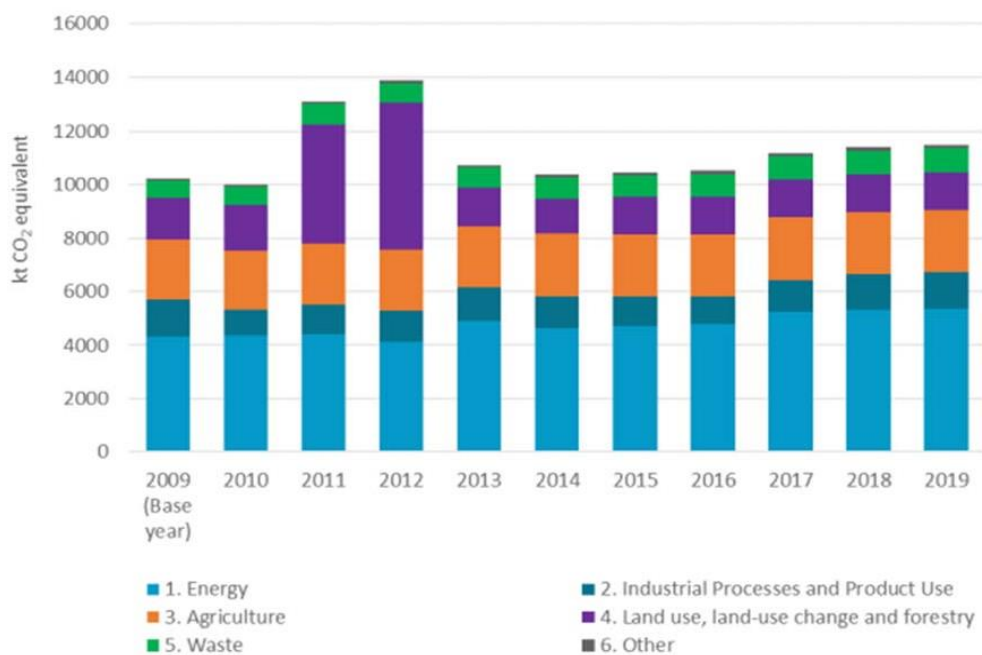


Figure 3 National GHG emissions by sector (2009-2019)

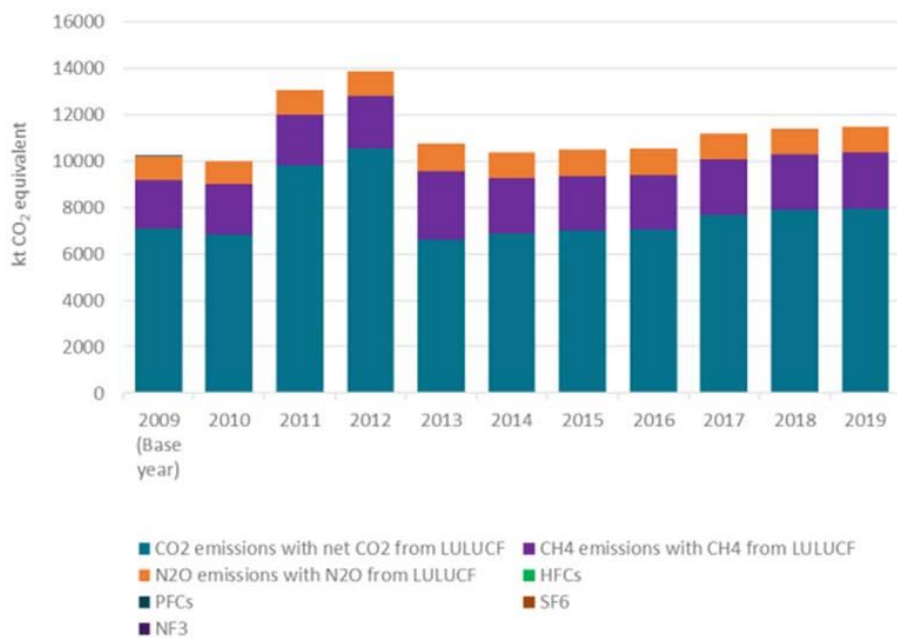


Figure 4 National GHG emissions by gas (2009-2019)

The GHG emissions from the energy sector account for the emissions released because of fuel combustion activities, as well as the fugitive emissions from the extraction of solid fuels and transmission and distribution of liquid and gaseous fuels. Analysis shows that Transport is the most significant category across all years.

Transport Sector

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 transport activity, especially for road transport, which led to a significant increase of transport fuel consumption, mainly diesel and gasoline. 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 forecast the demand for passenger and freight transport: passenger-km and ton km. It is forecast that ton-km will increase by 85% in 2030 compared to 2014, while passenger-km will increase by 37%. Most of the 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 transport sector consumes the most final energy (40.22% in 2019), followed by households (25.02% in 2019) and industry (19.02% in 2019).

Regarding road transport energy efficiency, the mitigation action aimed at reducing emissions from road transport is a modal shift towards active travel such as cycling and walking, and to encourage use of public transport. This action also encompasses development of an efficient transport system, as documented in the National Energy Strategy 2018-2030. The National Energy Strategy details the aim of decreasing private vehicle use, increasing e-mobility (through electricity supplied by RES plants/auto producers) for both passenger and freight transport. For example, by 2030 30% of road journeys longer than 300 km shall be shifted to other transport modes, increasing to 50% by 2050. The mitigation action is comprised of four components:

- Regulatory component: Establishment of the Municipality Energy and Climate Action Plan process by promoting walking, biking, e-cars and public transport;
- Financial component: Collaboration between each Municipality and donors, especially IPA, to facilitate the promotion of walking, biking, e-cars and public transport;
- Technical support component: The Ministry of Infrastructure Energy is coordinating with the UNDP and other donors to incorporate new courses on technical training promoting walking, biking, e-cars and public transport at accredited vocational schools in the country;
- Outreach component: The Ministry of Infrastructure and Energy might develop an information campaign promoting walking, biking, e-cars and public transport.

The transport emissions net CO₂ are calculated within energy sector. The transport sector emission/removal in the transport sector to reduce emissions from oil by-products by improving the energy efficiency of passenger road transport through promoting walking, biking, e-cars and public transport

estimates of GHG emission reductions (kt CO₂ eq) foreseen 8.98 (average annual reduction from 2016 to 2030).

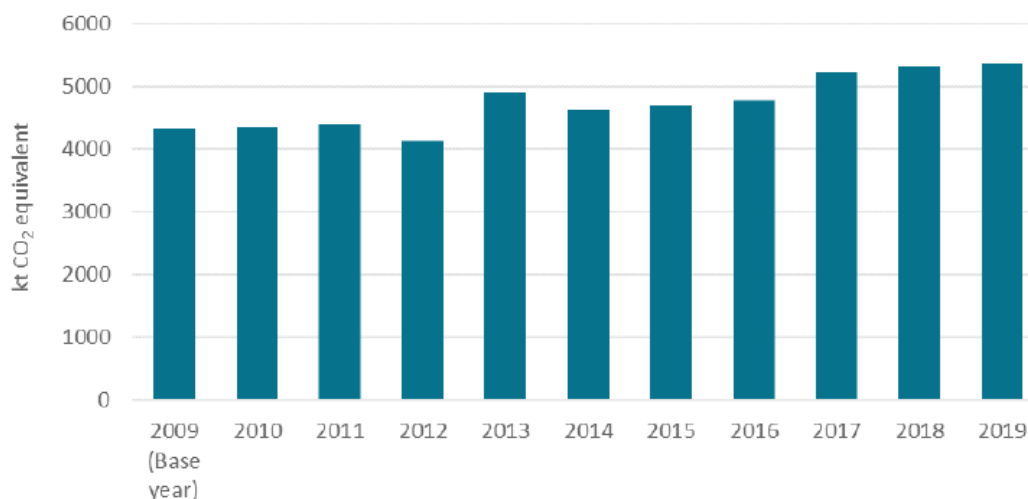


Figure 5 Albania - Energy sector GHG emissions (2009-2019)

Analysis shows that Transport is the most significant category across all years followed by Manufacturing Industry and Construction (related to fuel consumption). The primary energy supply in Albania is dominated by oil by-products, hydro and net imports of electricity, fuel wood and a small amount of coal and natural gas.

Oil derivatives consumption from the transport sector for 2019 has been approximately 1 million tons and with a total cost for costumers up to 1.5 Billion Euro and all this amount is imported increasing country trade deficit.

	Emissions in Gg Net CO ₂ , 2019	Index
Total national CO₂ emissions with net CO₂ from LULUCF	7961.04	100
Energy	5373 .95	47
Energy Sector/Others	2500.23	31.4
Energy Sector/Transport	2653.11	33.3

Figure 6 Share of Transport Emissions Net CO₂ Albania's, Fourth National Communication to UNFCCC,2022

The figure shows GHG emissions from the energy sector in the year 2019. The total amount of the emissions in 2019 is equal to 5373.00 kt CO₂eq.

Mitigation actions

In 2019 Albania endorsed the Strategic Document on Climate Change and its Action Plan on Mitigation. Six mitigation strategy priorities (SP) are identified:

- SP.1 Ensure a sustainable economy growth consistent with GHG emission pathways defined in the NDC and move towards an economy-wide target to which all sectors contribute;
- SP.2 Establish a monitoring, reporting and verification system of GHG in line with EU requirements
- SP.3 Strengthen the capacity of relevant institutions and inter-institution cooperation to address climate change issues;
- SP.4 Streamline climate changes across sectoral strategic planning;
- SP.5 Reinforce capacity building and awareness raising on climate change issues;
- SP.6 Align with the EU Climate Change framework across sectors.

Albania submitted its first Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) in November 2015. It included a commitment to reduce business as usual (BAU) CO₂ emissions by 11.5% by 2030.

This represented the country's contribution to the global efforts to address climate change which, as per the Paris Agreement, aim to limit the rise in global temperature to 1.5°C compared to preindustrial times. As per Article 3 of the Paris Agreement, countries' contributions are expected to be "ambitious" and "represent a progression over time". For this reason, in October 2021, Albania presented its revised NDC with enhanced ambition, but also with a broader scope that encompasses more types of GHGs and more sectors. Albania's revised contribution to mitigation aims to decrease emissions by 3,170 kt CO₂eq. by 2030 compared to the BAU scenario, corresponding to a mitigation impact of -20.9%.

The revised NDC is complemented by its Implementation Plan which lays out the roadmap to operationalize the NDC. It acknowledges that climate change is a cross-cutting issue for all sectors and regions of Albania, and that several policies and strategies have or are being developed to address it in many of these sectors and regions.

The Action Plan also builds on the National Climate Change Strategy and Plan (NCCS&P), not only through the integration of the priority actions in the revised NDC, but also by aligning implementation mechanisms and timelines.

Mitigation actions for transport sector

The following table presents a summary of the mitigation actions taken into account in the NDC (Nationally Determined Contributions) scenario for transport sector.

Table 3 Albania – mitigation action for transport sector

N°	Sector	Name	Subsector	Policy context	Description
E1	Energy	Energy efficiency	Transport	National Energy Efficiencies Actions Plans (NEEAP), NSE, Action Plan of Transport sector, National Energy Strategy 2018-2030	Efficient transport system: Increasing the share of public transport for passengers and freight (roads, railways and waterways). Up to 2030, 30% of the road transport of over 300 km shall be shifted to other transport modalities, like the rail. Up to 2050 the goal to be achieved is 50%. Energy labelling of new vehicles.
E2	Energy	Renewable Energy	Transport	National Energy Strategy 2018-2030	Renewable energy sources in transport: Goal for the share of the biofuels vs. total fuel consumption in transport sector 10% in 2020, 10% in 2025 and 10% in 2030 as compared to 3.55% in 2015. The share of electrical vehicles (EV) is increasing in the passenger cars fleet (up to 10% of passenger.km in 2030). Bicycle as Passenger travel mode is increasing (up to 5% of passenger.km in 2030).

The Ministry of Infrastructure and Energy is planning to accelerate the integration of the transport system, and to establish an integrated market, consisting of infrastructure and transport by land, sea and inland waterways, to efficiently support the transport development.

The following major infrastructure projects will have a direct impact on the development of tourism and economic growth in Albania:

- Vlora Airport, as an international airport
- Saranda Touristic Airport
- New Freight Port in Porto Romano, Durrës
- Touristic Port and Waterfront in Durrës
- Touristic Port in Limjon Saranda
- Adriatic-Ionian Road Corridor

Decarbonisation - emissions trading system towards neutrality

Albania's contribution to global greenhouse gas (GHG) emission is limited to only 0.01 percent of global emission in 2019. In 2019, Albania's percapita GHG emissions reached 1.68 tCO2e per capita, ranking 141 out of the 218 countries and the second lowest in Europe. Albania's per capita GHG emissions are significantly lower than regional peers.

The authorities have committed to reducing Albania's GHG emissions further. In view of the recent energy crisis, the authorities intend to pilot schemes encouraging households and businesses to invest in renewable energy (notably solar panels), while sharing some of the investment costs. These policies could support decarbonization and help to address energy poverty, since energy intensity and energy expenditure are higher for low-income households.

To reach its climate goals, Albania will have to implement further reforms, including taxing large polluters. In line with regional peers and above the average of European OECD countries, Albania's environmental taxes stood at 3.2 percent of GDP in 2019 or 12.5 percent of total tax revenue. Compared to peers, exemptions in Albania are limited. Since the war in Ukraine and the sharp increase

in oil prices, the government has rightly refrained from reducing tax rates on energy products and removed some fuel excise exemptions (effective from 2022), opting instead to provide targeted support for the most affected households. Carbon taxes are applied mostly downstream to fuel for road transport. However, there are no carbon taxes for large industrial polluters. Albania manages its emissions mostly through regulations, imposing a flat tariff by type of activity, which is not linked to the carbon content of emissions, and is not part of the European Emission Trading Schemes (EU-ETS). It has yet to establish effective monitoring for carbon emissions.

Further the adoption of an effective emissions trading system is recognised as a crucial step towards promoting carbon neutrality and reducing greenhouse gas emissions across the Energy Community as stated in the Energy Community's Informal Ministerial Council Meeting on the implementation of the organisation's Decarbonisation Roadmap (30 June 2023), in Albania.

2.2 Local policies and regulations, incentives for decarbonization, energy efficiency and sustainable mobility, strategies on carbon credits – MONTENEGRO

Introduction

Global warming caused by CO₂ emissions are one of the world's most pressing challenges. Montenegro is internationally committed to reduce its emissions by 35% in 2030. However, in contrast to this commitment, projections for the year 2030 show a slight increase of total emissions in Montenegro.

Commitments at local level

Global warming caused by CO₂ emissions are one of the world's most pressing challenges. Montenegro is internationally committed to reduce these emissions.

Human emissions of CO₂ are a primary driver of climate change and present one of the world's most pressing challenges.¹³ Montenegro is committed to reduce CO₂ emissions:

- It became a party to the UN Framework Convention on Climate Change (UNFCCC) as a non-Annex-I Party in October 2006.¹⁴
- It acceded to the Kyoto Protocol on 27 June 2007, and ratified the Paris Agreement on 20 December 2017.¹⁵
- It endorsed the Sofia Declaration on the Green Agenda for the Western Balkans in November 2020.¹⁶ This declaration includes a full commitment to support the EU Green Deal, which sets

¹³ IPCC, 2013

¹⁴ UNDP Montenegro 2021, p. 6.

¹⁵ UNDP Montenegro 2021, p. 6.

¹⁶ UNDP Montenegro 2021, p. 121.

the framework to achieve carbon neutrality by 2050 in the EU.¹⁷ Recently, Montenegro committed to a 35% CO₂ emission reduction by 2030.¹⁸

- Montenegro signed on 9 June 2006 a Multilateral Agreement between the European Community and its Member States and the Republic of Albania, Bosnia and Herzegovina, the Republic of Bulgaria, the Republic of Croatia, the former Yugoslav Republic of Macedonia, the Republic of Iceland, the Republic of Montenegro, the Kingdom of Norway, Romania, The Republic of Serbia and the United Nations Interim Administration Mission in Kosovo on the establishment of European common aviation area - European Common Aviation Area (ECAA) Agreement.

Political context

As mentioned above, Montenegro became a party to the UN Framework Convention on Climate Change by succession, after becoming independent in 2006, being a non-Annex I Party to the UNFCCC. The Ministry of Ecology, Spatial Planning and Urbanism is the main national entity responsible for the national environmental and climate change policy and the National Focal Point to the UNFCCC, GCF and GEF, Montenegro regularly submits greenhouse gas inventory reports as well as national reports to the Secretariat of the Convention.

The European integration has been at the top of Government's agenda ever since the country independence and the membership of the European Union remains a strategic goal of the country. In the context of the EU accession process, the country also initiated harmonization of its EU and UNFCCC commitments. The EU integration agenda has generated momentum for political, economic and social reforms and contributed to consensus building on cross-sectoral policy. While EU accession poses great challenges in terms of human and financial capacity at the national and local levels, it also provides opportunities for the creation of more integrated, crosscutting policies and better utilization of available resources.

Montenegro, as a member of the UN, by ratifying the Paris Agreement, pledged to join the international community with the objective to reduce greenhouse gas emissions. In addition, as a member of the Energy Community and a candidate for EU membership, Montenegro pledged to meet the goals of the Energy Community and the European Union in the fields of renewable energy, energy efficiency and greenhouse gas emission reduction.

In order to fulfil these obligations and to achieve set goals, Montenegro must harmonize and coordinate its energy and climate policies. Integrating environmental and climate change issues into ambitious development and energy policies and strategies is one of country's greatest challenges in joining the European Union.

On top of EU ambition, Montenegro is a member of the Energy Community and has made regional commitments through this forum. Under the Energy Community treaty, Montenegro is committed to endorsing EU rules related to climate action, and the country is a signatory of the Sofia Declaration thereby committing to continue alignment with the EU ETS and general promotion of carbon pricing.

¹⁷ UNDP Montenegro 2021, p. 121.

¹⁸ Updated NDC for Montenegro, 2021

Montenegro is implementing several international obligations to move towards a low-carbon economy, including the establishment of goals for increasing the share of renewable energy by gross final energy demand, improving energy efficiency, and reducing greenhouse gases (GHG) emissions in electricity generation.

Intended nationally defined contribution (INDC) and updated nationally defined contribution (NDC II)

National GHG inventory and Targets

Montenegro submitted its Intended nationally defined contribution to the 2015 Paris Climate Agreement, committing itself to reducing greenhouse gases emissions by 30% by 2030 against the baseline year of 1990. INDC of Montenegro did not consider adaptation measures. By ratification of the Paris Agreement in September 2017, INDC has become legally binding and transformed into NDC. With the revision of the NDC, Montenegro excludes the measure related to the construction of small hydropower plants and sets a new target value of a GHG reduction of 35% by 2030, compared to 1990 (not including the LULUCF and agriculture sector due to lack of data), or a reduction of greenhouse gas emissions by 2117 kilotons by 2030.

Based on Decision of the Ministerial Council of the Energy Community No 2022/02/MC-EnC, the most recent adopted 2030 targets for Montenegro are as follows: GHG emission cuts (-55% against 1990 level or 2.42 MtCO₂eq excl. LULUCF), renewables (50% share of energy from renewable sources in gross final consumption of energy) and energy efficiency (0.92 ktoe - maximum share of primary energy consumption and 0.73 ktoe – maximum share of final energy consumption).

Montenegro submitted the Third National Communication to UNFCCC in 2020¹⁹.

The below table shows net emissions, including removals from LULUCF, for the years 2009 to 2017.

¹⁹ https://www4.unfccc.int/sites/SubmissionsStaging/NationalReports/Documents/8596012_Montenegro-NC3-1-TNC%20-%20MNE.pdf

Table 4 Montenegro - GHG emissions by year and sector

YEAR	Energy (Gg CO ₂ eq)	Industrial processes (Gg CO ₂ eq)	Agriculture and land use emission sinks (Gg CO ₂ eq)	Waste (Gg CO ₂ eq)	Total emissions with sinks (Gg CO ₂ eq)	Total emissions without sinks (Gg CO ₂ eq)
2009	1958.93	585.63	-456.42	269.16	1581.97	2357.30
2010	2711.73	776.97	129.80	271.83	3703.46	3890.33
2011	2752.40	734.21	4975.69	275.94	8738.24	8738.24
2012	2667.07	522.11	1584.27	271.67	5045.13	5045.13
2013	2400.73	385.11	635.48	269.46	3690.79	3690.79
2014	2304.51	364.24	353.71	268.24	3290.70	3290.70
2015	2455.69	355.35	720.21	266.40	3797.65	3797.65
2016	2265.80	335.13	664.42	264.86	3530.22	3530.22
2017	2370.32	351.42	1961.18	253.89	4936.81	4936.81

Table 5 Montenegro - GHG emissions sinks in CO₂eq, 2009–2017 (Gg)

YEAR											1999	2000
Sink emissions (Gg)											1082.37	/
YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Sink emissions (Gg)	/	1168.06	853.71	467.94	468.91	245.79	/	/	/	775.34	186.87	
YEAR	2011	2012	2013	2014	2015	2016	2017					
Sink emissions (Gg)	/	/	/	/	/	/						

Transport Sector

The Montenegro transport sector is a significant source of CO₂ emissions, with a share of more than 23% in 2020, increasing to 30% in 2030.

Within the transport sector, road transport is the main source of CO₂ emissions, with an estimated share of around 95%, mainly due to the use of private cars (61.5% of total transport emissions) and road freight transport (21.8% of total transport emissions).

Table 6 Montenegro - GHG emissions transport sector²⁰

	Emissions in tCO ₂ e, 2020	Index
Total national CO₂ emissions	3,037,993	100
Total transport emissions	706,333	23.3
Total transport emissions	706,333	100
<i>Cars</i>	<i>434,396</i>	<i>61.5</i>
<i>Buses</i>	<i>37,636</i>	<i>5.3</i>
<i>Lorries</i>	<i>154,249</i>	<i>21.8</i>
<i>Other road</i>	<i>44,735</i>	<i>6.3</i>
<i>Rail</i>	<i>4,937</i>	<i>0.7</i>
<i>Aviation</i>	<i>30,380</i>	<i>4.3</i>

Given the importance of transport, both from an economic as well as a social point of view, the challenge for transport policy is to reduce CO₂ emissions by 35% in 2030, while ensuring the sector meets the current and future transport and mobility demands of its users.

To meet this challenge, the following policy objectives have been defined:

- Modal shift from cars to bus, trains, boats and other forms of environmentally friendly transport.
- Renewal of cars and buses.
- Modal shift from road to rail in freight transport.
- Decarbonisation of vehicles used in freight transport.
- Efficiency improvement of the road transport industry.

The challenge for transport policy is to reduce CO₂ emissions by 35% in 2030, while ensuring the sector meets the current and future transport and mobility demands of its users.

Transport is one of the fundamental pillars of the economy and plays an essential role in the social sphere as well. Goods transport supports manufacturing, and enables access to products, while passenger transport enables people among others to go to work, to go to school, to visit friends, and to get access to health services. However, most transport services rely on internal combustion engines, the main source of CO₂ emissions.

The policy challenge is to reduce CO₂ emissions by 35% in 2030 in line with international commitments, while ensuring the transport sector is able to meet current and future transport and mobility demands of its users. In addition, the aim for 2050 is a zero-emission sector. Since it is not realistic to rely on the electrification of road transport, or believe that zero emission cars and lorries will solve all problems, particularly for meeting the medium-term carbon reduction targets to 2035, additional policy measures are necessary.

²⁰ Roadmap for Transport Decarbonisation Montenegro

Problem definition

In contrast to the commitment to reduce CO2 emissions, projections for the year 2030 show a slight increase of total CO2 emissions in Montenegro.

Figure below²¹ shows historical and projected total emissions for Montenegro, based on a business-as-usual scenario (BaU).²²

The figure shows a slight decrease in CO2 emissions since 2000, followed by a moderate increase from 2015. Under the BaU scenario emissions are predicted to show a moderate growth till 2030. The projections indicate that the trend in emissions is not in line with the commitments made by Montenegro.

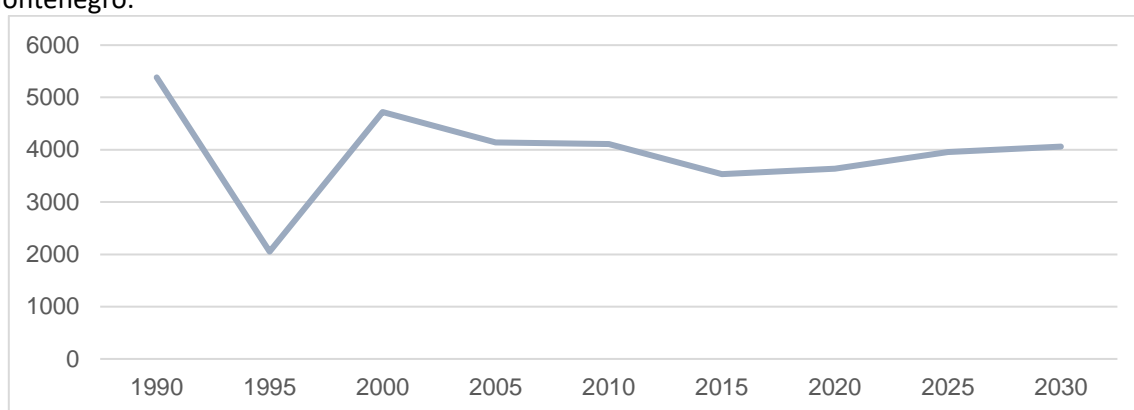


Figure 7 Montenegro - Historical and projected total emission in Gg CO₂eq, excl. LULUCF – BaU scenario

The Montenegro transport sector is a significant source of CO2 emissions, with a share of more than 23% in 2020, increasing to 30% in 2030.

Montenegro's transport sector is a significant source of CO₂ emissions, estimated at 649,000 t CO₂e in 2018 (21.9% of total national CO₂ emissions), and forecasted to grow to 993,000 tCO₂e (30% of the national CO₂ emissions) by 2030.²³ The emissions of the transport sector in Montenegro more than doubled since 1990 caused by the increasing needs in mobility.²⁴ Although projections for the energy sector show CO₂ emission decreases are expected in all other subsectors, these decreases cannot counterbalance the increase in transport emissions.²⁵

Within the transport sector, road transport is the main source of CO2 emissions with an estimated share of around 95% in 2020. This is mainly due to the extensive use of private cars, responsible for 61,5% of total transport emissions, and little use of railway transport and buses.

²¹ Source: Background Report for the preparation of the updated NDC, Final, UNDP April 2021

²² Based on UNDP Montenegro 2021, p. 77. The BaU scenario considers that no measures are implemented and the trend is only determined by GDP development and changes in population, livestock numbers and fertilizer use.

²³ UNDP Montenegro 2019, p. 1. The total transport emissions for 2020 and its share of 23.3% were calculated on the basis of interpolation. See annex 2.

²⁴ UNDP Montenegro 2021, p. 18.

²⁵ UNDP Montenegro 2021, p. 68.

Road transport is responsible for around 95% of total transport related CO₂ emissions in 2020.²⁶

Passenger cars have a share of 61.5% of the total transport emissions, buses are estimated to have a share of 5.3%, and road freight transport a share of 21.8%. In comparison with the EU²⁷ and surrounding countries, the share of private cars in total passenger kilometres is relatively high, while the share of rail is relatively low.²⁸

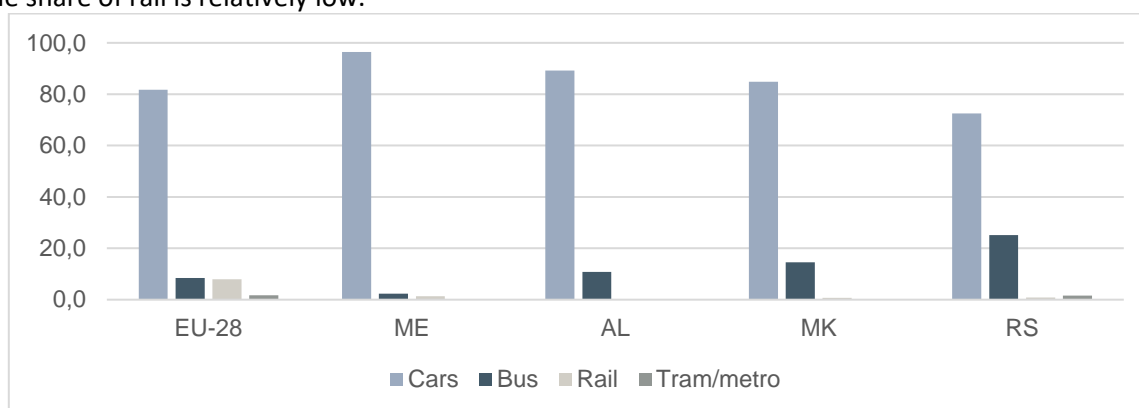


Figure 8 Montenegro - Modal split of passenger transport on land, passenger kilometres in %

Lack of technological and physical integration of various modes of transport: Although, road transport is the primary mode of transport in Montenegro and Podgorica, particularly personal transport in the form of cars, buses, trains and non-motorized transport (NMT) such as walking and bicycling are had under-utilized potential.

Seamless technological/digital as well as physical integration of these various modes of transport, together with **airports in Podgorica and Tivat**, with an emphasis on integrating and promoting public bus transport and NMT and implementing smart common mobility payment systems, can be an important way to increase use of public transport and reduce the use of private modes of transport. However, such multimodal integration of various transport options has not been planned or implemented until now.

Measures to reduce transport CO₂ emissions should take into account that the current public transport system is not able to meet the mobility needs of the population of Montenegro.

Decarbonisation

There are several strategical acts that address the decarbonisation.

Energy Policy of Montenegro by 2030 (hereinafter the Energy Policy), which takes into account three main priorities (security of energy supply, the development of a competitive energy market and sustainable energy development in the country). The Policy will be updated soon, in line with the Law on Energy. **Energy Development Strategy (EDS)** until 2030 with Action Plan 2016-2020 and **The**

²⁶ UNDP Montenegro 2021, p, 19.

²⁷ Source: EU Transport in figures 2020

²⁸ Based on figures from EU Transport in figures, 2020.

National Climate Change Strategy (NCCS) until 2030 and appropriate Strategic Environmental Impact Assessments (SEIA) were adopted in 2012 and 2015 respectively. All above mentioned policy and strategies are outdated. **The National Energy and Climate Plan (NECP)** development is currently underway. It is expected the NECP to be adopted by June 2024. The NECP will replace both EDS and NCCS for the post-2020 period. This also applies with the National Renewable Energy Action Plan of Montenegro and the National Energy Efficiency Action Plan 2021-2023. The development of the NECP follows Recommendation 2018/01/MC- EnC requesting Contracting Parties to produce their NECPs in accordance with Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action (hereafter referred to as Governance Regulation). The Policy Guidelines PG 03/2018 of June 2018 on the development of National Energy and Climate Plans under Recommendation 2018/01/MC-EnC provides a good overview of the scope, required content and the timeline of the NECP process for the Contracting Parties of the Energy Community. The NECPs should cover the period from 2021 to 2030, laying down the pathway to achieve the agreed 2030 targets, build upon what each Contracting Party should deliver in relation to their policies for 2020 (as a baseline), and include a perspective until 2050 in order to ensure consistency with long-term relevant policy objectives at EU, UNFCCC and Energy Community level.

Finally, preparation of the **Low-Carbon Development Strategy (LCDS) with an Action Plan** is at the very beginning, and it is planned to be completed by end of 2025.

In order to set strategic courses of action and public policies related to the limiting greenhouse gases emissions, determined by the projected nationally determined contribution, to reduce anthropogenic emissions of greenhouse gases and increase their removal through sinks, to achieve the goals of the Paris Agreement, as well as transparent and accurate monitoring of the achievement of emission targets, the Low-Carbon Development Strategy shall adopted with the aim of achieving climate neutrality.

The Strategy shall be prepared by the state administration authority responsible for environmental affairs in cooperation with other state administration authorities, local administration and other legal persons with public powers responsible for energy, transport, agriculture, health, waste management, forestry, industry, infrastructure, construction, spatial planning, and tourism.

Strategy will include:

- individual targets in reducing the emissions and removing issuing using sinks by sectors, including: energy, industry, transport, housing, central heating and cooling, agriculture, waste, forestry, land use, and change of intended use of land;
- estimate of expected progress in transitioning to the low-carbon economy, including intensity of greenhouse gases emissions, carbon intensity of the gross domestic product, associated long-term investments and strategies connected with the development and research.

National Strategy for Sustainable Development (NSSD) until 2030 together with a corresponding Action Plan was adopted in 2016, integrating the UN Agenda for sustainable development until 2030. The document represents a strategic framework for the transposition of the UN sustainable development goals and defines a set of indicators to track national progress on the implementation of the sustainable development policy, which also involves the establishment of an indicator-based

reporting information system. This is a comprehensive strategic document which covers an array of different topics, but one of the main objectives is transition to green economy through mitigation of climate change, efficient use of resources, circular economy, sustainable consumption and production, competitive growth of economy, etc. This strategy is an umbrella and long-term development Strategy of Montenegro, which fully integrates the UN Agenda 2030 and represents the national response to those requirements and identified national needs, including reporting on the national implementation of the agenda. This is important because of the SDG 14 and other related goals.

In June 2019 Montenegro was the first country in the region to adopt **Smart Specialisation Strategy (S3)**, covering the period 2019-2024. Strategic priorities are energy and sustainable environment, sustainable agriculture and food value chain, sustainable and health tourism, ICT (information and communication technologies). This is a National Innovation Strategy that sets development priorities, aimed at building competitive advantage through networking own forces in research and innovation with the needs of the economy, responding coherently to growing opportunities and market development, thus avoiding overlapping and fragmenting policies. The S3 has high political backing and, with careful management and monitoring, has the potential to generate economic growth by developing the country's competitive advantages through an innovative approach. Montenegro should follow up on the technical recommendations resulting from a conditional positive assessment by the European Commission (December 2019) and ensure sustained and close collaboration between all relevant stakeholders in a continuous Entrepreneurial Discovery Process.

The Government adopted **Action Plan for Meeting the Final Benchmark in Chapter 27 - Environment and Climate Change** in February 2021.

Montenegro adopted Final Report on the implementation of the National Strategy for the Transposition, Implementation and Enforcement of the EU Acquis for Environment and Climate Change (only opening benchmark in this chapter) on 19 November 2020. According to the Final Report the total percentage of the implementation of obligations for the period 2016-2020 is 80.35%.

Having in mind that the National Strategy for the Transposition, Implementation and Enforcement of the EU Acquis for Environment and Climate Change was related to the period until July 2020, the Government of Montenegro adopted the Action plan for the fulfilment of the closing benchmarks in the Chapter 27 on 18 February 2021 (after EC has submitted the positive opinion on the Action plan on 23 December 2020).

During 2019, at the legislative level, the Law on Protection against Adverse Impacts of Climate Change (Official Gazette of Montenegro, No. 73/19) was enacted, covering all the climate issues relevant for Montenegro. The law incorporates elements of the new EU policy set Clean Energy Transition for establishment of National Systems for GHG inventories and National Systems for PaMs and projections, carbon storage and ozone layer protection, obligations of the stationary plant and the aircraft operator as well as envisages Low Carbon Development Strategy (LCDS) and National Adaptation Plan (NAP) preparation. The Law provides the basis for the establishment of the National System for Monitoring, Reporting and Verification of Greenhouse Gases, the operation of the Emissions Trading System, as well as a sectoral distribution of efforts to reduce emissions outside the Emissions Trading System. Moreover, the Law represents the basis for enhancement of issues of the

use of ozone-depleting substances and fluorinated gases. Recently, the Government adopted Regulation on Activities and Gases for Issuance of the Emission Allocation Allowances to the Stationary Plants Carrying out Activities Resulting in GHGs and currently prepares set of other bylaws (regulations and rulebooks) in accordance with abovementioned Law. A number of new EU regulations are in transposing preparation during 2020, which regulate this field.

Montenegro plans to adopt a majority, if not all laws and bylaws, to speed up its EU integration process. At the beginning of next year, the Ministry of Ecology will work on amendments to the Law on Protection from the Negative Impacts of Climate Change, in accordance with the Decarbonisation roadmap, EU Climate Law.

Montenegro has implemented concrete activities in order to achieve full compliance with the EU acquis in the field of climate change by adopting the Law on Protection Against Negative Impacts of Climate Change (OG of MNE, No 73/19).

This Law represents the basis for the establishment of the National System for Monitoring, Reporting and Verification of Greenhouse Gases, the operation of the Emissions Trading System, which will ensure a sectoral distribution of efforts to reduce emissions outside the Emissions Trading System. Moreover, the Law represents the basis for enhancement of issues of the use of ozone-depleting substances and fluorinated gases.

In accordance with the Law, 14 of bylaws have been adopted to achieve compliance with the EU regulations in this field.

The draft Law on protection against adverse impacts of climate change has been prepared by the Climate Change Department of the Ministry of Ecology. It includes 11 chapters (basic provisions, documents for climate change protection, low-carbon development and monitoring, reporting in the emissions trading system, national system for GHG emissions reporting, climate finance, ozone layer protection, geological storage of CO₂, control of the implementation of law, penalty provisions, transitional and final provisions).

The key changes are related to the procedure for issuing permits for greenhouse gas emissions in the ETS in terms of the issuance procedure, then the revision of the permit, the validity period, the amendment of the permit (deadlines for processing and submitting applications); termination of the license; development, submission and evaluation of an emission monitoring plan for both stationary installations and aircraft; simplified monitoring plan for reporting and verification of emissions reports; conservative estimates of emissions; control of eligibility for verifiers, more precise regulation of the GHG emissions trading system in terms of allocation, conditions for exclusion from the ETS, circumstances in which free credits may be granted (prevention of relocation of energy sensitive industries), as well as data management and control on ETS emissions.

In addition, the changes include the establishment of a national inventory system and a national reporting system for GHG emission policies, measures and projections in terms of defining clear responsibilities and reporting deadlines. However, the question of time limits for implementation of certain provisions on reporting remains open, because the question of resources (human and financial) for the implementation of reporting arises.

The law will also include provisions on monitoring and reporting on climate change mitigation policies and measures, reporting on planned measures and implementation of the **Climate Change Adaptation Strategy**, obligations and responsibilities for data collection and quality for reporting, as well as financing protection against climate change funds collected in the emissions trading system as well as reporting on the use of revenues.

Provisions related to the development of a low-carbon development strategy and a national adaptation plan will be more clearly defined. In addition to the above, the law will provide a legal basis for the adoption of new bylaw legislation.

Montenegro as a Party to the UNFCCC prepares and submits every four years a national report on climate change reporting on the implementation of the Convention's obligations. The most recent reports are the Third National Communication (TNC) and the Third Biennial Report (TBUR) of Montenegro.

Policy objective of Roadmap for Decarbonisation of Transport Sector in Montenegro: Renewal of cars and buses

Draft of Roadmap for Decarbonisation of Transport Sector in Montenegro proposes several measures regarding decarbonisation of transport sector that might be reflected to Airports as well.

The policy objective is the decarbonisation of private cars and buses used in public transport in urban and non-urban areas.

- Measure 1: Import restrictions for older cars

In the current situation, the Government has imposed restrictions on the import of passenger vehicles. It is not possible to import a used vehicle with an emission standard lower than Euro-4, or a new vehicle with a standard lower than Euro-6.

The Ministry of Capital Investments is considering the introduction of the Euro 5 standard in respect of passenger vehicles. For that purpose, the Ministry is now conducting a number of cost-benefit analyses of the introduction of a higher standard, following which it will be possible to take certain positions and pass certain decisions.

The Ministry has no mandate to take other measures in this field, but would welcome measures introduced by other ministries and local self-government to restrict mobility (such as an eco-tax, insurance policies, etc.).

- Measure 2: Redesign of the taxation system for cars

The redesign of the taxation system related to the ownership and use of cars will include the emission standards of the car. Taxes to be redesigned include registration tax, ownership tax, fuel duties and taxes, and road taxes and tolls.

- Measure 3: Introduction of low emission zones in city centres

Many countries and municipalities in Europe have introduced low emissions zones in city centres. A low-emission zone (LEZ) is a defined area where access by some polluting vehicles is restricted or

deterred with the aim of improving air quality. This measure is expected to contribute to the renewal of the car fleet.

The Ministry of Capital Investments will coordinate with the municipalities the possibilities to introduce low emission zones in city centres.

- Measure 4: Expansion of the charging infrastructure

A charging infrastructure based on demand and needs of women and men is needed to promote the use of electric vehicles.

EPCG, the national energy company, is considering an investment to build fast charging solar driven stations of 100 kW in 24 cities.

- Measure 5: Electrification of government fleets

Electrifying a part of the fleet of cars owned by government is expected to stimulate the uptake of electric vehicles.

The Ministry is advocating for electrification of the Governments' fleet to an extent that is justified.

Incentives for electric vehicle sales are aimed at increasing the share of such vehicles in the total vehicle fleet. Incentives can be divided among purchase, use, and waivers on access restriction incentives. The countries currently implementing it generally provide a subsidy up to EUR 12,000 per vehicle. A recent UNDP study mentions EUR 6,000 as an appropriate amount in Montenegro.²⁹

Subsidizing the purchase of electric cars by private persons is a complex issue, as it touches upon a number of different institutions, and it is also an issue that should be considered first and foremost by the Government of Montenegro.

At present, the Ministry of Capital Investments does not have any funds available to subsidize the purchase of electric vehicles.

- Measure 6: Import restrictions for older buses

Restrictions on the import of buses will contribute to the renewal of the bus fleet. Further stakeholder consultation will be used to set the maximum age of buses and/or the minimal emission standards, and the timing of implementation of the measure.

- Measure 7: Redesign of the taxation system for buses

The redesign of the taxation system related to the ownership and use of buses will include the emission standard of the bus. Taxes to be redesigned include registration tax, ownership tax, fuel duties and taxes, and road taxes and tolls.

- Measure 8: Emission standards in public transport concessions

The fleet of buses and coaches used in public transport needs to be renewed. Stakeholder consultation and literature review will be used to assess the most effective method. The mandatory use of electric buses for a certain part of transport performed under public service obligation contracts is a promising method. It needs to be assessed whether the municipalities or national government would be the

²⁹ UNDP Montenegro 2019.

owner of the electric bus fleet, leasing these buses to private operators, or private operators will receive a financial incentive to clean their fleets.

Incentives programme: “Sustainable transport infrastructure: Airport of Montenegro”

The objective of this project is to expand the facilities of Tivat and Podgorica airports, using the energy efficient materials, building and construction systems, as well as modern equipment. The aim is to create all the necessary preconditions for adequate servicing of the growing number of passengers, thus boosting the tourism and overall economic growth. From energy efficiency to carbon accreditation of airports, our goal is to help the country develop sustainable transport infrastructure and contribute to achievement of sustainable development goals.

Consistent with the international regulations on airports, it is planned to set up an energy management system and to work on the airport carbon accreditation of the Tivat Airport. Reducing carbon and increasing airport sustainability will start with the mapping process - measurement of carbon footprint.

The programme was realized in the period March 2018 – December 2020 (planned to finish). The project was funded through a donation by Airports of Montenegro A.D. Amount contributed by donation was about USD 5.243 million.

EE measures are given through the EE elaborated, and then applied in the construction of the new terminal building of Tivat Airport using materials with low heat transfer coefficient, energy efficient devices, systems and equipment, but also public lighting in the building and exterior.

In accordance with international regulations on airports, it was planned to establish an energy management system and work on the carbon accreditation of Tivat Airport.

Achieved energy savings are not measured.

Through the IPA II perspective for 2014-2020, a total of EUR 34 million was provided for the transport sector through the national IPA programs, of which EUR 28.2 million were grants. In the period 2015-2019, three national action programs - CAP 2014, CAP 2017 and CAP 2019 - are implemented.

A total of EUR 18.6 million (EUR 15.1 million in grants) has been allocated for the railways sub-sector, which is in line with the goal of the Government of Montenegro and the European Commission's guidelines for promoting and investing in ecological transport modes that will increase the efficiency and safety of transport, reduce the negative impact on the environment.

Also, the funds secured through the IPA II perspective 2014-2020 are also directed towards harmonization of the national legislation with the EU acquis, and therefore the fulfillment of the benchmarks foreseen in the negotiation chapter 14 - Transport policy, as well as the improvement of the capacities available to all institutions related to the transport sector, in the amount from EUR 3.7 million through the CAP 2017 for which the tender procedure is under way, and through the CAP 2019 through which the 1.8 million EUR was estimated for this purpose.

Finally, the preparation of projects (technical documentation) will also be undertaken to ensure sufficient maturity and adequate quality of all necessary documentation related to projects implemented through EU funds so that they are ready to be financed and implemented in the amount

of EUR 2.5 million through the CAP 2017 for which tender documentation is being prepared, and through CAP 2019 in the amount of 2 million euros.

In addition, it should be emphasized that through the CBC program, a total of EUR 2.5 million of financial support for the sub-sector of seafaring has been secured through two projects (grants of EUR 2.1 million).

Legal and regulatory framework for Energy Efficiency in Montenegro

As a contracting party to the Energy Community, Montenegro has concrete obligations for the harmonisation of its legal framework in the energy field with the relevant EU acquis, meaning that key EU Directives and regulations have to be transposed into the national legal framework. In recent years, the Ministerial Council of the Energy Community adopted several decisions which introduced obligations for the transposition of the following EU directives in the field of EE:

- Directive 2012/27/EC on Energy Efficiency (EED),
- Directive 2010/31/EC on the Energy Performance of Buildings (EPBD);
- Directive 2010/30/EU on Energy Labelling of Energy Related Products (and a certain number of the accompanying regulations for specific groups of products).

Additionally, as a part of the EU accession process, Montenegro has also decided to transpose Directive 2009/125/EC, establishing a framework for the setting of eco-design requirements for energy-related products as well as accompanying regulations for different product groups.

In that respect, there are two main legal acts relevant for EE in Montenegro:

- Law on Energy (adopted in January 2016 and amended in 2017 and 2020);³⁰
- Law on Efficient Use of Energy (adopted in December 2014, amended in 2019).³¹

The Law on Energy as one of the main goals of EE development prescribes ensuring sustainable and efficient production and use of energy. Under the EE, it implies investing in EE measures. It also prescribes the obligation of passing the national climate plan which contains goals related to the EE. The Law on Energy brings provisions relevant to EE in the energy supply, more specifically related to the promotion of improved efficiency in heating and cooling, energy efficiency in network tariffs, priority access to the grid and priority dispatching of electricity produced from high-efficiency cogeneration.

The focus hereafter will be solely on the **Law on Efficient Use of Energy**, which is compliant with main EU directives in the field of EE as listed above. The Law, as one of EE measure prescribes activities which achieve EE improvement and which may be checked, measured and estimated. The Ministry adopts the Study on improvement of energy efficiency in buildings, that contains an overview of the

³⁰ Official Gazette of Montenegro 5/2016, 51/2017 and 82/2020

³¹ Official Gazette of Montenegro 57/2014, 3/2015 and 25/2019

feasible EE measures; an overview of grant measures for financing works on reconstruction of buildings; long-term projections for channelling investments in energy efficiency improvement by the owners, construction and financial industry. Public institutions and local authorities are obliged to manage energy and water consumption, conduct energy audits, plan and implement energy efficiency measures and report on energy improvements. Also, public buildings owned by the state including the ones owned by the municipalities) must comply minimal EE requirements. Design, construction and reconstruction i.e. renovation of buildings is done in a way to provide fulfilment of minimal EE requirements in line with the types and purpose of the building. These minimal requirements are prescribed for the building envelope and technical systems considering optimal ratio of the costs and achieved decrease of the energy consumption.

The overview of the Law on Efficient Use of Energy provisions relevant for the EE in the public sector is given hereafter:

- Specific obligations related to energy performance of buildings, including energy audits, minimum energy efficiency requirements and energy performance certification
- State administration bodies' obligations:
 - establishing energy management in buildings that they use
 - preparation of three-annual plan for energy renovation of state administration buildings
- Local self-governments' obligations:
 - establishing energy management in buildings/facilities that they use/operate
 - preparation of three-year programmes for energy efficiency improvement
 - to obtain certificate on energy characteristics of the buildings owned by the state, operated by them
- Introduction of energy efficiency criteria in public procurement procedures for goods and services, as well as for purchasing and leasing buildings; and
- Provision of energy services and energy performance contracting.

The three-year program contains:

- proposal of EE measures on territory of the local self-government which includes:
- plan of adaptation and maintenance of the buildings used by the local self-government bodies and public services;
- plan of improvement of communal services and traffic;
- specific EE measures in buildings protected as cultural heritage;
- dynamic and way to conduct EE measures;
- funds needed to conduct the program and their sources.

State administration bodies, local self-governments and public services founded by the state are obliged to manage the energy in the buildings or part of the buildings they are paying the electricity bills. Energy manage means tracking and analysing consumption of energy and water, conducting

energy check-ups and reporting on the achieved results. The latest provision is particularly important for establishment of sustainable financing mechanisms, hence will be described in more detail hereafter.

The Law recognizes energy services as the services that ensure EE increase, energy savings or material benefits and environment protection with application on EE technology and/or procedures on a measurable way. Energy services can be conducted during energy audits, design, construction, construction supervision, reconstruction, maintenance or operation and supervision over energy consumption. They can be provided by a legal entity which takes over financial risk for services rendered commensurable with the level of realized energy savings.

Priority in reconstruction is accorded to official buildings with the most unfavourable energy characteristics. If the annual rate exceeds 1%, the difference may be calculated in a yearly plan for any year predicted by the reconstruction plan. Based on this Decree, the **Plan for renovation of official buildings for period 2020-2022**³² was adopted. The Plan contains the inventory of all officially buildings and plan to renovate 2 official buildings in the given period through EEPPB project (KfW loan). The Plan gives the recommendation to for the following period stating that it is necessary to use the funds intended for current and investment maintenance of official buildings as much as possible for the improvement of their energy performance characteristics. To this end, it is necessary to design activities for the maintenance of official buildings that affect energy performance as energy efficiency measures (plan, implement and monitor the results achieved).

Government of Montenegro is currently conducting activities in order to adopt **Revised Law on Protection from Negative Impact of Climate Change and Protection of the Ozone Layer**. This Law governs powers, obligations and responsibilities for mitigating climate change, adaptation to climate change, strategic documents in the field of climate change, monitoring and reporting on greenhouse gas emissions, protection of the ozone layer, financing protection from negative impact of climate change, and protection of the ozone layer, administrative and inspection oversight, and other matters related to protection from negative impact of climate change.

This Law establishes a mechanism that should contribute to achieving the climate neutrality by 2050, aiming at achieving the long-term temperature target set in Article 2, paragraph 1, item (a) of the Paris Agreement and provides a framework for progress in achieving the global goal on adaptation established in Article 7 of the Paris Agreement.

Regional initiative

According to Action plan for Implementation of Green Agenda in Western Balkans, the transport sector is one of the main sources of GHG emissions (and NOx emissions) in the region and coupled with the energy sector account for two-thirds of the overall share of emissions. In 1990, the share of the transport sector was 12% while its share in 2018 has increased to 18%. The increase in emissions continues in parallel with economic activities, while the transport sector's contribution comes from

³² Source: http://energetska-efikasnost.me/download/strateska_dokumenta/4.-Plan-rekonstrukcije-drzavnih-sluzbenih-zgrada-za-period-2020-2022.-godina.pdf (accessed on: 18/11/2020)

five subsectors: road transportation, railways, aviation, and maritime and inland waterways transportation. The overall share of transport emissions is dominated by CO₂ from road transport (more than 90%), most evident in large urban areas that also suffer from related high pollution.

The Transport Community Permanent Secretariat (TCPS) together with the regional partners have developed a Sustainable and Smart Mobility Strategy for the Western Balkans. The purpose of this Strategy is to: i) mirror the European Union's Sustainable and Smart Mobility Strategy; ii) adjust the EU goals, milestones, and actions to the Western Balkan reality; and iii) provide the region with a decarbonisation and digitalisation roadmap for its transport sector and to assist the regional partners in the drafting of their national strategies. The Strategy sets ambitious goals in the three key areas: Sustainable, Smart and Resilient Mobility, as well as common regional objectives with a roadmap and set of actions that each Western Balkan economy will be invited to implement. The focus is placed on immediate short and mid-term actions to increase greening and digitalisation of mobility in the region and making transport greener, more sustainable, and healthier for Western Balkans citizens.

Smart mobility foresees integrating digital technologies and automation to transport systems with the aim of increasing the efficiency and sustainability of passengers and freight mobility. This new concept of transportation is one of the three components of the Sustainable and Smart Mobility Strategy for the Western Balkans. To implement this Strategy, the economies in the region need to transform their transport sectors by introducing multimodal ticketing, mobility as a service, paperless transport and deployment of various software, or 5G networks and artificial intelligence for optimization of transport activities. The Strategy also envisages creating cooperation frameworks and partnerships within the region and with EU MS to boost innovation and deployment of innovative technologies.

2.3 Local policies and regulations, incentives for decarbonization, energy efficiency and sustainable mobility, strategies on carbon credits – ITALY

Introduction

On the 12th December 2015, UNFCCC Decision 1/CP.21 adopted the Paris Agreement, aimed at reducing GHG emissions with a view of “holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change” (Article 2.a, Paris Agreement).

The European Union submitted an INDC committing its Member States to reduce its overall GHG emissions by at least 40% by 2030, compared to 1990 levels.

The EU INDC, which was translated into a NDC following the ratification and entry into force of the Paris Agreement, is in line with the 2030 EU Climate and Energy Framework, defined in October 2014.

In this framework, the European Union set the following binding targets to be reached by 2030:

- at least 40% reduction in GHG emissions compared to 1990 (compared to 2005 levels, -43%, for EU ETS sectors and -30% for ESD sectors);
- at least 27% of energy consumption from renewable sources;

- at least 27% of energy efficiency improvements³³.

In December 2019, the European Council endorsed the objective of making the EU climate-neutral by 2050, in line with the Paris Agreement. The long-term strategy has been submitted to the UNFCCC in March 2020. On this basis, in December 2020 the European Council updated the NDC by increasing its climate ambition, endorsed a binding EU target for a net domestic reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990.

To reach that target the European Commission proposed a comprehensive and interconnected set of new directives and regulations, known as the “fit for 55%” package.

In November 2022, the Council and the European Parliament reached a provisional political agreement on stronger emission reduction targets for member states under the Effort Sharing Regulation.

The provisional deal endorses an EU-level GHG reduction target of 40% compared to 2005, by 2030, for the sectors not covered by the EU-ETS.

The other policies in the “fit for 55%” package are still under discussion. Since the formal adoption is still pending, the Policies and Measures presented in this Chapter as well as the projections presented in Chapter 5 do not include the effect of the “fit for 55%” package.

The potential emissions reduction has been assessed up to 2030 at sectoral level. The policies and measures hereinafter described are divided into two types:

- Measures implemented by 31st December 2019;
- Measures planned

The measures envisaged as planned are consistent with the ones reported in the National Energy and Climate plan. The impact assessment have not been calculated for policies and measures individually, but at sectoral level because of interaction between the mitigation actions.

Some planned measures have been reported in more than one sector, anyway the effect assessed in terms of greenhouse gas emissions reduction is the one expected in the specific sector to avoid double counting. For each sector a table of mitigation actions is reported.

The total GHG reduction for the planned measures can be estimated as 62,900 kt CO₂e at 2030

Italy submitted the Eighth National Communication to UNFCCC in December 2022³⁴. that includes data and information on the compliance of Italy’s objective under the second Kyoto Period (2013-2020).

Commitments at local level

The year 2020 was an important year of verification because it closed the second commitment period of the Kyoto Protocol and its Doha amendment, and the data, as presented in this communication, clearly show that Italy has reached its Doha commitments.

³³ https://ec.europa.eu/clima/policies/strategies/2030_en

³⁴ <https://unfccc.int/documents/624766>

Policies and measures in all sectors described in the Communication are in fact consistent with the commitments taken under the Kyoto Protocol and its amendment, the European Climate and Energy Package for the period 2013-2020, the EU NDC, the European 2030 Climate and Energy

Framework and Clean energy for all Europeans package for the period 2021-2030.

It is important to mention that Italy is continuing to adopt policies and measures with a post-2020 horizon. In this context one of the most important tools is represented by the “Recovery and Resilience Plan” (NRRP) adopted on July 2021. This Plan includes both important measures to tackle climate change aimed at an inclusive, climate resilient and a net-zero emissions future and pursue sustainable, virtuous economic growth . It envisages investments and a consistent reform package for repairing the economic and social damage caused by the pandemic crisis, contributing to addressing the structural weaknesses of the Italian economy, and leading the country along a path of ecological, environmental and just transition.

In November 2021 has been submitted to the United Nations Framework Convention on Climate Change the Adaptation Communication of Italy

In October 2022, the Italian Ministry of Environment and Energy Security, in collaboration with ISPRA, has published the National Adaptation Platform to foster the exchange of information between the Central Administration, Local Authorities and all stakeholders on the issue of climate change adaptation.

The Platform, in particular, aims to facilitate access to and sharing of data and information on observed and future climate changes impacts and vulnerabilities of regions, natural systems, socio-economic sectors, institutional levels working on the issue, adaptation strategies and plans at different administrative levels and possible adaptation actions.

Political context

During the last twenty year has been adopted different laws and policies aligned with EU legislation with regard to the Climate Change and adaptation, below the most relevant:

Italy's National Plan for Resilience and Recovery #NextGenerationItalia - Italy, 2021

To benefit from the support of the Recovery and Resilience Facility set up by the EU in the aftermath of the COVID-19-induced economic crisis, Member States submit their recovery and resilience plans to the European Commission. Each plan sets out the reforms and investments to be implemented by end-2026 and Member States can receive financing up to a previously agreed allocation.

Each plan should effectively address challenges identified in the European Semester, particularly the country-specific recommendations of 2019 and 2020 adopted by the Council. It should also advance the green and digital transitions and make Member States’ economies and societies more resilient. The Commission validates the plan after which it effectively enters in force and EU subsidies can start flowing towards the member state.

37% of the plan’s total allocation is assessed to be directed towards reforms and investments supports climate objectives. Notable investments include the following:

- Sustainable mobility: integrate more regions into the high-speed rail network and complete the rail freight corridors; boost sustainable local transport through the extension of cycle lanes, metros, tramways and zero- emission buses, including the construction of electric charging stations across the country and hydrogen refuelling points for road and rail transport. €32.1 billion
- Energy efficiency in residential buildings: financing large-scale renovation of residential buildings to make them more energy efficient. €12.1 billion The plan supports interventions for the improvement of energy efficiency of residential buildings by which beneficiaries may benefit from a tax rebate over the next five years for the amounts spent, provided that the energy savings of those interventions are higher than 30%. By the end of 2025, building renovation interventions will be completed for at least 32 million square meters.
- Renewable energy and circular economy: developing the production and incentivising the use of renewable energies including green hydrogen as well as increasing recycling, reducing landfill waste and improving water management. €11.2 billion

Italy's Integrated National and Energy Climate Plan - Italy, 2019

The National Energy and Climate (ENCP) Plan is a ten-year integrated document mandated by the European Union to each of its member states in order for the EU to meet its overall greenhouse gases emissions targets. The Energy and Climate Plan addresses all five dimensions of the EU Energy Union: decarbonisation, energy efficiency, energy security, internal energy markets and research, innovation and competitiveness.

The plan establishes key objectives : 1) to accelerate the transition from traditional fuels to renewable sources by promoting the gradual phasing out of coal for electricity generation in favour of an electricity mix based on a growing share of renewables; 2) to implement policies and measures in order to reduce greenhouse gases (phase out of coal, higher CO2 price, acceleration of renewables and energy efficiency in manufacturing process level); 3) to use a mix of fiscal, economic, regulatory and policy instruments to ensure an energy efficiency; 4) to become less dependent on imports by increasing renewable sources and energy efficiency and to diversify sources of supply through the use of natural gas, including liquefied natural gas (LNG); 5) to ensure a greater degree of market integration and the development of processes, products and knowledge for the use of renewables, energy efficiency and network technology.

FER1 Decree to incentivise the production of energy from renewable sources - Italy, 2019

The FER1 decree supports the production of energy from renewable sources in order to achieve the European targets by 2030 defined in the Integrated National Plan for Energy and Climate. It provides incentives for the diffusion of photovoltaic, wind, hydroelectric and purification gas plants.

The aim is to promote the effectiveness, efficiency and sustainability of the sector, both in environmental and economic terms, by promoting the creation of thousands of new jobs through the implementation of a transition to low-carbon energy.

RES Decree 2019 - Italy, 2019

The Ministerial Decree providing incentives to electricity production from renewable energy sources (The RES Decree) 2016 updates the allocation scheme of incentives to renewable energy other than photovoltaic. The scheme covers wind farms, hydro, biomass and biogas, CSP and other non-photovoltaic renewable energy sources for the year 2016. It maintains the structure of the previous incentive 2012-2015 regime, while decreasing the value of overall incentives available. As in the previous scheme, renewable energy plants may benefit from:

- All-inclusive tariff, applicable to Plants with capacity up to 500kW; or
- Feed-in tariff, applicable to Plants with capacity up to 500kW which do not opt for the above All-Inclusive Tariff, and Plants with nominal capacity greater than 500kW.

Incentives are granted either through registry procedure (plants with capacity below 5MW) or tender procedures (reverse auctions; plants with capacity above 5MW). The overall cap on incentives for RES plants remains at €5.8 billion per year. The 2019 decree updates the 2016 text to promote renewable energy production over the period 2019-2021.

National Strategy on Adaptation to Climate Change - Italy, 2015

The Climate Adaptation Strategy establishes specific objectives to be reached by end of December 2016 and it is to be updated within 5 years.

The National Adaptation Strategy provides an extensive knowledge on past, present and future climate change and on impacts/vulnerabilities to climate change of different sectors, including: water resources; desertification, soil degradation and drought; hydrogeological risks; biodiversity and ecosystems; health; forestry; agriculture, aquaculture, marine fishery; energy; coastal zones; tourism; urban settlements; and critical infrastructures.

The Strategy also provides a national vision on how to address future impacts of climate change in various socio-economic sectors and natural systems and it in particular aims to:

- improve current knowledge on climate change and its impacts;
- identify vulnerabilities and adaptation options for relevant natural and socio-economic systems, and describe opportunities that may be associated to climate change;
- promote participation of stakeholders in defining strategies and sectoral adaptation plans to make later implementation more effective;
- increase awareness about climate change risks and adaptation through a range of communication activities;
- specify methods to be used to identify the best options for adaptation actions, also highlighting the co-benefits.

The Strategy sets the broad adaptation framework, but it is the Action Plan and sectoral plans that are to be adopted by December 2016 will define the timeline, quantifiable objectives and details of implementation.

The National Adaptation Strategy also identifies areas where synergies between climate mitigation and adaptation actions could be exploited, including: energy and green buildings; food production and consumption; forestry and land-use; and water resources.

National Energy Strategy - Italy, 2013

The National Energy Strategy (NES), which has a double time horizon (2020 and 2050), directs efforts towards substantially improving the competitiveness of the energy system and environmental sustainability. The results expected by 2020 are:

- Wholesale prices of all energy sources will be aligned with average European average price levels, resulting in savings of about EUR9bn (USD11.3bn)/year in the overall power and gas bill (from current EUR70bn (USD87.8bn) - assuming same commodity prices).
- Expenditure on energy imports will be reduced by about EUR14bn (USD17.6bn)/year from the present EUR62bn (USD77.8bn), and dependency on foreign supplies from 84% to 67%, thanks to energy efficiency, increased production from renewables, lower electricity imports and increased production from national resources.
- Private investment of EUR180bn (USD213bn) will be supported by incentives between now and 2020 in renewables and energy efficiency and in traditional sectors (electricity and gas networks, re-gasification plants, storage, hydrocarbon development).
- GHG emissions will fall by about 21% compared to the 2005 level, exceeding the European 20-20-20 targets for Italy.
- Renewable energy sources will account for 19-20% of gross final consumption (compared with about 10% in 2010). This is equivalent to 22-23% of primary energy consumption, while fossil fuel use will fall from 86% to 76%. Renewables will become the primary source in the electricity sector together with gas, accounting for 34-38% of consumption (compared with 23% in 2010).
- Primary consumption will fall by about 24% by 2020 compared with the reference scenario (an estimated 4% below 2010 levels); this exceeds the European 20-20-20 targets of -20%, thanks mainly to energy efficiency measures.

To attain these results, the strategy formulates seven priorities, each with specific supporting measures already set in motion or currently being defined:

- Fostering Energy Efficiency
- Promoting a competitive gas market, integrated with the other European markets and with aligned prices
- Developing renewable in a sustainable way, in order to exceed the European targets (20-20-20), while at the same time keeping energy bills competitive
- Developing an efficient electricity market fully integrated with the European market; with gradual integration of renewable power production

- Restructuring the refining industry and the fuel distribution network, to achieve a more sustainable system competitive on the European level
- Sustainably raising national hydrocarbons production, which will bring major economic and employment benefits, while observing the highest international standards in terms of security and environmental protection
- Modernising governance of the energy sector to make decision-making processes more effective and more efficient
- Research and development will play a key role in developing technologies that allow for a more competitive and sustainable energy system The NES lays down long-term indicative objectives for 2050.

Among the most important:

- The need to strengthen efforts in energy efficiency. Primary consumption will have to fall in the range of 17-26% by 2050 compared to 2010, by decoupling economic growth from energy consumption. In particular, efforts in building and transport will be critical
- The high penetration of renewable energy, than in any of the scenarios envisaged at the time is expected to reach levels of at least 60% of gross final consumption by 2050, with much higher levels in the electricity sector. In addition to the need of research and development for the reduction of costs, it will be fundamental to rethinking the market and network infrastructure
- A substantial increase in the degree of electrification, which will almost double by 2050, reaching at least 38%, particularly in electricity and transport
- The key role of gas for the energy transition, despite a reduction of its weight both in percentage and in absolute value in the span of the scenario

National GHG inventory and Targets

Total greenhouse gas emissions, in CO₂ equivalent, excluding emissions and removals from land use, land use change and forestry (LULUCF), have decreased by 26.7% between 1990 and 2020, varying from 520 to 381 CO₂ equivalent million tons (Mt).

The most important greenhouse gas, CO₂, which accounts for 79.3% of total emissions in CO₂ equivalent, shows a decrease by 31.2% between 1990 and 2020. In the energy sector, in particular, CO₂ emissions in 2020 are 29.6% lower than in 1990.

CH₄ and N₂O emissions are equal to 11.2% and 5.1% of the total CO₂ equivalent greenhouse gas emissions, respectively. CH₄ emissions have decreased by 13.4% from 1990 to 2020, while N₂O has decreased by 28.4%.

Specifically, the energy sector is the largest contributor to national total GHG emissions with a share, in 2020, of 78.4%. Emissions from this sector have decreased by 29.7% from 1990 to 2020; in particular, an upward trend is noted from 1990 to 2004 (+14.5%) in total greenhouse gas emissions in CO₂ equivalent excluding LULUCF, whereas a reduction by 38.7% between 2005 and 2020 is observed.

From 2005, GHG emissions from the sector are decreasing because of the policies adopted at European and national level to implement the production of energy from renewable sources and, from the same year, a further shift from petrol products to natural gas in producing energy has been observed.

The below table shows net emissions, including removals from LULUCF, for the years 2009 to 2021³⁵.

Table 7 Italy - GHG emissions and removals by year and sector

Category	1990	1995	2000	2005	2010	2015	2018	2019	2020	2021
<i>kt CO₂ equivalent</i>										
A. Energy: fuel combustion	411,345	424,917	448,235	477,669	420,227	351,289	339,054	329,427	293,855	327,124
<i>CO₂: 1. Energy Industries</i>	136,941	139,941	144,273	159,227	136,885	105,486	95,335	91,235	81,212	86,009
<i>CO₂: 2. Manufacturing Industries and Construction</i>	90,772	88,969	94,893	90,786	68,899	54,552	53,228	48,972	44,899	52,791
<i>CO₂: 3. Transport</i>	100,319	111,531	121,642	126,780	114,628	105,587	104,042	105,231	85,640	102,200
<i>CO₂: 4. Other Sectors</i>	75,428	75,205	79,023	92,265	90,880	77,681	78,721	76,229	74,587	78,347
<i>CO₂: 5. Other</i>	1,071	1,496	837	1,233	652	459	341	453	625	299
<i>CH₄</i>	2,735	3,024	2,764	2,577	3,539	3,367	3,274	3,294	3,143	3,386
<i>N₂O</i>	4,078	4,751	4,803	4,801	4,743	4,157	4,113	4,013	3,747	4,092
1B2. Energy: fugitives from oil & gas	14,203	13,376	12,090	10,616	9,676	8,677	7,449	6,964	6,193	5,708
<i>CO₂</i>	4,048	4,002	3,262	2,557	2,377	2,574	2,295	2,756	2,112	1,816
<i>CH₄</i>	10,145	9,363	8,818	8,047	7,289	6,094	5,146	4,200	4,074	3,885
<i>N₂O</i>	11	10	11	12	11	9	8	8	7	8
2. Industrial processes	39,257	37,271	38,368	47,226	38,960	33,328	34,927	34,038	31,040	31,852
<i>CO₂</i>	29,303	27,260	25,815	28,704	21,654	15,039	15,331	15,001	13,613	15,221
<i>CH₄</i>	144	150	82	83	67	48	49	46	38	45
<i>N₂O</i>	6,402	6,848	7,646	7,338	1,088	545	608	570	559	505
<i>HFCs</i>	372	861	2,803	8,718	14,325	15,630	16,928	17,019	16,035	15,388
<i>PFCs</i>	2,615	1,351	1,363	1,759	1,377	1,529	1,502	915	499	395
<i>Unspecified mix of HFCs and PFCs</i>	NO,NA	24	24	24	24	24	22.74	23.15	22.37	25.33
<i>SF₆</i>	421	700	621	565	405	485	464	444	257	258
<i>NF₃</i>	NA,NO	77	13	33	20	28	22.13	17.94	16.24	15.23
3. Agriculture	37,676	38,076	37,185	34,629	32,225	32,102	32,306	32,190	33,427	32,717
<i>CO₂: Liming</i>	1	1	2	14	18	14	15	16	10	26
<i>CO₂: Urea application</i>	465	512	525	507	335	425	405	396	472	414
<i>CO₂: Other carbon-containing fertilizers</i>	44	54	44	42	28	20	22	17	21	22

³⁵ <https://unfccc.int/documents/627845>

Category	1990	1995	2000	2005	2010	2015	2018	2019	2020	2021
<i>kt CO₂ equivalent</i>										
<i>CH₄: Enteric fermentation</i>	17,093	16,697	16,509	14,484	14,100	14,272	14,612	14,584	14,771	14,671
<i>CH₄: Manure management</i>	5,424	5,161	5,122	5,248	5,088	5,011	4,879	4,868	4,875	4,782
<i>CH₄: Rice Cultivation</i>	2,102	2,228	1,855	1,962	2,041	1,868	1,793	1,776	1,788	1,756
<i>CH₄: Field Burning of Agricultural Residues</i>	16	16	16	17	16	17	16	16	16	16
<i>N₂O: Manure management</i>	2,518	2,406	2,329	2,144	2,074	1,865	1,852	1,832	1,835	1,800
<i>N₂O: Agriculture soils</i>	10,011	10,998	10,779	10,206	8,521	8,607	8,708	8,683	9,634	9,228
<i>N₂O: Field Burning of Agricultural Residues</i>	3	3	3	4	4	4	3	3	3	3
4A. Land-use change and forestry	-3,489	-23,920	-21,554	-35,557	-41,685	-43,964	-45,171	-41,837	-32,545	-27,473
<i>CO₂</i>	-5,690	-25,039	-22,972	-36,453	-42,459	-44,551	-45,741	-42,473	-33,381	-28,924
<i>CH₄</i>	1,440	339	800	335	392	296	171	203	371	978
<i>N₂O</i>	761	781	618	561	382	291	399	433	465	472
6. Waste	18,999	22,014	24,099	24,058	22,377	20,340	19,893	19,657	20,456	20,190
<i>CO₂</i>	512	458	208	230	177	99	91	96	89	86
<i>CH₄</i>	17,317	20,395	22,540	22,284	20,551	18,639	18,202	17,979	18,808	18,546
<i>N₂O</i>	1,170	1,160	1,351	1,544	1,649	1,602	1,600	1,582	1,559	1,558
Total emissions (with LULUCF)	517,992	511,734	538,424	558,640	481,781	401,772	388,460	380,439	352,425	390,118
Total emissions (without LULUCF)	521,480	535,654	559,978	594,197	523,466	445,736	433,631	422,276	384,970	417,591

The policies and measures taken by Italy to mitigate climate change are driven by the commitment undertaken under:

- the Kyoto Protocol and its amendment (Doha amendment);
- the European Climate and Energy Package for the period 2013-2020;
- the EU NDC, the European 2030 Climate and Energy Framework and Clean energy for all Europeans package for the period 2021-2030.

The provisional deal endorses an EU-level GHG reduction target of 40% compared to 2005, by 2030, for the sectors not covered by the EU-ETS. For Italy, the proposal increases the national reduction target to 43.7%.

Transport Sector

In Italy, the transport sector was responsible³⁶ in 2019 (last year pre-Covid) for 25.2% of total greenhouse gas emissions and 30.7% of total CO₂ emissions. 92.6% of these emissions are attributable to road transport. Moreover, although emissions have decreased in Italy from 1990 to 2019 by 19%, transportation industry is one of the few sectors that reported a growth in emissions (+3.2% compared to 1990), jointly with the residential, services and waste ones.

³⁶ https://www.mit.gov.it/nfsmitgov/files/media/notizia/2022-04/STEMI_Decarbonizzare%20i%20trasporti_0.pdf

Transport also generates a very large share of emissions in the atmosphere of other pollutants: 40.3% of nitrogen oxides (NO_x), 11.4% of non-methane volatile organic compounds (NMVOC), 10.1% fine particles (PM) and 18.7% carbon monoxide (CO). In particular, for nitrogen oxides (NO_x) and fine particles, Italy is undergoing an infringement procedure for non-compliance with the European directives on air quality.

In implementation of Regulation (EU) 2018/1999, the Ministry of Economic Development, the Ministry of Infrastructure and Transport and the Ministry of the Environment have drafted and published the text of the Integrated National Plan for Energy and Climate, sent in December 2019 to the European Commission.³⁷ The Integrated National Energy and Climate Plan 2030 is a fundamental tool that marks the beginning of an important change in Italy's energy and environmental policy towards decarbonisation. It was prepared as part of the European regulation on the governance of the energy union and climate action³⁸.

The Plan is structured in 5 lines of action, which will develop in an integrated manner: from decarbonisation to energy efficiency and security, passing through the development of the internal energy market, research, innovation and competitiveness. The objectives are defined for each dimension of energy, comparing two scenarios: the first (base or reference scenario) projects the evolution of the national energy system, starting from the policies currently in force. The second (scenario with objectives or policies) imposes the objectives, outlining the most economically convenient solutions, based on assumptions on the evolution of technologies.

According to European rules, sometimes the objectives are numerically quantified, other times they are more qualitative. The main ones are reported below, with a brief explanation of the reasons³⁹.

1. Decarbonization (including renewable sources)

One objective, not directly related to the forecasts of the European package, is the abandonment of coal for electricity production. Achieving this objective requires the construction of sufficient plants and infrastructures to replace the corresponding energy production and to keep the electricity system in balance. In terms of renewable sources, the objective was defined considering three fundamental elements:

- to provide a contribution to the European objective consistent with the provisions of the governance regulation (Annex II);
- to increase the share of consumption covered by renewable sources as far as possible, considering, in the electricity sector, the intermittent nature of the sources with greater development potential (wind and photovoltaic) and, in the thermal sectors, the limits on the use of biomass, resulting from the contextual air quality objectives;
- the need to contain soil consumption: this led to the definition of a target share of total consumption covered by renewable sources equal to 30% by 2030.

³⁷ <https://temi.camera.it/leg18/post/OCD15-13946/mobilita-sostenibile-e-trasporti-nel-piano-nazionale-integrato-energia-e-clima-pniec.html>

³⁸ https://energiaclima2030.mise.gov.it/images/documenti/LINK0_Regolamento_Governance_12-18.pdf

³⁹ <https://energiaclima2030.mise.gov.it/index.php/il-piano/obiettivi>

This is a very demanding objective, which will involve, in the electricity sector, in addition to safeguarding and strengthening the installed base, a substantial diffusion of wind and photovoltaic power, with an average annual installed from 2019 to 2030 equal, respectively, to approximately 3200 MW and approximately 3800 MW, compared with an average installed capacity of the last few years of a total of 700 MW. This diffusion of wind and photovoltaic power will also require many infrastructural works and the massive use of distributed and centralized storage systems, both for system safety needs and to avoid having to stop renewable plants in periods of lower consumption than production.

Important efforts will also be required to increase the consumption of renewable energy for heating and cooling, especially in terms of diffusion of heat pumps, and for transport.

It should be remembered that, for the purposes of decarbonisation, a national target has been set, it consists of reducing CO₂ emissions in the non-ETS sectors by 33% by 2030, compared to those of 2005. This result that can be achieved through various interventions, both national and community level, especially in terms of energy efficiency and renewable sources.

2. Energy efficiency

The primary objective consists in the reduction, by 2030, of the European primary energy requirement by 32.5%, calculated with respect to the projections elaborated by the EC in 2007 with the Primes scenario. Italy is expected to achieve a 43% reduction, calculated in the same way.

The objective of reducing, in each of the years from 2021 to 2030, final energy consumption by a value equal to 0.8% of average annual consumption in the three-year period 2016-18, through active policies, is very demanding. This target is equivalent to a reduction of 0.93 Mtoe/year, and, compared with the 2016 final consumption of 115.9 Mtoe, highlights the great effort it will require, even in "difficult" sectors, including buildings and transport.

The integration of electricity in the transportation industry will be very important: by 2030, the target is 1.6 million pure electric cars, 4.5 million hybrid cars, out of a car fleet circulating in the same year of 37 million vehicles, slightly lower than the current one.

3. Energy security

Increasing renewable sources and energy efficiency and diversifying the sources of supply is a primary goal to improve security of energy supply. An example is represented by the use of natural gas also through LNG, making use of infrastructures in line with the scenario of deep decarbonisation by 2050. For safety purposes, it will be necessary to coordinate national emergency plans with those of other countries.

A new role for gas infrastructures, to be investigated, could be derived from fuels such as biomethane and from integration with the electricity system, for example with the transformation into gaseous fuels of energy from renewable sources that is not immediately consumed.

Petroleum products will continue to be necessary to maintain the transport sector efficient; however, the transition of existing infrastructures into more sustainable means of transport will be favoured.

On the electricity system front, it will be important to promote the creation of infrastructure and accumulation systems necessary to consider the evolution of the production mix, increasingly based on intermittent renewables, an issue also connected to the internal market dimension.

4. Internal market

The aim is to ensure greater flexibility of the electricity system, expanding the resources that will be able to provide the services necessary for the real-time balance between supply and demand. Likewise, market rules will have to evolve in order to favour the integration of the growing share of renewables, for example with a progressive approach of the negotiation term to the physical delivery of electricity.

Appropriate developments of the transmission network, internally and with third countries, and the coupling of the national electricity market with those of other countries will help to bring Italian electricity prices closer to those of Europe.

The role of consumers, seen as prosumers (producers of renewable sources and consumers) will be fundamental to reach the object; the active role of consumers will be enhanced through renewable energy communities. The protection of consumers will be granted, both by promoting an active role on the market and through greater transparency of the market in all its phases.

However, it will be necessary to introduce market mechanisms to also guarantee the adequacy of the system, i.e. the ability of the system to meet the expected electricity needs in the medium and long term, respecting the operational and quality requirements, an issue therefore also connected to the objectives safety.

Lastly, the tools design to fight the phenomenon of energy poverty (families in economic hardship) will be perfected.

5. Research, innovation and competitiveness

In terms of research, the aim is to improve the capacity of the research system to oversee and develop the product and process technologies essential for the energy transition and to encourage the introduction of technologies, systems and organizational and management models that are functional to the same energy transition and safety.

The main tools will consist of better governance of the research system and coordination between policies and measures on the demand side of products and technologies (induced, for example, by the support mechanisms for renewable sources and energy efficiency) and supply of the same products and technologies, so that the production system finds it convenient to evolve in a coherent sense with the needs of the future energy system.

The great importance of the transport sector in the framework of national emissions and its very strong dependence on fossil fuels make it the cornerstone of the emission reduction strategy.

Italy has a transport system which presents a series of deficits and structural distortions that need to be corrected and tackled together, because of their profound interrelationships. For example, it is among the European countries with the higher number of cars per inhabitant (second only to Luxembourg), it has a poorly managed public transport networks and the service provided lacks reliability. Moreover, there is a strong territorial lack of homogeneity in the availability of

infrastructures and an excessive prevalence of road transport compared to other less expensive means.

In 2019, air traffic in Italy emitted 2.7 Mt of greenhouse gases, equal to 0.6% of total national emissions, considering only the entire routes carried out in Italian territory. The relative direct emissions must be added to this figure to international air transport, estimated at around 11.9 Mt CO₂.

The replacement of kerosene (Jet A and Jet A1 fuels) of fossil origin in the air transport is the biggest challenge in the decarbonisation of transport. The kerosene combines two properties ideal for flight: a very high energy density and the ability to remain liquid up to -47 °C, which is the temperature of the atmosphere around 10,000 m, i.e. at the cruising altitudes of the aircraft, thus making possible intercontinental flights without interruptions of more than 20 hours. Decarbonization of air transport must therefore necessarily go step by step, starting from solutions that can be implemented today for the reduction of emissions on all types of aircraft and planning the transition to new fuels and energy carriers, starting with smaller aircraft flying short distances.

The first option to undertake is the reduction of energy consumption necessary to flight. The combination of different technologies could reduce consumption (per passenger km) by up to 25% in a decade and up to 40% in two decades compared to current values.

However, high capital costs for new aircraft models, long lead times of fleets, the lowest level of maturity of some of the technologies that offer greater energy savings and the slow pace of infrastructure changes in the supply chain, suggest that the shift to more efficient aircrafts will be characterized by progressive transition, over a relatively long time.

To make long-haul air transport possible with a view to decarbonisation, the only option for energy diversification and decarbonization (albeit partial) feasible today is to use fuels alternatives similar to kerosene, but obtained from non-fossil raw materials, in compliance with key sustainability and feasibility criteria. In this perspective, sustainable fuels for aviation (Sustainable Aviation Fuels, SAF), can be seen which include biofuels and hydrocarbons synthetics. A marginal reduction in the carbon intensity of aviation fuels can also be obtained through low-carbon fuels, obtained from oil, but with emissions below the standard mean value. In the short term, SAF from oleochemical biomass will be probably the most favourable option to decarbonise the energy used in aviation, albeit partially, as they are more convenient and technologically ready.

Alternative propulsion systems for aviation are centre stage on electricity or hydrogen. They offer opportunities to significantly reduce the emission of greenhouse gases and other atmospheric pollutants but it is reasonable to expect possible developments for short-range applications.

3 INTERNATIONAL AND NATIONAL COMMITMENTS OF THE CIVIL AVIATION INDUSTRY

3.1 ACI engagement

Airports Council International (ACI) is the only worldwide professional association of airport operators. Airports Council International Europe (ACI EUROPE) is the European region of ACI.

ACI EUROPE is the voice of Europe's airports, representing over 500 airports in 55 countries. It is a non-profit organisation, whose prime purpose is to represent and lead the European airport industry as well as to promote professional excellence in airport management and operations.

It is actively engaged in promoting climate action by the airport industry through the Airport Carbon Accreditation programme⁴⁰, the only institutionally endorsed carbon management certification standard for airports.

Whilst much has been done to tackle emissions from aviation, in a "business-as-usual" scenario these emissions are still set to increase, due to lack of clear-cut solutions to decarbonise aviation, teamed with rising demand. Aviation must play its part in this global effort and look for ways to decarbonise rapidly.

Airports have bold ambition in this regard, with experience in carbon management dating back over a decade, when the awareness of the climate emergency was still in a relatively nascent stage. Building on experience of consistent carbon management and reduction within the Airport Carbon Accreditation programme, European airports have again come to the fore. In their landmark Resolution adopted in June 2019, they committed to Net Zero carbon emissions from operations fully within their own control by 2050 at the latest. Going beyond that, they have called on all industry stakeholders to jointly work on the development of a shared ambition, roadmap and vision for the entire air transport system to be Net Zero.

To reach their commitment, European airports will reduce their absolute emissions to the furthest extent possible and address any remaining emissions through investment in carbon removal and storage. This means that the Net Zero 2050 commitment requires airports to reduce their emissions ideally down to zero.

To do so, airports can:

- reduce energy and fuel consumption through the design of new energy-efficient infrastructure and the retrofitting of existing infrastructure,
- invest in low energy vehicles and equipment,
- switch to zero-carbon energy and fuel sources.

To reduce any residual emissions, airports have to use the so-called Negative Emissions Technologies (NETs). NETs rely on natural processes ('carbon sinks' such as forests) or dedicated technologies (carbon capture and storage) to eliminate CO₂ from the atmosphere.

⁴⁰ <https://airportco2.org/>

Airports are willing to pull their weight in accelerating the decarbonisation of the aviation industry as a whole. They can facilitate the introduction of low emissions aircraft technologies and operations, the deployment of Sustainable Aviation Fuels or charging infrastructure for electrified aircraft operations and much more. This collaborative approach is essential to unlocking the full potential of CO₂-reducing opportunities and finding new measures faster. Through their Net Zero Resolution, ACI EUROPE⁴¹ and its members express their determination to actively support these changes to meet the critical challenge of Climate Change.

To support airports that are in the process of charting their roadmaps, ACI EUROPE has developed a guidance document. It outlines five key steps⁴² in defining a roadmap to Net Zero Carbon (see Figure 2) and relies on good practice identified amongst already existing airport roadmaps, as well as examples from other industries.

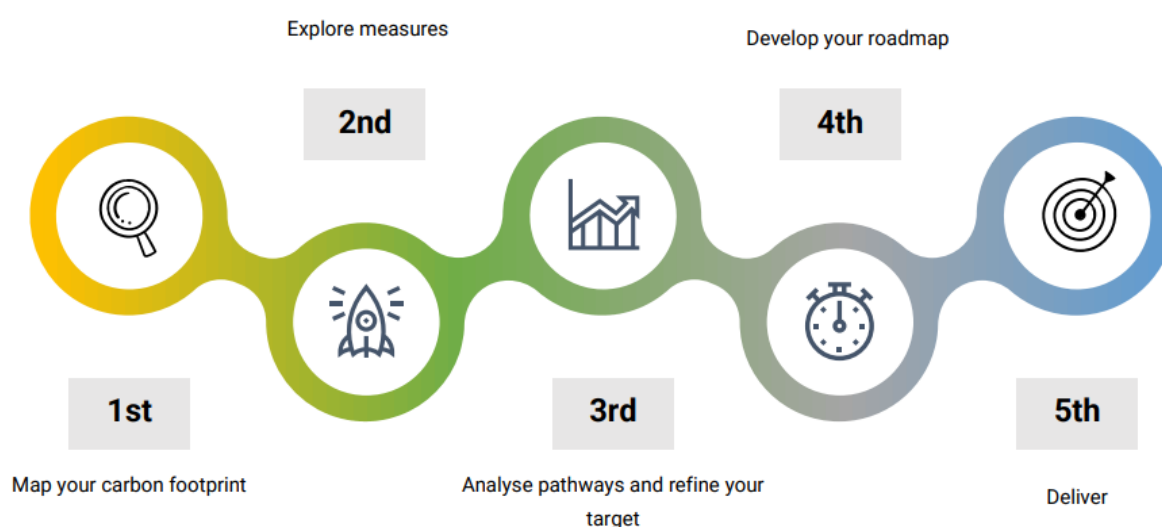


Figure 9 Net Zero Carbon: a roadmap in five steps

The starting point is to measure past and current emissions so that airports can scope their roadmap. This will allow them to understand the emissions impact of the various activities across the airport and the value chain. It also provides a basis from which to set targets.

Once they have a good overview of your past and current emissions, identifying the measures to reduce your emissions is the next step. Airports will be looking for improved efficiency of technology and operations, clean energy sources as well as innovations to reduce emissions. Ideas can be gathered through consultation with the airport community and benchmarking against other airports.

⁴¹ <https://www.aci-europe.org/netzero>

⁴² <https://www.aci-europe.org/downloads/roadmap/Guidance%20-%20Developing%20an%20Airport%20Net%20Zero%20Carbon%20Roadmap.pdf>

With the baseline calculated and a list of identified measures, the next step is to model different emissions reduction pathways. They are based on scenarios with different assumptions and projections on energy use, carbon emissions and costs to give greater certainty on the impact of various mitigation measures and investment timelines.

The Net Zero Carbon target is a long-term goal – progress towards it can be difficult to monitor.

When building roadmap, airports will combine all the elements gathered in the previous steps to turn them into an actionable plan.

The roadmap is so ready to be implemented. Through feasibility and design studies for individual measures, airports will be able to consolidate their roadmap and the delivery. In the meantime, periodic/yearly reviews will allow assessing the impact of the measures, the evolution of their carbon footprint and, when needed, identifying additional changes to be made.

Timely climate action will make airport operations more cost-efficient and resilient. Cutting carbon emissions is becoming increasingly affordable and often results in reduced energy consumption. Using renewable energy also contributes to making airport operations more resilient to disruptions by protecting energy supply and delivering price certainty. The airport also legitimises its position within society, maintaining a so-called 'license to operate'.

3.2 Toulouse declaration

In early February 2022, the French Presidency of the Council of the European Union organized a high-level Summit in Toulouse (France) with the future of European aviation and in particular its decarbonization as the centrepiece of the agenda⁴³. The hybrid event gathered representatives of the European Union (EU) Institutions, EU Member States, other (European Civil Aviation Conference (ECAC) States, and like-minded countries and the industry.

On the 4 February 2022, following the two-day long EU Aviation Summit, the so-called “Toulouse Declaration”⁴⁴ was launched. This declaration is the first-ever public-private initiative supporting European aviation’s goal to reach net zero CO₂ emissions by 2050. This is also the first joint initiative of its kind globally, aligning all EU stakeholders on the principles and actions needed to decarbonise and transform Europe’s aviation sector, representing a true breakthrough.

On the side of the industry, at a regional level this goal was first outlined in the Destination 2050⁴⁵ roadmap developed by the five key European aviation associations: ACI EUROPE, Airlines For Europe (A4E), Europe’s Regional Airlines Association (ERA), Civil Air Navigation Services Organization (CANSO) and Aerospace and Defence Industries (ASD).

Several European airports and airport associations have endorsed the Declaration, which complements their objective of reaching net zero CO₂ emissions by 2050 at the latest, first set out in June 2019 in the ACI EUROPE Resolution committing European airports to this ambitious goal.

In particular, 89 airport operators of 311 airports came out in support of the Toulouse Declaration.

⁴³ <https://blog.aci.aero/toulouse-declaration-the-prototype-agreement-for-global-aviations-net-zero-future/>

⁴⁴ <https://www.aci-europe.org/toulouse-declaration>

⁴⁵ <https://www.destination2050.eu/>

While originating in the EU, the Declaration openly calls on all partners worldwide to work together towards the adoption by ICAO of an ambitious Long-Term Aspirational Goal for international aviation of Net Zero carbon emission fully aligned with the Paris Agreement. It thus includes a standing invitation to other countries and international organizations to join the effort and together work to rid global aviation of carbon. The Declaration then received endorsements from countries outside of the Union, and even going beyond the ECAC zone. In total, 35 European countries came forward in support of the Declaration, joined by several trailblazers in other regions of the world, including the USA, Canada, Morocco, and Japan. This enthusiastic response confirms the historic character of this initiative and its potential to spur action on the global level.

In addition to endorsements from national Governments, the Toulouse Declaration has also been open to signatures from individual industry stakeholders, both European airport operators and national airport associations. The Declaration has been endorsed by ACI EUROPE, both as part of the Destination 2050⁴⁶ partnership and as the voice of the European airport industry, as well as by its members in record numbers.

Concretely, signing industry stakeholders promise to continue to invest in the maturation, development, and implementation of decarbonization technologies. First and foremost, these will include operations, next-generation aircraft, and engines, as well as different kinds of sustainable aviation fuels⁴⁷.

The French Presidency of the European Union and the Destination 2050 partners have been driving forces behind the declaration. Destination 2050 is also requesting more support for airport infrastructure and operations through an airport carbon accreditation scheme. Furthermore, it wants support for a zero-emissions aircraft to make it to market by 2035 - including the supply of green hydrogen and electricity to help power it. This includes the deployment of said technologies via airport infrastructure.

3.3 Commitments at local level – ALBANIA

Albania Civil Aviation Authority, is a regulatory to the national aviation sector, under the Ministry of Infrastructure and Energy.

The Albanian Civil Aviation Authority (ACAA) is responsible for ensuring that civil aviation in Albania has a high safety standard and that it is in keeping with sustainable development. The ACAA aims to ensure the safe, best possible and environmentally friendly use of infrastructure, which includes airspace, air traffic control and aerodromes.

The Albanian Civil Aviation Authority is a member of international organizations, requiring operation under certain standards and recommended practices and meeting the specific commitments relating to all aspects of operations. The primary aviation legislation of Albania is the Law No. 10 040 of 22 December 2008 “Air Code of the Republic of Albania” as amended by Law No. 10 484 of 24 December

⁴⁶ an alliance consisting of the five major European aviation associations

⁴⁷ <https://simpleflying.com/toulouse-declaration/>

2011. On the basis of the Act regulations are implemented in different domains such as infrastructure, airworthiness, air traffic regulations, operating rules, air transport.

Albanian Civil Aviation is member of International Civil Aviation Organization (ICAO), a member of the European Civil Aviation Conference (ECAC). Albania is a member of the European free trade association EFTA and participates in the European Aviation Safety Agency (EASA).

Albania, like all of ECAC's forty-four States, is fully committed to and involved in the fight against climate change, and works towards a resource-efficient, competitive and sustainable multimodal transport system. Albania recognizes the value of each State preparing and submitting to ICAO an updated State Action Plan on emissions reductions, as an important step towards the achievement of the global collective goals agreed at the 38th Session of the ICAO Assembly in 2013.

In Albania a number of actions are undertaken at the national level, including by stakeholders.

Albania is part of the CORSIA scheme (Carbon Offsetting and Reduction Scheme) since 2017, an ICAO initiative CORSIA, as a reduction and compensation scheme designed and approved by ICAO, in October 2016, for the reduction of CO2 emissions from international flights, in order to curb the impact of aviation sector in climate change.

Based on Assembly A40-18 on environmental issues, ICAO member states are called upon to voluntarily develop and submit their action plan to ICAO and review this plan every three years after submission to ICAO. Albania's first version of this Plan was drafted in 2019, and it was revised in June 2021 as published ICAO/ECAC APER website.

The review of the CO2 emissions reduction plan has been drawn up in accordance with the ECAC/EU guidance material "European Action Plans for CO2 Emissions Reduction", Version 4th, dated 02.06.2021, maintaining a uniformity between countries through the integration of basic data. The Plan has integrated the necessary information regarding Tirana International Airport and Kukes International Airport in the Republic of Albania, as well as the new national airlines. There are reported CO2 emissions from international flights for the air operator Albawings and Air Albania in the CCR (CORSIA Central Register).

Albania shares the view of all ECAC States that comprehensive approach to reducing aviation emissions is necessary, and that this should include:

- Emission reductions at source, including European support to CAEP work.
- The optimization and improvement of the Air Traffic Management, and infrastructure use within Europe, in particular through the Single European Sky ATM
- Market-based measures, which allow the sector to continue to grow in a sustainable and efficient manner, This growth becomes possible through the purchase under an ETS of the CO2 allowances from other sectors of the economy, where abatement costs are lower than within the aviation sector.

Albania has taken below National actions specified in ICAO State Action Plan on CO2 emissions reduction in aviation⁴⁸:

- aircraft related technology development
- alternative fuel use
- Improve Air Traffic Management and Infrastructure Use
- Improve efficiency in operations
- Economic/Market based Measures (CORSIA scheme implementation)
- Regulatory Measures/Other (ACA Program implementation)
- Airport improvement

3.4 Commitments at local level - MONTENEGRO

ECAC Member States have always been strong supporters of a market-based measure scheme for international aviation to incentivise and reward good investment and operational choices, and so welcomed the agreement on the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

The 39th General Assembly of ICAO (2016) reaffirmed the 2013 objective of stabilising CO2 emissions from international aviation at 2020 levels. In addition, the States adopted the introduction of a global market-based measure, namely the 'Carbon Offsetting and Reduction Scheme for International Aviation' (CORSIA), to offset and reduce international aviation's CO2 emissions above average 2019/2020 levels through standard international CO2 emissions reductions units which would be put into the global market. This major achievement was most welcome by European States which have actively promoted the mitigation of international emissions from aviation at a global level.

National actions in Montenegro specified in ICAO State Action Plan on CO2 emissions reduction in aviation of Montenegro⁴⁹ aim at:

- limiting CO2 emission from civil aviation activities starting from 2020;
- informing the aircraft operators, ANSP and airport operators on new internationally promoted technologies;
- encouraging involvement of national stakeholders in international and national projects aiming at reducing GHG emission in civil aviation;
- meeting the objectives of the aircraft operators by participating in the EU ETS scheme and CORSIA.

⁴⁸ https://www.ecac-ceac.org/images/activities/environment/Albania_Action_Plan_on_CO2_Emission_Reduction_2021.pdf

⁴⁹ https://caa.me/sites/default/files/montenegro_action_plan_on_co2_emission_reduction_2021.pdf

Eu ETS And Aviation

The EU Emissions Trading System (EU ETS) is the cornerstone of the European Union's policy to tackle climate change, and a key tool for reducing greenhouse gas emissions cost-effectively, including from the aviation sector. The 30 EEA States in Europe have already implemented the EU Emissions Trading System (ETS), including the aviation sector with around 500 aircraft operators participating in the cap-and-trade approach to limit CO₂ emissions. It was the first and is the biggest international system capping greenhouse gas emissions. In the period 2013 to 2020 EU ETS has saved an estimated 200 million tonnes of intra-European aviation CO₂ emissions.

In respect to the issue of climate change, Montenegro is working on international and domestic level in order to contribute to global combating of climate change. Montenegro's engagement on international level includes two equally important, mutually supportive courses of action, that is, adherence to relevant international multilateral environmental agreements and the EU accession process. EU accession process is regarded as a paramount national priority.

Approximation of the EU acquis, including EU ETS, into national legislation represents a process whereby the national legal framework and overall political, social and economic reality are strongly and increasingly shaped, even more so after the official initiation of accession negotiations with the EU in June 2012. In its path towards full-fledged EU membership Montenegro has to adopt complete body of EU legislation. Important part of the EU legislation is the climate related legislation, inter alia, EU ETS and Aviation ETS legislation. In that respect, for activities other than aviation, Montenegro will not be officially part of the EU ETS until joining the EU. Accordingly, Montenegro is planning development of administrative, regulatory and institutional framework in the coming years in order to be ready for implementation and enforcement of this demanding legislation.

SECSI plays a major part in the European Union (EU) initiative to develop the Single European Sky regardless of state or FAB borders, with an aim to improve safety, efficiency and air traffic capacity in Europe. The main benefit of SECSI is the reduction of direct operational cost that results from reduction in flight distances flown within FRA. SEAFRA is also expected to bring the following qualitative benefits:

- 240,000 nautical miles less flown per year,
- 36,000 hours less controlled per year,
- 1,000,000 kg of fuel less consumed per year,
- 4. 3.160.000 kg of CO₂ less emitted per year, and
- 10,500 kg of NO_x emitted less per year.

At the moment there are no measures taken by aerodromes nor aviation industry to introduce alternative fuels.

3.5 Commitments at local level - ITALY

Italy has been a member of ICAO since its foundation in 1944 and has always been represented in the Part 1 of the Council due to its longstanding engagement in the International Civil Aviation Regulatory body, its important industrial aeronautical achievements, its strong contribution to the development of safe and sustainable Air Transport.

Italy is also a member of the European Union and of the European Civil Aviation Conference (ECAC). ECAC is an intergovernmental organisation covering the widest grouping of Member States of any European organization dealing with civil aviation.

ECAC States share the view that the environmental impacts of the aviation sector must be mitigated, if aviation is to continue to be successful as an important facilitator of economic growth and prosperity, being an urgent need to achieve the ICAO goal of Carbon Neutral Growth. Italy, like all of ECAC's 44 States, is fully committed to and involved in the fight against climate change and works towards a resource-efficient, competitive and sustainable multimodal transport system.

On 25th July 1997, the Italian Civil Aviation Authority (ENAC) was established by the Legislative Decree no. 250/97 as the National Authority. By the wording of its official Mission, ENAC is committed to regulate, control and oversee the field of civil aviation, by promoting the development of the civil aviation sector, in an environmentally friendly framework.

All the Italian Airlines report to ENAC the emission generated by the use of their fleet, and present to the National aviation authority (NAA) a list of actions with the sake of reducing the emissions, in addition to the results coming from other actions coordinated at supranational level⁵⁰.

The table below show the emissions of CO₂ generated by Italian airlines operating in Italy, according to the IPCC definition of international flights. Data have been rounded to facilitate reading. The table below only refers to the airlines that are under direct control of ENAC.

Table 8 Italy – CO₂ emissions generated by Italian airlines

Year	Total RTKs (tonne-kilometres)	Total fuel (litres)	Total CO ₂ emissions (metric tonnes)	International RTKs (tonne-kilometres)	International fuel (litres)	International CO ₂ emissions (metric tonnes)
2018	1.899.512.595	721.303.070	1.823.198	1.897.004.449	707.932.517	1.789.488
2019	1.946.704.426	756.377.384	1.912.265	1.943.529.069	741.711.306	1.874.793
2020	366.554.350	199.115.304	504.332	362.360.154	178.876.826	452.124

Aviation is a small but important contributor to climate change. Aircraft are estimated to contribute for roughly 3,5% of the total radioactive forcing (a measuring unit of climate change) produced by all human activities. This percentage, which excludes the effects of possible changes in cirrus clouds, is expected to grow.

CO₂ emissions from air transport represent roughly 2% of total global CO₂ emissions. Fuel burning is responsible for the GHG increase and, on the other hand, the fuel price is one of the major drivers in the determination of profitability in aviation industry. The implementation of a fuel efficiency policy has been pushed forward because of the oil cost growth in the last decade. A consequence of this fuel efficiency policy is the CO₂ emissions reduction.

⁵⁰ <https://www.enac.gov.it/pubblicazioni/italys-action-plan-on-co2-emissions-reduction-edition-2021>

Since 2009 some Italian airlines have been adopting several measures for fuel saving, to prevent a more significant downgrade, to avoid a worsening of the global economic crisis, as well as in application of the ETS system.

From 2009 to 2019 Italian airlines phased out most of their old aircraft with new and more fuel-efficient aircraft. The reduction of fuel consumption can be estimated around 20% compared to the aircraft model previously operated. In absolute terms, Italian airlines saved every year CO₂ emissions equivalent to about 1000 tonnes per aircraft phased out. Several measures have been implemented to improve Air Traffic Management. It is important to note how the optimization of flight plan activities and flight procedures and routes also plays a relevant role in CO₂ emissions reduction.

Efforts in green technologies have to be collected and prospected in three major lines: Air vehicle, Air Transport System and Sustainable Energies. The introduction of alternative fuels will contribute significantly to creating an effective and sustainable framework for the growing aviation industry. Cultivating energy crops that do not compete with food can open up new agro-economic perspectives; research on promising feedstocks such as algae and the development of advanced biorefinery technologies can also contribute to create economic opportunity for Italy.

From 2020, global aviation should experience CO₂ neutral growth; by 2050, net CO₂ emissions should be reduced by 50% compared to the base year 2005. These goals have been set by the airline members of IATA. Increasing the share of aviation biofuel is essential in order to reach these goals. This is because, unlike other modes of transport, new forms of propulsion such as electric or H₂ systems cannot be realized for aviation in the coming decades.

Italy is strongly committed, both in the EU and in the world context, in trying to create the conditions for the development of a sustainable aviation biofuels competitive market.

Within the EU Horizon 2020, Italy is the coordinating Country for the following research projects:

- Brazil-EU Cooperation for Development of Advanced Lignocellulosic Biofuels
- Biomethane as Sustainable and Renewable Fuel (BIOSURF)
- Advanced sustainable Biofuels for Aviation
- Improving Photosynthetic Solar Energy Conversion in Microalgal cultures for the production of Biofuels and High Value Products
- FREE Coordination (Coordination of Renewable Sources and Energy Efficiency)
- Biofuel from Microalgae project.

Moreover, new technologies have been developed by Italian industries, for example:

- Tecnam is an historic Italian company world leader in the design, construction and marketing of General and Commercial Aviation aircraft. In order to illustrate the opportunities that the technological concept underlying the electrical aircraft could offer, based on the battery swap principle, i.e. changing the entire battery pack at the end of each section by using a streamlined ground infrastructure, automated and to be developed ad-hoc.

- Leonardo's Aircraft Division has been engaged for years in initiatives focused on sustainability and on reduction of both direct and indirect GHG emissions and in environmental impact.

ENAV S.p.A. is the main Italian Air Navigation Service Provider and its first mission is to guarantee the safety of air traffic management. One of ENAV's key objectives is also to contribute to lowering the environmental impact related to flight operations. To this regard, in accordance with the relevant international guidelines, ENAV promotes wide-ranging initiatives to decrease the amount of greenhouse gases.

In winter 2008/2009, the Company released its first three-year action plan, which is annually monitored and reviewed. Moreover, ENAV has in place structural initiatives, mainly addressed to airlines, aimed at increasing cooperation and sharing operational suggestions with Airspace Users to elaborate enhanced and tailored operational solutions. The information exchange has followed-up important feedbacks to finetune ENAV Flight Efficiency Plan (FEP) initiatives.

Under the framework of the National Performance Plan, endorsed by Civil Aviation Authority (CAA) according to Reg. (EU) 390/2013, ENAC monitors ENAV FEP because of its environmental relevance. The implemented measures have allowed considerable savings in terms of fuel consumption and GHG emissions thus producing their positive effects year after year. The outcome⁵¹ in the period 2018-2020 is an emission reduction of 404500 tonCO₂.

ENAC asked airport operators for a complete picture of the measures taken under their direct responsibility to reduce CO₂ emissions and the following data represent the Italian "state of play".

Moreover, airports are committed to becoming cleaner and more efficient. In the middle of a complex web of aircraft movements, technical operations and surface access transport, airports can address the issue of CO₂ emissions in several ways.

These include better insulation and energy efficiency (e.g. replacement of building casings, construction of low-consumption energy systems; cogeneration or trigeneration plants; replacement of lighting systems with LEDs; new air conditioning and ventilation systems), switching to green energy sources (e.g. photovoltaic power plants), investment in green mobility (e.g. replacement of vehicles operating in the airside area with electric and/or hybrid vehicles, and adaptation of network infrastructures to install charging points/stations), encouraging employees, passengers and visitors to use public transport, working with airlines and air traffic management to reduce runway taxiing times, implementing green landing processes and much more.

Italian airports have from the start been closely involved in Airport Carbon Accreditation.

So far there are 14 accredited airports in Italy, which account for more than 80% of the country's 2019 air passenger traffic. Of these, 7 airports - representing 57% of the national passenger traffic - are carbon neutral, resulting in Italian airports accounting for 15% of our continent' carbon neutral airports – which is quite remarkable. Furthermore, it is notable that 2 Italian airports, Rome Ciampino and Rome Fiumicino, have achieved the new highest level of the Airport Carbon Accreditation programme: Level 4+ "Transition", the first in Europe to do so.

⁵¹ <https://www.enac.gov.it/pubblicazioni/italys-action-plan-on-co2-emissions-reduction-edition-2021>

In addition to the above, 10 Italian airports have since June 2019 been formally committed to achieve Net Zero for CO₂ emissions under their control by 2050 at the latest. This commitment was undertaken through ACI EUROPE and formally undersigned by 215 airports. The 10 airports in Italy which have adhered to the resolution are: Bologna, Milan Bergamo, Milan Linate, Milan Malpensa, Naples, Palermo, Rome Ciampino, Rome Fiumicino, Turin and Venice.

On the 26th of May 2023, ENAC and ENEA (national agency for new technologies, energy and sustainable economic development) signed a protocol⁵² relating to the decarbonisation of air transport and new solutions for sustainable aviation, with a particular focus on use of hydrogen as an energy carrier of the future in the airport logistics chain.

The signed agreement provides for the creation of a study which, after a selected case study, analyzes the current energy flows of an airport site and the airport processes and identifies technologies, strategies and possible improvement configurations in terms of energy.

The ultimate goal is the preparation of Guidelines that provide airport managers with useful elements for optimizing energy networks in overall airport logistics and identifying future end uses of hydrogen at airport hubs. To this end, the study plans to analyze and compare energy mix solutions (renewable sources, accumulation systems, energy vectors, etc.), together with management, control and monitoring technologies of the site in order to increase its energy independence and resilience, making the model replicable and scalable in similar and/or larger contexts than in the case study.

Finally, the protocol also provides for the publication of an ENAC tender to identify, at a national level, the sample airport site for conducting the case study. The proposals that, in addition to actively involving the airport, manage to extend the benefits of the initiative to local, institutional and private realities, manufacturers of vehicles and technologies, energy supply and dispatching bodies and companies and logistics operators will be awarded.

⁵² <https://www.enac.gov.it/news/energia-enac-ed-enea-insieme-per-la-decarbonizzazione-del-trasporto-aereo-firmato-un>

4 CORSIA GLOBAL SCHEME

4.1 Carbon Offsetting and Reduction Scheme for International Aviation

CORSIA⁵³ (Carbon Offsetting and Reduction Scheme for International Aviation) is an international program approved by ICAO (International Organization for Civil Aviation)⁵⁴ which aims to stabilize CO₂ emissions at 2020 levels by requiring airlines to offset the growth in their emissions after 2020. This initiative was conceived in conjunction with the measures to reduce aviation's emissions through technological and organizational improvements and with the Sustainable Aviation Fuels (SAF) initiative.

The emissions that are requested to be compensated under the CORSIA are those covered by the Paris agreement, or international flights, as the national ones are included in the actions of the National Determined Contributions (NDCs).

CORSIA is the first global market-based measure for any sector and represents a cooperative approach that moves away from a “patchwork” of national or regional regulatory initiatives. It offers a harmonized way to reduce emissions from international aviation, minimizing market distortion, while respecting the special circumstances and respective capabilities of ICAO Member States.

CORSIA complements the other elements of the basket of measures by offsetting the amount of CO₂ emissions that cannot be reduced through the use of technological improvements, operational improvements, and sustainable aviation fuels with emissions units from the carbon market.

The scheme has some of the toughest eligibility criteria in the sector. That is the result of years of hard work by expert groups and with participation of environmental NGOs at the ICAO level, essentially making aviation offset projects state approved. Carbon offset standards and programs are independently reviewed by the Technical Advisory Body (TAB) to ensure that projects are meeting the stringent environmental integrity criteria under CORSIA.

4.2 CORSIA applicability, phases and requirements

The CORSIA Scheme is applied in the presence of the following conditions:

- the operator has a three-letter ICAO designator, or an AOC issued by the reference country;
- there are aircraft in the fleet with MTOM⁵⁵ exceeding 5,700 kg;
- international flights are made/planned with these airplanes (according to the ICAO definition, i.e. they take off from one country and land in a different one);
- international flights result in annual CO₂ emissions of more than 10,000 tonnes.

The scheme is implemented in three specific phases:

- a pilot phase (2021-2023),

⁵³ <https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>

⁵⁴ ICAO Resolution A39-3 adopted by the 39th General Assembly in October 2016

⁵⁵ maximum takeoff mass

- a first phase (2024-2026),
- and a second phase (2027-2035).

Like the Paris Agreement, CORSIA is initially a voluntary program: in the first two, three-year phases (from 2021 to 2026) countries will be able to voluntarily decide whether to participate in the system or not, while in the last phase (from 2027 to 2035) the participation will be mandatory and it is estimated that 80% of emissions above 2020 levels will be offset.

Least Developed Countries (LDCs), Small Island Developing States (SIDS), Landlocked Developing Countries (LLDCs), will be exempt from the scheme in this second phase. All European countries will join the CORSIA from the beginning.

Both the CORSIA and the EU-ETS require airlines to monitor and report their emissions, returning a certain number of credits (in terms of allowances or offsets) depending on their emissions.

The revision of the EU-ETS directive on air transport served to implement CORSIA by the EU in a manner consistent with the European climate objectives for 2030. The initiative also proposed to increase the number of allowances auctioned under the EU-ETS as regards aircraft operators. The proposal is part of the broader European Green Deal.

Airlines are required to:

- monitor emissions on all international routes (if there are airplanes in the fleet with MTOM⁵⁶ greater than 5,700 kg)
- offset the emissions exceeding 10,000 tons of CO₂eq per year, produced by flights on the routes included in the scheme, by purchasing eligible emission units generated by projects that reduce emissions in other sectors (e.g. renewable energy).

The implementation of the CORSIA focus on the Corsia Central Registry (CCR)⁵⁷ which consist of a web application supported by a database, and contain information and data for Transparency: list of approved aircraft operators, list of accredited verification bodies, CO₂ emissions, list of eligible fuels, cancelled emission units. All actions are recorded without the possibility of cancellation. This is an information management system that allow participating countries to submit to ICAO data and information relating to CORSIA in a standardized format. Using the CCR, the ICAO Secretariat stores the submitted information, performs calculations, develops the necessary reports and makes available the information required for transparency.

The CCR is one of CORSIA's five implementation elements, along with:

- the list of pairs of Countries subject to the compensation requirements for each year of the voluntary period 2021-2026;
- a tool for estimating and reporting emissions;
- the list of eligible fuels;

⁵⁶ maximum takeoff mass

⁵⁷ <https://www.icao.int/environmental-protection/CORSIA/Pages/CCR.aspx>

- the list of emission units eligible for compensation (for the 2021-2023 pilot phase some programs have already been selected and ten others are under evaluation: American carbon registry, China GHG voluntary emission reduction program, Clean Development Mechanism, Climate action reserve, The gold standard, Verified Carbon Standard).

The five ICAO CORSIA Implementation Elements⁵⁸ listed below are reflected in 14 ICAO documents approved by the ICAO Council for publication. These ICAO documents are directly referenced in Annex 16, Volume IV and are essential for the implementation of the CORSIA.

Table 9 Italy – ICAO CORSIA Implementation Elements

<i>CORSIA States for Chapter 3 State Pairs</i>	1. CORSIA States for Chapter 3 State Pairs
<i>ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT)</i>	2. ICAO CORSIA CO ₂ Estimation and Reporting Tool (CERT)
<i>CORSIA Eligible Fuels</i>	3. CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes 4. CORSIA Approved Sustainability Certification Schemes 5. CORSIA Sustainability Criteria for CORSIA Eligible Fuels 6. CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels 7. CORSIA Methodology for Calculating Actual Life Cycle Emissions Values
<i>CORSIA Eligible Emissions Units</i>	8. CORSIA Eligible Emissions Units 9. CORSIA Emissions Unit Eligibility Criteria
<i>CORSIA Central Registry (CCR)</i>	10. CORSIA Central Registry: Information and Data for the Implementation of CORSIA 11. CORSIA Aeroplane Operator to State Attributions 12. CORSIA 2020 Emissions 13. CORSIA Annual Sector’s Growth Factor (SGF) 14. CORSIA Central Registry (CCR): Information and Data for Transparency

As of 1 January 2023, 115 States had announced their intention to participate in CORSIA and 4 more States announced their intention to participate in CORSIA from 1 January 2024, bringing the total number of participating States to 119.

4.3 CORSIA and the European normative context

CORSIA is part of the European context of regulating air emissions governed by the Emissions Trading system, to which several European and international air operators are already subject.

To this end, EU Regulation 2392/2017 was approved, which launched the process of integrating the CORSIA system in Europe, with the Emission Trading System (ETS) already governed by EC Directive

⁵⁸ <https://www.icao.int/environmental-protection/CORSIA/Pages/implementation-elements.aspx>

2003/87. In essence, in the European Union, CORSIA is implemented through the ETS. This is in order to avoid an excessive administrative burden for aircraft operators.

The monitoring system has been in force since 1 January 2019 according to the provisions of the MRR Regulation (Monitoring and Reporting Regulation) n. 601/2012, as amended by art. 76 of Reg. (EU) 2018/2066, published on 31 December 2018 in the O.G. of the European Union L 334.

The European Commission has published the new monitoring plan model⁵⁹ for aircraft operators affected by the ETS legislation, which also includes the monitoring of emissions for the purposes of the CORSIA scheme: Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012 (Text with EEA relevance)Text with EEA relevance. Aircraft operators will therefore be able to use a single Monitoring Plan to meet the requirements of both schemes.

Aircraft operators may have a different Competent Authority for CORSIA than for EU ETS. For the purpose of CORSIA, the attribution of an aircraft operator to a State shall be determined by its unique ICAO designator or by the Air Operator Certificate (AOC) in case of non-availability of ICAO Designator (aircraft operator is attributed to the issuing State) or by the place of the juridical registration (in case that the aircraft operator possesses neither an ICAO designator nor an AOC, the State where the aeroplane is registered as juridical person shall be the State where the operator has to fulfil his obligations).

ICAO published and regularly updates a list of Aeroplane Operators and the State to which they have been attributed. This document can be downloaded on the ICAO CORSIA webpage. For those aircraft operators that have an AOC or operating license from an EU Member State or EEA State, the administration of EU ETS and CORSIA is performed by the same competent authority.

⁵⁹ https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification-eu-ets-emissions_en#tab-0-1

5 REACHING CARBON NEUTRALITY: TOOLS AND METHODOLOGIES

5.1 Credible transition plans to Net Zero (CDP Guidance)

Climate transition plans are a vital tool to demonstrate to capital markets and stakeholders that an organization is committed to achieving a 1.5-degree pathway, and that its business model will remain relevant (i.e., profitable) in a net-zero carbon economy.

Transition plans enable an organization to outline how it will deliver on its strategy to align with the latest and most ambitious climate science recommendations and keep themselves in line or ahead of relevant policy goals for the organization. A time-bound action plan clearly outlines how an organization will pivot its existing assets, operations, and entire business model towards a trajectory that aligns with the latest and most ambitious climate science recommendations. i.e., halving greenhouse gas (GHG) emissions by 2030 and reaching net-zero by 2050 at the latest, thereby limiting global warming to 1.5°C.

Transition plans will be fundamental in catalysing action needed to achieve a sustainable economy and are therefore at the heart of CDP's strategy.

CDP⁶⁰, originally known as the Carbon Disclosure Project, is a global non-profit that runs the world's environmental disclosure system for investors, companies, cities and governments to assess their impact and take urgent action to build a truly sustainable economy. Over the past 20 years it has created a system that has resulted in unparalleled engagement on environmental issues worldwide. The world's economy looks to CDP as the gold standard of environmental reporting with the richest and most comprehensive dataset on corporate and city action.

CDP wants to do more to encourage and support companies to establish credible transition plans, underpinned by SBTs. CDP is continually working to refine and develop guidance on transition plans, as well as measure performance against them.

The CDP's technical note "Reporting on Climate Transition Plans"⁶¹ provides guidance on how organizations disclosing through CDP can demonstrate that they have a credible climate transition plan in place.

The structure of the technical note is:

- Part 1 broadly introduces the concept of transition, and then outlines the importance of climate transition plans specifically.
- Part 2 provides a technical definition of climate transition plans, the principles which govern their credibility and the elements which they comprise of.
- Part 3 lists the questions in the 2023 CDP climate change questionnaire that relate to credible climate transition plans.

⁶⁰ <https://www.cdp.net/en/info/about-us>

⁶¹ https://cdn.cdp.net/cdp-production/cms/guidance_docs/pdfs/000/003/101/original/CDP_technical_note_-_Climate_transition_plans.pdf?1643994309

- Part 4 provides additional resources which supplement information detailed in this technical note.
- Part 5 lists the frameworks and initiatives which relate to climate transition plans.

CDP considers a credible climate transition plan to be defined by the five following characteristics:

1. It supports a strategy for the climate transition i.e., actions that need to occur for an organization to pivot towards a 1.5°C world, with near-term (five to ten-year) science-based targets (emissions reduction targets in line with 1.5°C pathways), and then long-term science-based targets (for 2050 at the latest)
2. It contains verifiable and quantifiable key performance indicators (KPIs) which:
 - a. measure the success of an organization's climate transition; and
 - b. are tracked regularly.
3. It is succinctly integrated into an organization's existing mainstream filings (in annual financial reporting/sustainability reporting/overall business strategy) and provides an accountability mechanism.
4. It is guided by the following principles: Accountability, Internally coherent, Forward looking, Time bound and quantitative, Flexible and responsive, Complete.
5. It contains the following key elements: Governance, Scenario Analysis, Financial Planning, Value Chain Engagement and Low-Carbon Initiatives, Policy Engagement, Risks and Opportunities, Targets, Scope 1, 2 & 3 Accounting with Verification.

These criteria demonstrate to investors and other stakeholders that an organization is aligning with ambitious long-term climate goals, and that its business model will transition, in order to be relevant (i.e., profitable) in a 1.5°C world.

To avoid potential regulatory shocks, organizations should aim to align, as a minimum, with relevant Paris-aligned policy goals for where the organization operates (this includes direct and value chain operations). Given the number of countries that have committed to net-zero emissions, it is critical that investors and other stakeholders are able to assess an organization's plans to align with such a future.

5.2 Reducing emissions before offsetting (ACA Guidance and Tools)

Airport Carbon Accreditation is a carbon management certification standard for airports developed by ACI Europe. The programme independently assesses and recognises the efforts of airports to manage and reduce their carbon emissions with four levels of award.

To begin to address carbon management in such a complex space, 4 stages⁶² are identified and built Airport Carbon Accreditation programme, so that progress would be visible and measurable:

- Level 1 "MAPPING": Carbon footprint measurement;

⁶² <https://airportco2.org/managing-airport-co2-emissions.html>

- Level 2 “REDUCTION”: Reduction of the airport operator’s carbon footprint;
- Level 3 “OPTIMISATION”: Engaging others on the airport site to reduce their CO₂;
- Level 3+ “NEUTRALITY”: Offsetting any residual CO₂ emissions from the airport operator;
- Level 4 “TRANSFORMATION”: Transforming airport operations to achieve CO₂ reduction in line with global climate goals;
- Level 4+ “TRANSITION”: Offsetting residual CO₂ emissions from an extended list of sources at the airport site.

Airports looking to achieve Level 3+ ‘Neutrality’ under Airport Carbon Accreditation are asked to purchase offsets for emissions that cannot be reduced by other means. This relates to Scope 1 and 2 residual emissions as well as Scope 3 airport staff business travel emissions.

“Guidance on reducing emissions before offsetting”⁶³ aims to set out a process to guide airports on the steps they could take in order to reduce their emissions “as much as possible” before purchasing offsets. The guidance provides recommendations for airports and verifiers and does not introduce any new requirements to the programme. There is thus no obligation to follow the guidance to become accredited.

Although offsetting can allow airports to be ‘carbon neutral’, some external stakeholders are concerned that offsets may be used in place of action by the emitter to reduce their own emissions.

Therefore, the guidance aims to ensure there is a continued focus on the active reduction of the airport’s own carbon emissions. The steps below could be carried out regularly, i.e. on a 12-monthly cycle, to ensure continued improvement and reduction of emissions. Once offsets have been purchased, further efforts to reduce emissions could still be investigated and implemented on an ongoing basis.

The following diagram describes the process that airports could follow, and the steps are set out in more detail in the subsequent text.

⁶³ <https://www.airportcarbonaccreditation.org/component/attachments/?task=download&id=165>

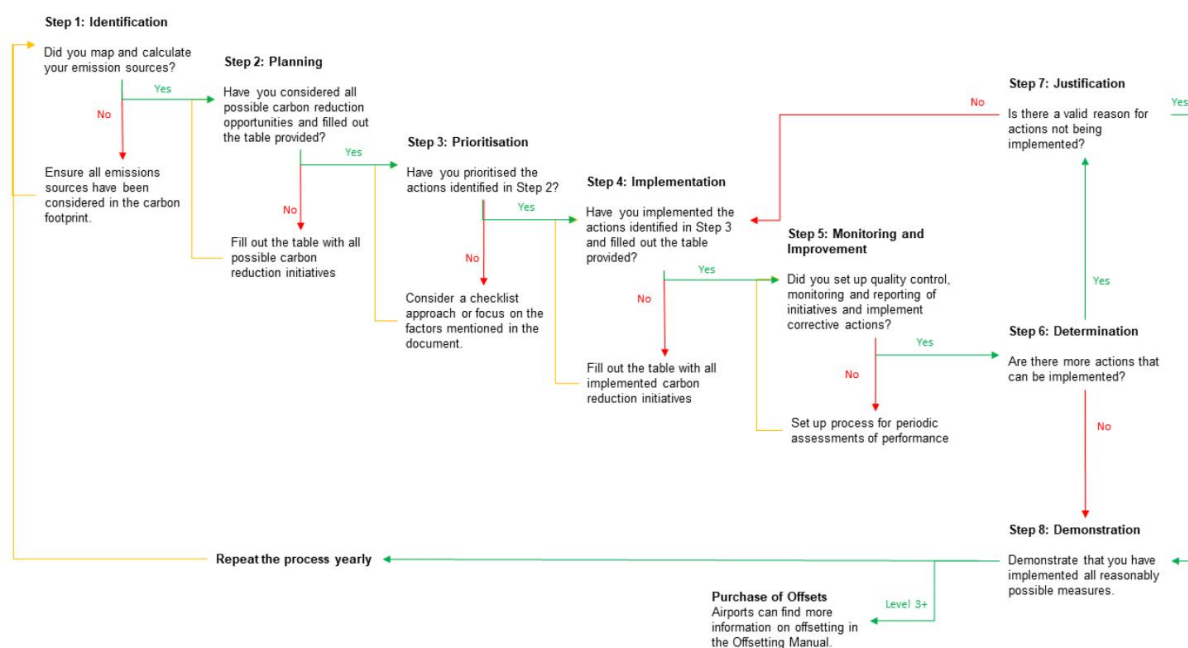


Figure 10 flowchart that Airports could follow to reduce emissions

Identification

Airports must map their carbon footprints for each reporting year. This would allow the airports to understand what their key emission sources or ‘carbon hotspots’ are and would allow them to understand how the airport and its operations can contribute to global emissions.

Airports can identify their carbon hotspots by analysing their carbon footprints and identifying the emissions sources which make up the biggest proportion of total emissions. It could also be useful for the airports to look at changes to the contribution of emissions sources to the carbon footprint, as this may be indicative of where emissions may be highest in the future with the growth of passengers etc, so may also be included as carbon hotspots.

Training of relevant staff is also crucial to this step to ensure the carbon footprint is calculated accurately, and in this training, airports could invite also stakeholders and tenants.

Planning

The identification of hotspots is an important part of the planning process as it allows the airport to then establish what opportunities they have for reducing their carbon footprint. This allows for the development of a carbon management plan and other strategies such as monitoring plans. The plan could identify ways to reduce the carbon footprint and limit emissions from future activities.

The planning stage could include the setting of GHG emissions reduction targets and could be revisited and updated every 12 months to ensure it remains effective and emissions continue to reduce as much as possible.

During the planning stage, airports may find it useful to form a committee covering all parts of the organisation. As carbon management plans are implemented across organisations, it is important to make sure all key areas are addressed in the plan and that responsibilities for implementation are identified and progress is tracked.

During the identification and planning stage, it could be useful for airports to consider validation or verification to ISO 14064 to ensure that reported climate change data is true, fair and reliable as supported by a robust management system.

Prioritisation

Continuing on from the planning step, which sets carbon reduction targets and identifies possible efficiency measures to implement, these actions could be prioritised. There are a number of different factors that could be assessed or analyses carried out to determine this:

- **Largest hotspot:** The first factor that could be assessed are sources that are emitting the highest proportion of carbon dioxide emissions and the feasibility of reducing these could be considered.
- **Carbon reduction:** Secondly, the extent to which each carbon reduction initiative may reduce emissions for that emissions source. The initiatives that will result in the greatest reduction in emissions could be prioritised.
- **Cost:** The initial capital investment each possible initiative could be considered first as this may show that some are not feasible due to significant capital cost and these initiatives can therefore be disregarded.
- **Return on investment (ROI):** A ROI analysis would calculate the most tangible financial gains that can be expected from a project versus the actual cost of the project. This would allow prioritisation on financial benefits as well as costs and would therefore allow business cases to be made for specific implementation measures.
- **Cost benefit:** A cost benefit analysis would not just look at the financial gains but consider any other benefits, including carbon emissions reduction, improvements to air quality, etc. It is a more comprehensive assessment, including both financial and non-financial costs and benefits.

Implementation

Before implementation, senior stakeholders could be consulted on the carbon management plan to understand their views on specific measures, discuss any concerns they may have that could be addressed and obtain approval to proceed where necessary.

Airports may also find it useful to provide training for their stakeholders, and this could particularly be considered at Level 3 and above.

Once initiatives have been prioritised and ranked, implementation could begin. Airports could draw up a timeline for implementation and review every 12 months, considering costs and expected emissions reductions. This timeline would allow targets to be met over a specific period.

Monitoring and Improvement

Airports could have a process in place for undertaking periodic assessments of performance against the carbon management plan. Following monitoring, airports could implement corrective actions for improvement to ensure that targets are achieved for any initiatives that are not delivering the projected reductions.

Determination

The airport could establish, through calculations, that they have implemented or have a plan to implement all the reduction options that are available to them. The methodology to establish this could include the amount and type of GHG emissions that have been reduced and the time period that this was achieved. This reduction can be quantified in absolute terms or expressed in emission intensity terms (e.g. pax).

Justification

Airports could also be able to justify the reasoning behind any carbon reduction initiatives that were identified in the planning stage but not implemented during Step 4. If they are able to do this, they can progress to the next step “demonstration”.

If initiatives have been considered but not implemented and the reasoning cannot be justified, airports could return to step “implementation”. An action plan could be useful as a structured approach to understanding the barriers to implementation (financial, physical, etc), and what needs to be done to overcome those barriers in order to invest and potentially revisit those carbon reduction opportunities in the future. The status of these initiatives can then be updated once they have been implemented.

Demonstration

Once the airport has followed all these steps, they could therefore be able to demonstrate that they have implemented all reasonable possible measures and can purchase offsets.

An airport can measure its footprint itself, assisted by the Application Manual or get support from one of a number of specialist companies. Airports can also use ACERT⁶⁴, the Airport Carbon and Emissions Reporting Tool provided by ACI World to assist airports worldwide to identify, quantify and manage their greenhouse gas emissions.⁶⁵

5.3 Offsetting Quality Criteria

In 2017 ACI EUROPE committed to the company Ecofys a comprehensive study on offsetting for airports which led to the preparation of the Offsetting Manual⁶⁶ in the context of The Airport Carbon Accreditation. This Offsetting Manual has been developed to inform and guide airports about

⁶⁴ <https://store.aci.aero/form/acert/>

⁶⁵ <https://www.airportcarbonaccreditation.org/about/6-levels-of-accreditation/mapping.html>

⁶⁶ <https://www.airportcarbonaccreditation.org/component/attachments/?task=download&id=189>

offsetting options, requirements and recommendations, as well as to provide practical support through dedicated offset procurement guidelines.

The study included, amongst others the identification of the key offsetting quality criteria and the assessment of offset programmes and projects against them. Based on this assessment, a proposed list of eligible offset programmes was established and offset project types were attributed different degrees of confidence in their compliance with the quality criteria. The Airport Carbon Accreditation Task Force and Advisory Board reviewed the study and agreed on the Offsetting Manual.

An offset must meet certain environmental integrity criteria, mitigate negative side effects and can promote positive side effects. Table 1 lists the mandatory and optional quality criteria that are considered as best practice for offsetting.

Table 10 *Overview of Offsetting Quality Criteria*

MANDATORY QUALITY CRITERIA	
CRITERION	DESCRIPTION
ADDITIONALITY	The offset project and resulting emission reductions would not have occurred in the absence of an offset project and the revenue from selling offsets. The ongoing need for financial support to cover operational expenses throughout the project duration after the initial investment decision is made and the project is implemented is referred to as vulnerability.
MRV	Emission reductions are <u>M</u> onitored, <u>R</u> eported, and <u>V</u> erified; therefore they are real and measurable.
PERMANENCE	Emission reductions are permanent and irreversible.
LEAKAGE	The offset project does not cause higher greenhouse gas (GHG) emissions or lower GHG mitigation outside of the project boundary.
OWNERSHIP	A robust accounting system prevents double counting and double claiming of offsets.
NO HARM	The offset project should not cause any negative environmental or social externalities.
OPTIONAL QUALITY CRITERIA	
CRITERION	DESCRIPTION
VINTAGE	Refers to the year in which an offset was generated. Confidence in environmental integrity is higher if the offset project was registered under latest standards and the emission reductions took place recently.
CO-BENEFITS	The offset project contributes to the Sustainable Development Goals (SDGs) beyond climate action.
LOCATION	Contributions to SDGs may increase if the offset project is implemented in least developed countries because there is a stronger potential for co-benefits.

Each offset project needs to go through a defined project cycle to pass several assessments and be registered. Then emission reductions need to be verified by verifiers (i.e., accredited entities which ensure that offset quality criteria are met) and certified before offsets can be issued. This cycle can be separated into two main stages: the project design stage and the project implementation stage. Moving a project from conception to final issuance of offsets takes two and a half years on average.

Offset project registries issue a unique serial number to each tonne of emission reduction that can be transacted multiple times before an owner can choose to retire it (i.e., it is taken out of the market and is no longer traded on a public registry). A retired offset is flagged as unsellable on the registry so that only the end buyer can claim the emissions reduction associated with the offset.

5.4 Offsetting credibility (ACA Requirements)

In the Offsetting Manual, the following requirements for offsetting are introduced to ensure that the programme evolves in line with the latest international developments, maintains its credibility, and maximises effectiveness.

1. Airports shall choose projects from specific offset programmes: Only the most established and credible offset programmes that meet strict methodological and quality criteria are eligible under Airport Carbon Accreditation. Airports shall choose one or more from the following list:
 - Clean Development Mechanism
 - Verified Carbon Standard
 - Gold Standard
 - Climate Action Reserve
 - American Carbon Registry
 - UK Woodland Carbon Code (for UK-based airports only)
 - Label Bas Carbone (for French airports only)
2. Airports shall not choose offset projects with a high risk of low environmental integrity: Recent studies conclude that environmental integrity of offsets mainly depends on the project type since the major offset programmes follow equivalent procedures and methodologies. In principle, in any offsetting project type, there can be a high-quality individual project. However, for some project types there are inherent concerns with respect to additionality, calculation and permanence of emission reductions, leakage risk, and negative externalities. Therefore, following offsetting project types are not eligible under Airport Carbon Accreditation:
 - Nuclear energy;
 - Fuel switching;
 - Industrial gases HFC & N₂O;
 - Coal mine methane.
3. Airports shall provide a minimum set of information about the offsets: In order to verify the compliance of the airport with the Offsetting Manual, the airport shall provide the following information to the Administrator about the offsets purchased:
 - Offset programme;
 - Offset project type;

- Project name;
- Project identification number.

If the offsets retired by an airport are registered in a public registry, the airport shall provide a link to the relevant entry in the registry to the Administrator.

GLOSSARY AND ACRONYMS

ACA: Airport Carbon Accreditation

Biogas Guarantee of Origin (BGO): A similar GO mechanism can be applied to certify biomethane and biogas that are fed into the natural gas network. Both can be certified, and such certificates exchanged in a system with certificate register where purchased biogas and biomethane are traced.

Carbon dioxide equivalent CO₂e (or CO₂eq): Unit that allows you to compare the force radiant of a GHG with that of carbon dioxide. Carbon dioxide equivalent is calculated using the mass of a given GHG multiplied by global warming potential.

CH₄: Methane

CO: Carbon monoxide

CO₂: Carbon dioxide

Direct emission of greenhouse gases: GHG emission from greenhouse gas sources of owned or controlled by the organization.

Direct removal of greenhouse gases: Removal by GHG from Absorbers of greenhouse gases of owned or controlled by the organization.

Gas greenhouse gases, greenhouse gases, GHG (*greenhouse gas*): Gaseous constituent the atmosphere, both natural and anthropogenic, which absorbs and emits radiation to specific wavelengths within the spectrum of emitted infrared radiation from the earth's surface, atmosphere and clouds.

GHG activity data: Quantitative measures of activity from which resulting in GHG emissions or removals. Examples: amount of energy, fuel or electricity consumed, of materials produced, of services provided or the extent of the territory involved.

GHG ratio: A stand-alone document adopted to communicate GHG information from a GHG organisation or project to intended users.

Global Warming Potential, GWP (*global warming potential*): Index, based on the radiant properties of GHG, who measure the radiating force of a mass unit of a given GHG in the current atmosphere compared to an equivalent unit of carbon dioxide over a given period Time horizon.

Greenhouse gas absorber: Process which removes a GHG from the atmosphere.

Greenhouse gas emission factor: Factor relating activity data to GHG emissions.

Greenhouse gas emissions: Release of a GHG in the atmosphere.

Greenhouse gas inventory: List of GHG emissions and removals and their quantification.

Greenhouse gas removal factor: Factor that correlates activity data to GHG removals.

Greenhouse gas sink: Component, different from the atmosphere, with the ability to accumulate GHG and to store and release them.

Greenhouse Gas Statement: an effective and objective statement of the subject matter of the verification or validation. The GHG declaration could be provided within a GHG report or GHG project.

Guarantee of origin (GO): It is an instrument defined in Article 19 of the European Directive 2018/2021/EC. to track electricity from renewable sources and provide information to electricity customers on the source of the energy purchased. Guarantees of origin are the only precisely defined instruments that certify the origin of electricity produced from renewable sources.

HFCs: Hydrofluorocarbons

Indirect emission of greenhouse gases: GHG emission resulting from operations and activities of an organization from non-source sources of owned or controlled by the organization.

Intended user: Individual or organization identified by those reporting GHG-related information as the one to whom such information is addressed in order to make decisions.

IPCC: Intergovernmental Panel on Climate Change

Ktoe: Kilotonnes of oil equivalent

Location-based method for the quantification of scope 2 emissions: Method for quantifying GHG emissions scope 2 based on the average emission factor associated with energy generation for defined locations, including local, subnational or national boundaries

LULUCF: Land Use, Land Use Change and Forestry

Market-based method for quantifying scope 2 emissions: method for quantifying GHG emissions scope 2 on the basis of GHG emissions emitted by energy generators for which the entity reporting the emissions purchases qualification tools that, contractually, can be supplied together with electricity (bundled) or individually (unbundled).

N₂O: Nitrous oxide

NAP: National Adaptation Plan

NAPM: National Action Plan on Mitigation

NC: National Communication

NDC: Nationally Determined Contribution

NMVOCs: Non-methane volatile organic compounds

NOX: Nitrogen oxides

NSCC: National Strategy on Climate Change

Organization: Person, or group of people, with specific responsibilities, authorities and relationships aimed at achieving its objectives.

PAX: Passenger

PFCs: Perfluorocarbons

Plant: Single installation, set of installations or production processes (fixed or furniture), which can be defined within a single geographical boundary, a unit organizational or a production process.

Reference year: Specific Historical period Identified in order to compare emissions or GHG removals or other GHG-related information over time.

Removal of greenhouse gases: withdrawal of a GHG from the atmosphere by absorbers of GHG.

SF6: Sulphur hexafluoride

Source of greenhouse gases: Process that releases a GHG into the atmosphere.

toe: Tonnes of oil equivalent

TU: Traffic unit

UNFCCC: United Nations Framework Convention on Climate Change

WLU: Workload Unit

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This project is co-financed by the European Union under the instrument for Pre-Accession Assistance (IPA II)

This document has been produced with the financial assistance of the Interreg IPA CBC Italy-Albania-Montenegro Programme. The contents of this document are the sole responsibility of Airports of Puglia, Airports of Montenegro and Albanian Civil Aviation Authority and can under no circumstances be regarded as reflecting the position of the European Union and of the Interreg IPA CBC Italy-Albania-Montenegro Programme Authorities.