

POLICY BRIEFING AND RECOMMENDATIONS



WESTERN BALKANS GREENHOUSE GAS EMISSION REDUCTION TARGETS 2030

**THE PATH TO ACHIEVING
CLIMATE NEUTRALITY BY 2050**

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Summary and Recommendations

This briefing is developed on the basis of our analysis on available pathways for the Western Balkans to reach an ambitious reduction of greenhouse gas emissions by 2030. This would help the region reach climate neutrality/decarbonisation by 2050¹, as well as stay in line with its commitments under the Paris Agreement².

The briefing should incentivise the discussion ahead of setting 2030 greenhouse gas emission reductions, renewable energy and energy efficiency targets for the region, within the Energy Community Treaty framework.

In our analysis we develop two scenarios: 1. Linear emission reductions by 2050, as the least ambitious line of emission reductions which the region should follow to reach decarbonisation by 2050; and 2. the region's share of global emissions following the IPCC Special Report on 1.5 pathways, a scenario developed as a comparison.

Our findings show that, in both of the scenarios, the Western Balkan countries face emergency for taking actions to mitigate and adapt to severe effects of climate change and significantly reduce emissions and air pollution. The emission reductions needs should be the foundation for policy development as well as development of necessary and cohesive investments.

The results under Scenario 1 – the linear reduction pathway - show that each of the Western Balkan countries should reduce its emissions by 30% in 2030, compared to the level of emissions in 2018. This reduction applies to emission levels excluding emissions and removals from the land use, land use change and forestry sectors (LULUCF)³. When this emission reduction target is compared to 1990 emissions, we can calculate the minimal ambition the region should follow in 2030.

¹ A political commitment by the Western Balkan countries expressed through the signing of the Sofia Declaration on the Green Agenda for the Western Balkans

² Except Kosovo, which is not a part of the United Nations

³ We have observed that LULUCF in the region account for generous levels of emissions removals. Therefore, we have put a cap on LULUCF, accounting for -20% of the current GHG levels in 2050, incentivising an 80% reduction in emissions by that date, compared to the baseline of this scenario (2018). The result of the linear reduction, taking these assumptions into account, provides a 30% emissions reduction in 2030, compared to 2018.

Table 1: Scenario 1 results of the 2030 greenhouse gas emission reduction target, excluding LULUCF, in MtCO₂eq

	Historical and calculated emissions in 2018	Scenario 1: 30% of 2018 emissions reduction	Emissions in 1990	Results from Scenario 1, compared to 1990 levels
Albania	9.17	6.42	4.34	+47.93%
Bosnia and Herzegovina	25.74	18.02	34.04	-47.06%
Kosovo	9.74	6.82	N/A	N/A
Montenegro	3.77	2.64	5.9	-55.25%
North Macedonia	10.13	7.10	12.48	-43.11%
Serbia	75.36	52.75	83.52	-36.84%
Total in Western Balkans	133.91	93.75	140.28	-33.17%

Under Scenario 2 - a 1.5 pathway - we use the IPCC Special Report on 1.5 degrees, indicating the level of global emissions, consistent with the Paris Agreement goal, in 2030 (including LULUCF). This way we could calculate per capita emissions⁴ and set the emissions level in 2030.

Table 2: Scenario 2 results of 2030 greenhouse gas emissions reduction, including LULUCF, in MtCO₂eq

	Scenario 2 / Country emissions according to 1.5 pathway	Country emissions in 1990	Results from Scenario 2, compared to 1990 levels
Albania	7.1	7.83	-9.32%
Bosnia and Herzegovina	8.45	26.62	-68.25%
Kosovo	4.7	N/A	N/A
Montenegro	1.5	4.37	-65.67%
North Macedonia	5.35	12.27	-56.40%
Serbia	17.24	66.66	-74.14%
Western Balkans	44.34	117.75	-62.34%

It is important that the target setting process takes into consideration the equity principles of the UN Framework Convention On Climate Change which refer to historic responsibility and capacity to act. The Paris Equity Check project, which we consider in Chapter 4, shows the needed emission reductions by 2030, taking into account the equity principles, which confirms our findings that climate action in the Western Balkans region cannot be further delayed.

⁴ Climate Action Network (CAN) Europe does not consider accounting for global per capita emissions as equitable, as the ambition of each country falls on their historical responsibility, economic development as well as equity.

Therefore, we highlight the following recommendations:

- Embed the decarbonisation/climate neutrality goal by 2050 in national level legislation in Western Balkan countries.
- Set ambitious economy wide 2030 targets as a stepping stone towards reaching the 2050 goals. This goal needs to be reflected in national legislation, long term strategies, energy and climate laws, as well as in the countries' National Energy and Climate Plans (NECPs) and National Determined Contributions (NDCs) to the UN.
- Set separate targets for the LULUCF sector, in order to avoid a situation where removals from the LULUCF sectors are used to reduce ambition in tackling emissions in all other sectors.
- Introduce an adequate governance regulation in the Energy Community acquis to monitor and oversee the development of NECPs and long-term plans and strategies, and to ensure cohesion between the 2030 targets and the 2050 climate neutrality/decarbonisation goal. The regulation should also increase civil society participation in climate and energy governance at the Energy Community and at national level.
- In addition to the governance regulation, the legislative package in the Energy Community must support the implementation of ambitious greenhouse gas emission reduction targets by providing a legislative framework which supports renewables and energy efficiency measures. Furthermore, we call for the introduction of necessary legislation to support the region in introducing a carbon pricing mechanism, which would incentivise the lowering of emissions and open possibilities for deploying renewables, promoting energy savings and efficiency.
- Each of the Western Balkan countries should immediately introduce systems to monitor, report and verify greenhouse gas emissions. This should become mandatory under the Energy Community Treaty.
- Due to the highest levels of emissions coming from the energy sector and the dependency on coal, the countries should immediately stop any plans to develop new coal generating capacities and introduce feasible coal phase out dates.
- The 2030 greenhouse gas emission reduction target should reflect equity principles, especially regarding the historical emissions of the countries in the Western Balkans.
- The European Commission should set clear and defined political, economic and integration plans with the Western Balkans region. We recommend to immediately start the work to include the Western Balkans in the EU ETS.

1. Introduction

With the signing of the Sofia Declaration in November 2020, the Western Balkans countries have put forward a political pledge to achieve net zero emissions by 2050⁵, in line with the upcoming EU Climate Law.

As the economies of the Western Balkans are carbon intensive it would require considerable effort to lower greenhouse gas emissions in order to achieve climate neutrality by 2050. The coal sector will bear the biggest burden of making this commitment a reality since it is the cornerstone of the energy sector.

Greenhouse gas profiles according to the latest reported national data are presented in the table below.

Table 3: Greenhouse gas emissions excluding Land use, land use change and forestry in the last reported year, and emission sources as a percentage of overall CO₂eq emissions

	Albania	Bosnia and Herzegovina	Kosovo	Montenegro	North Macedonia	Serbia
Total GHG in MtCO ₂ eq	8.95	25.74	9.35	3.77	10.11	67.15
Energy	53%	78.30%	87%	74.24%	73.7%	80.42%
Industrial processes	11%	8.50%	2%	10.09%	8.5%	5.09%
Agriculture	26%	9.53%	6%	7.60%	11.8%	9.58%
Waste	9%	3.67%	5%	8.06%	6%	4.91%
Year last available data	2016	2014	2018	2018	2016	2014

As the table shows, the energy sector accounts for the most greenhouse gas emissions in the Western Balkans, while coal based energy production (8.2 GW) accounts for two thirds of the region's CO₂ emissions⁶. It must be underlined that the thermal power plants in the Western Balkans have reached or are fast reaching the end of their lifespan, making them inefficient with high levels of pollution⁷.

In recent years, three out of five of the Western Balkans countries defaulted on their plans to build new coal generating capacities, namely the Kosova e Re project in Kosovo (500 MW), Pljevlja II in Montenegro (254 MW) and Oslomej reconstruction in North Macedonia (129.5 MW). Currently the only countries planning to construct new coal generating capacities are Serbia and Bosnia and Herzegovina (6 GW in total).

The Western Balkans are Contracting Parties of the Energy Community Treaty, which aims to create a pan European energy market⁸. This platform has been the main driver behind the energy transition in the Western Balkans. It is guiding the region towards climate neutrality through setting 2030 targets to lower greenhouse gas emissions, increasing the share of renewables in the energy mix, as well as lowering energy demand and increasing energy efficiency through energy efficiency targets. This process is led by

⁵ Regional Cooperation Council (RCC), 2020. "Sofia Declaration on the Green Agenda for the Western Balkans", [available here](#).

⁶ Energy Community Secretariat, 2021. "WB6 Energy Transition Tracker: second edition", p.4.

⁷ HEAL, CAN Europe, Sandbag, CEE Bankwatch Network and Europe Beyond Coal, 2019. "Chronic coal pollution - EU action on the Western Balkans will improve health and economies across Europe", [available here](#).

⁸ At present [the Energy Community has nine Contracting Parties](#) - Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Georgia, Moldova, Montenegro, Serbia and Ukraine. Founding members of the Treaty establishing the Energy Community in 2005, Bulgaria and Romania, joined the European Union in 2007. This was also the case with Croatia as of 1 July 2013.

the European Commission which is developing a study on the region's 2030 targets, namely the "Extension of the EU energy and climate modelling capacity to include the Energy Community and its nine Contracting Parties". At the same time, the Energy Community Secretariat is facilitating the process of drafting the National Energy and Climate Plans (NECPs) in order to implement the 2030 targets which are expected to be adopted at the next Ministerial Council of the Energy Community in the autumn of 2021.

Western Balkan countries have also made pledges at the United Nations Framework Convention on Climate Change, except Kosovo which is not part of the United Nations, to lower greenhouse gas emissions and to commit to playing their part in achieving the objectives of the Paris Agreement to limit global warming to 1.5°C compared to pre-industrial levels. Currently, the countries are working on their second commitment under the UN Convention, the so-called enhanced National Determined Contributions.

This paper aims to provide recommendations for the 2030 greenhouse gas emissions target for each of the Western Balkan countries, based on their commitment to decarbonise by 2050 in line with the EU Climate Law, and their commitments to comply with the Paris Agreement.

Due to the uncertainty on when any of the Western Balkan countries might join the European Union, this paper will not take the accession process into account. Nevertheless, we strongly encourage the region to streamline its ambition with the 'Fit for 55' legislative package at the European Union level, as well as stress that the country specific 2030 targets should be adjusted accordingly if any of the countries from the Western Balkans should access the EU.

2. The two models

Taking the region's climate related obligation into account, namely the commitment to achieve decarbonisation by 2050 and pledges to the United Nations Framework on Climate Change, we are able to design two models. The first one, which aims to represent the lowest possible ambition the region should follow in order to achieve decarbonisation by 2050, is the linear emissions reduction scenario. This allows us to derive the target for 2030. The second one aims to show the necessary level of ambition in 2030, according to the Intergovernmental Panel on Climate Change Special Report on Global Warming of 1.5°C's recommendations.

Table 4: Representation of the two scenarios

	Scenario name	About the scenario
Scenario 1 / The lowest threshold	Linear emissions reduction until 2050	Establishing the current level of emissions and apply linear regression to reach decarbonisation by 2050
Scenario 2 / In line with the Paris Agreement	The 1.5 pathway	Account the global GHG emissions and removals from the P1 pathway of the IPCC SR on 1.5 in 2030, and apply the share to each WB country

2.1. Model for Scenario 1 / The lowest threshold

Assumptions on current emissions, setting the baseline year

Due to the lack of the availability of the most recent data on greenhouse gas emissions in the Western Balkans, the main challenge is setting a baseline for all of the Western Balkan countries. A baseline would allow for the application of linear reductions in emissions.

Table 5: The documents and sources of the data used in this paper

Country	Data source	Year of data	Comment
Albania	UNFCCC	1990 – 2009	Third national communication data. LULUCF increases the overall level of emissions
	UNDP Albania	2016	Data for 2016: Western Balkans and Eastern Europe Regional Network Meeting (Jan 2021) ⁹
Bosnia and Herzegovina	UNFCCC webpage	1990 - 2014	
Kosovo	Climate Change Strategy 2019 -2028 ¹⁰ , Eurostat ¹¹	2008 - 2017	No information on Kosovo at UNFCCC, as Kosovo has not ratified the Paris Agreement, as it is not part of the UN.
Montenegro	Second Biennial Update Report on Climate Change ¹²	1990 – 2015	
	Enhanced NDC ¹³	2018	
North Macedonia	Third Biennial Update Report on Climate Change ¹⁴	1990 - 2016	
	NECP draft ¹⁵		
Serbia	Second National Communication of the Republic of Serbia under the United Nations Framework Convention on Climate Change ¹⁶	1990, 2000, 2005, 2010 - 2014	

⁹ Kamberi, M. 2021, “Experiences of Albania in collaborating with the GSP in 2020” [Available here](#).

¹⁰ Ministry of Environment and Spatial Planning Kosovo, 2016. “Strategy for Climate Change” [Available here](#).

¹¹ Eurostat, Online data code: env_air_gge

¹² Ministry of Sustainable Development and Tourism (MSDT) & United Nations Development Programme (UNDP) in Montenegro, 2019. “SECOND BIENNIAL UPDATE REPORT ON CLIMATE CHANGE”, [available here](#).

¹³ Montenegro updated NDC submission to UNFCCC, June 2021, [available here](#)

¹⁴ Ministry of Environment and Physical Planning, N.Macedonia, 2019. “Third Biennial Update Report on Climate Change: NATIONAL INVENTORY REPORT”, [Available here](#).

¹⁵ Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2020. “NATIONAL ENERGY AND CLIMATE PLAN OF THE REPUBLIC OF NORTH MACEDONIA: DRAFT”, [Available here](#).

¹⁶ Ministry of Environmental Protection Serbia, 2017. “Second National Communication of the Republic of Serbia under the United Nations Framework Convention on Climate Change”. [Available here](#).

The available data are insufficient to determine the current level of emissions. To overcome this gap, we refer to the ‘The PRIMAP-hist national historical emissions time series (1850-2018) v2.2’¹⁷ (PRIMAP group at the Potsdam Institute for Climate Impact Research) for the years where data is missing for some countries. While the trends of development of GHG emissions for the years where the comparison was possible are significantly aligned, we did not use this dataset for the projections, as it underestimates the level of emissions for each country. The PRIMAP-hist dataset provides data until 2018, which is used as a baseline year for the linear emissions reduction.

The PRIMAP-hist dataset combines several published datasets to create a comprehensive set of greenhouse gas emission pathways for every country on the greenhouse gases covered by the Kyoto Protocol. It covers the years 1850 to 2018, and all UNFCCC (United Nations Framework Convention on Climate Change) member states as well as most non-UNFCCC territories.

We used the latest version from January 2021 and we referred only to the “HISTCR” scenario, where country-reported data (CRF, BUR, UNFCCC) are prioritized over third-party data (CDIAC, FAO, Andrew, EDGAR, BP).

We used the total national emissions, excluding LULUCF, namely the IPCM0EL. While for gas categories, we used global warming potentials (GWP) from the Fourth Assessment Report (AR4), namely, KYOTOGHGAR4 - Kyoto greenhouse gases (AR4).

This made it possible to derive the emissions for the following missing years:

	Missing years
Albania	2010 – 2015 and 2017 - 2018
Bosnia and Herzegovina	2015 - 2018
Montenegro	2016 and 2017
North Macedonia	2017 and 2018
Serbia	2015 - 2018

The PRIMAP dataset does not contain data for Kosovo which is not part of the UN. Hence the available historical emissions covered the period from 2009 to 2017. To calculate Kosovo’s 2018 emissions, we used a forecast based on historical data with a 95% confidence interval.

¹⁷ Gütschow, J.; Günther, A.; Jeffery, L.; Gieseke, R. 2021. “The PRIMAP-hist national historical emissions time series v2.2 (1850-2018)” [available here](#).

Table 6: Historical and derived emissions in the baseline year 2018 in MtCO₂eq, excluding LULUCF

Country	Emissions in 2018	Percentage share of total regional emissions
Albania	9.17* ¹⁸	6.85%
Bosnia and Herzegovina	25.74*	19.22%
Kosovo	9.74*	7.27%
Montenegro	3.77	2.82%
North Macedonia	10.13*	7.56%
Serbia	75.36*	56.28%
Total GHG emissions in the Western Balkans	133.91	100%

Assumptions on land use, land use change and forestry (LULUCF)

It is of the utmost importance to highlight the role of nature and ecosystems as considerable work should be done in order to safeguard biodiversity, as well as to contribute to mitigating climate change.

Most of the Western Balkan countries have reported high levels of natural sinks. Only in Albania do natural sinks actually add to the level of emissions, while in Kosovo, officially, natural sinks have an insignificant impact on emissions. Other countries report levels of natural sinks a few times higher than the EU countries.

As profound as the role of the natural sinks are, it is important that the LULUCF sector does not dictate the ambition of the greenhouse gas emissions reduction. For the purpose of development of Scenario 1, the natural sinks are accounted for in the following manner:

In order to ensure that the region actually commits to lowering its greenhouse gas emissions to reach decarbonisation in 2050, we calculate that LULUCF will contribute to 20% of natural greenhouse gas emissions removals, compared to the baseline year of 2018. This indicates that the countries of the Western Balkans should commit to lowering 80% of the greenhouse gas emissions by 2050, compared to the current levels.

In the case of Albania, we assume that the country should reach the 'no debit rule'. This means that the greenhouse gas emissions from land use are entirely compensated for by an equivalent accounted removal of the greenhouse gas emissions through action in the LULUCF sector, by 2030. Following this, it should still dedicate its efforts towards increasing the natural sinks so they account for 20% in 2050, compared to the current level of emissions.

The same assumptions are taken for Kosovo as well, namely working towards increasing the role of the natural removals to account for 20% by 2050, compared to the current level of greenhouse gas emissions.

¹⁸ * Denotes derived emissions

Table 7: LULUCF levels in the Western Balkans

	Year of the latest LULUCF reported data	LULUCF levels
Albania	2016	+13% (contributing to the increase of GHG)
Bosnia and Herzegovina	2014	-24.86%
Kosovo	2009	-0.34%
Montenegro	2018	-65.73%
North Macedonia	2016	-20.68
Serbia	2014	-25.87%

The linear reduction model

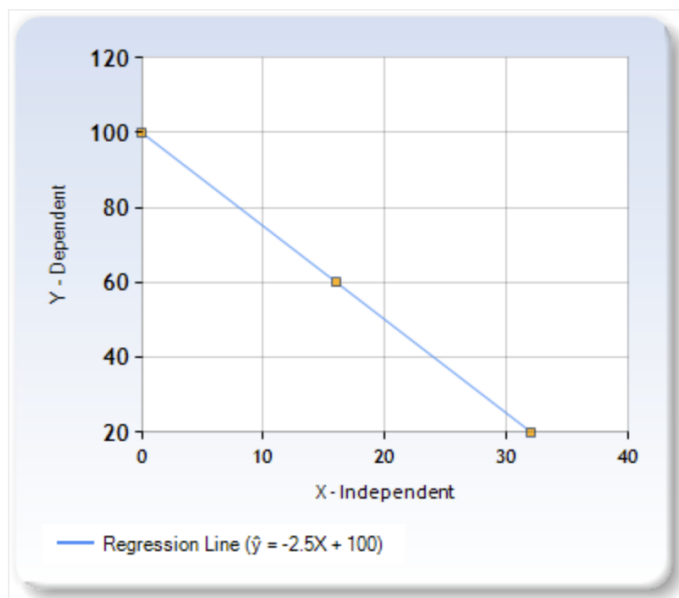
Taking into consideration the above assumptions, the linear reduction model is built to represent 80% of emissions reductions from 2018 until 2050 for all of the Western Balkan countries.

We use the least squares method to find the line of best fit for a set of paired data, allowing us to estimate the value of a dependent variable (Y) from a given independent variable (X).

The line of best fit is described by the equation $\hat{y} = bX + a$, where b is the slope of the line and a is the intercept (i.e., the value of Y when X = 0).

X represents the years, while Y the percentage of the emissions in the given year. X = 0 in the baseline year (2018), and reaches the maximum value in 2050, namely 32, while Y = 100% in the baseline year and in 2050, Y = 20% (taking into account the above assumptions on LULUCF).

X values (years)	Y values (emissions in %)	Summary of the calculation
0	100	Sum of X = 48, Sum of Y = 180, Mean X = 16, Mean Y = 60 Sum of squares (SSX) = 512 Sum of products (SP) = -1280 Regression Equation = $\hat{y} = bX + a$ $b = SP/SSX = -1280/512 = -2.5$ $a = MY - bMX = 60 - (-2.5*16) = 100$ $\hat{y} = -2.5X + 100$
16	60	
32	20	

Graph 1: Linear reduction line

The model $\hat{y} = -2.5X + 100$ indicates that emissions in 2030 should be 30% lower than 2018 levels.

2.2. Model for Scenario 2 / In line with the Paris Agreement

For the second model we refer to the illustrative model pathways of the IPCC Special Report on Global Warming of 1.5°C (SR1.5)¹⁹. SR1.5 identifies four illustrative pathways, which differ in the level of temporary overshoot of 1.5°C they foresee between now and 2100 (from 0°C to 0.4°C) and consequently differ in the number of dangerous impacts they would include. Furthermore, the higher the overshoot in a given pathway, the more carbon removals will be needed to bring temperature rise back to 1.5°C in the second half of the century²⁰.

We suggest using the P1 pathway as the preferred option. P1 foresees the least overshoot, limits the dangerous climate impacts the most and excludes the use of Carbon Capture and Storage (with or without bioenergy), as carbon removal needs will be the lowest of the four pathways. Table 2.4 of Chapter 2 of SR1.5, provides numbers for the total amount of 2030 global net greenhouse gas emissions and removals in GtCO₂-equivalent for the four illustrative pathways. For the P1 pathway, the number identified for 2030 is 22.1 Gigatonnes CO₂-equivalent.

¹⁹ The Intergovernmental Panel on Climate Change (IPCC). "SPECIAL REPORT: Global Warming of 1.5 °C", [available here](#).

²⁰ More info on the different pathways can be found on page 16 of the Summary for Policy Makers and on pages 100 and 123 of Chapter 2 of SR1.5 (Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development)

DISCLAIMER

Climate Action Network (CAN) Europe does not consider accounting for global per capita emissions as equitable, as the ambition of each country falls on their historical responsibility, economic development as well as equity.

Using the per capita emissions on the global level, to account for projected per capita emissions in each of the Western Balkan countries, is solely used for the context and calculation purposes of this exercise.

This also means that no disadvantages against countries with population control policies should be inferred from the assumptions made in this exercise.

Per capita emissions on a global level for the 2030 calculation: For consistency in data, we will convert 22.1 Gigatonnes CO₂eq to 22100 MtCO₂eq. The global population estimation according to the UN in 2030 is 8,548,487,371 , by which we divide the 22100 MtCO₂eq, which gives us 2.59E-06 (0.0000059...) MtCO₂eq per capita.

We now turn to calculations on how much the share of these emissions is in each Western Balkan country in 2030. For the purpose of this calculation, we calculate the per capita emissions on a global level in 2030, and multiply for the expected population in each of the countries in the Western Balkans.

2030 GHG emissions and removals = country population forecast in 2030 * 2030 global per capita emissions.

3. Application of models

3.1 Albania

Historical emissions in Albania

Greenhouse gas emissions in Albania rose by almost 100% between 1990 and 2009. By 2016, the rise went above 100%.

The graph below shows greenhouse gas emission in Albania, according to official resources (see Table X for references):

Graph 2: Historical greenhouse gas emissions in Albania MtCO₂eq, excluding LULUCF

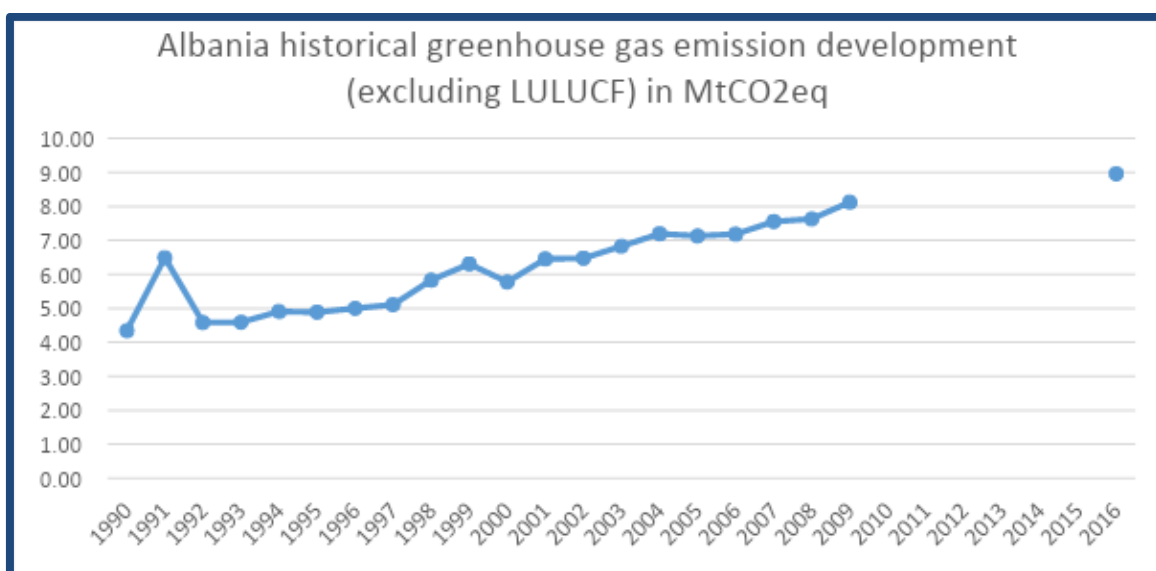


Table 8: Sources of greenhouse gas emissions in 1990 and in 2016 in Albania

Year	1990	2016	
Source	Share in %	Share in %	Percentage change
Energy	71.54	52.87	-26.10
Industrial processes	4.86	11.49	136.42
Agriculture	20.31	26.44	30.18
Waste	3.29	9.20	179.64
Emissions in MtCO ₂ eq	4.34	8.95	106.22

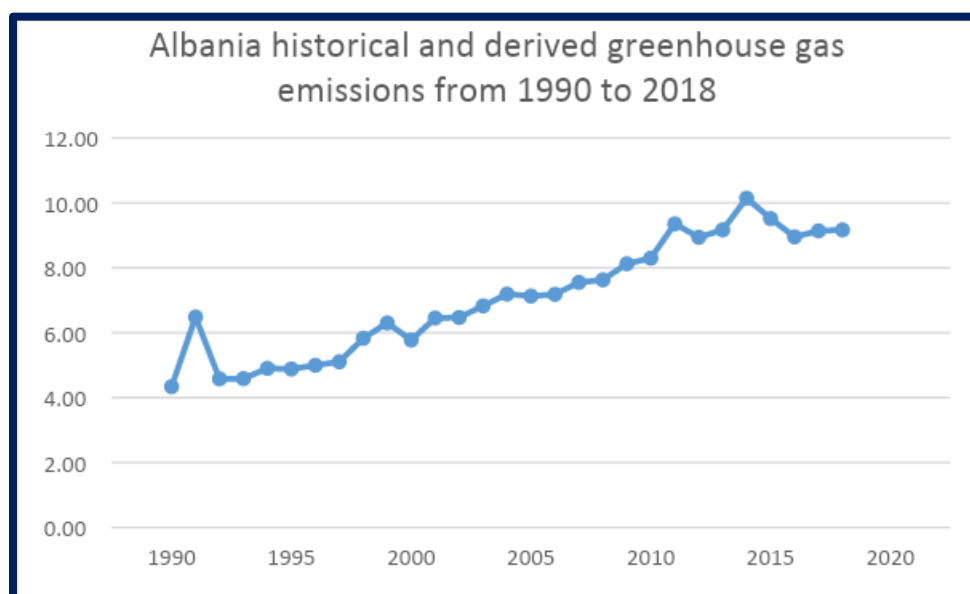
In Albania, the land use, land use change and forestry (LULUCF) sector does not lower emissions, instead it increases them. In 1990, the greenhouse gas emissions from the LULUCF were 3.49 MtCO₂eq, bringing the total net emissions to 7.83 MtCO₂eq, and representing 44.57% of overall emissions. In 2016, the LULUCF accounted for 13% - or 1.32 MtCO₂eq - of overall emissions (10.18 MtCO₂eq), which is a significant reduction compared to 1990, but it still added to overall emissions.

Baseline year emissions (2018)

To project emissions in 2018, we used the trend change in emissions of the PRIMAP-hist national historical emissions time series (1850-2018) v2.2 from 2016 to 2018 and applied it to the last official emissions data available from 2016.

Since there is a considerable gap in emissions data between 2010 and 2015, we used the PRIMAP trend change to calculate emissions for those years to give a complete picture.

Graph 3: Historical and derived greenhouse gas emission in Albania in MtCO₂eq, excluding LULUCF



The application of this yielded the emissions for 2018, which for Albania were 9.17 MtCO₂eq.

Albania Scenario 1 / Linear reduction

When applied to the baseline year of 2018, taking into account the assumptions, the model $\hat{y} = -2.5X + 100$ indicates that each of the Western Balkan countries should reduce its emissions by 30% in 2030, compared to the level of emissions in 2018. For Albania this emissions reduction means that the emissions in 2030 should be 6.42 MtCO₂eq.

2030 linear greenhouse gas emission target results in MtCO ₂ eq (excluding LULUCF)			
Emissions in 2018	Linear reduction – 30% in 2030	Emissions in 1990	Linear reduction in 2030, as a percentage change compared to 1990 emissions
9.17	6.42	4.34	+ 47.93%

Albania Scenario 2 / 1.5 pathway

For Scenario 2, we have calculated the global per capita emissions in 2030 and we now apply it to the estimation of Albania's population in 2030.

According to model: 2030 GHG emissions and removals = country population forecast in 2030 * 2030 global per capita emissions.

Albania 2030 GHG emissions and removals = 2,745,996²¹ MtCO₂eq/capita * 2.59E-06MtCO₂eq = 7.1 MtCO₂eq.

2030 1.5 pathway greenhouse gas target results in MtCO ₂ eq (including LULUCF)		
Albania greenhouse gas emissions in 2030	Emissions in 1990	2030 1.5 pathway greenhouse gas target, as a percentage change compared to 1990 emissions
7.1	7.83	-9.32%

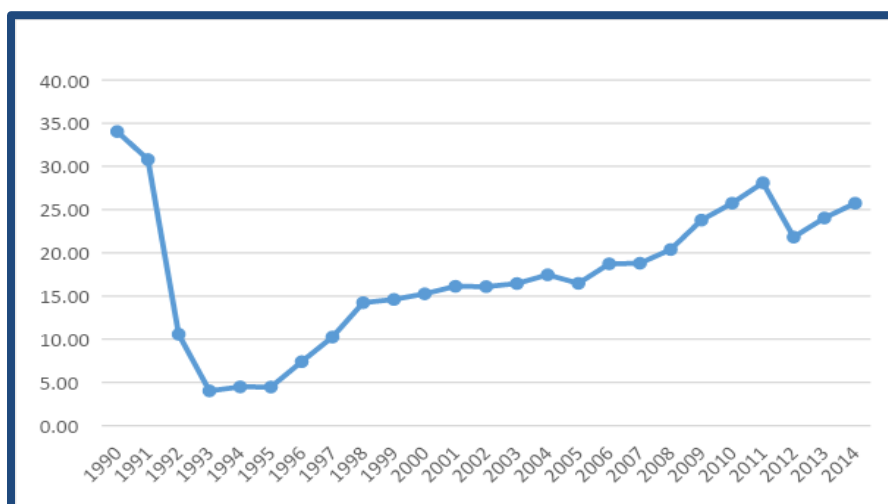
3.2. Bosnia and Herzegovina

Historical emissions in Bosnia and Herzegovina

At the beginning of the 1990s, emissions in Bosnia and Herzegovina fell sharply, but they have since been on the rise. Bosnia and Herzegovina accounts for around 20% of total greenhouse gas emissions in the Western Balkans (see table X).

Greenhouse gas emissions in Bosnia and Herzegovina are shown in the graph below, according to the latest available official resources (see Table X for references).

Graph 4: Historical greenhouse gas emissions in Bosnia and Herzegovina in MtCO₂eq, excluding LULUCF



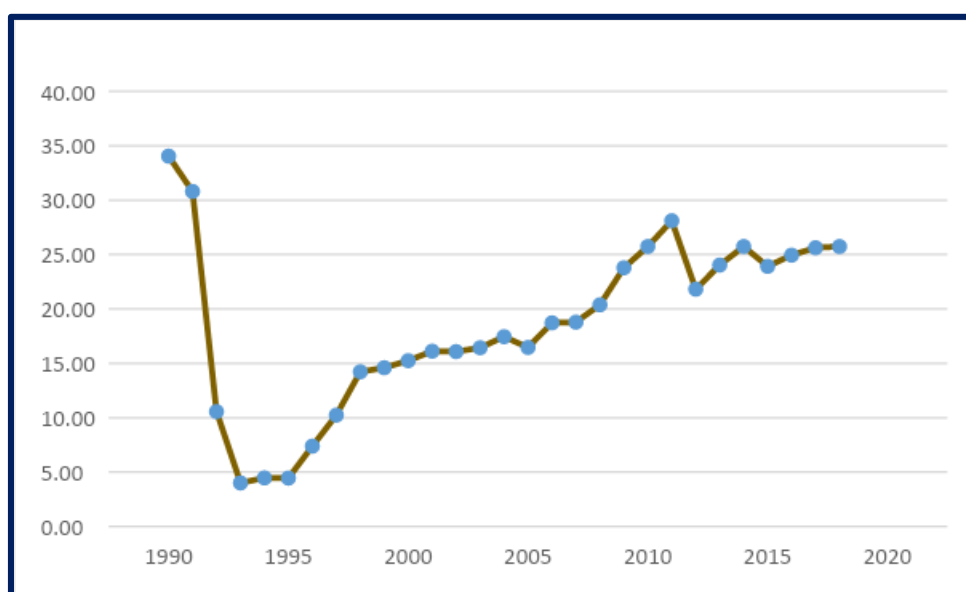
²¹ PROJECTION HYPOTHESES FOR POPULATION (2019-2031), [available here](#)

Table 9: Sources of greenhouse gas emissions in Bosnia and Herzegovina in 1990 and 2014

Year	1990	2014	
Source	Share in %	Share in %	Percentage change
Energy	73.11	78.30	7.10%
Industrial processes	10.44	8.50	-18.58%
Agriculture	13.54	9.53	-29.62%
Waste	2.92	3.67	25.68%
Emissions in MtCO ₂ eq	34.04	25.74	-24.38%

Baseline year emissions (2018)

To calculate emissions in 2018, we used the trend change in emissions of the PRIMAP-hist national historical emissions time series (1850-2018) v2.2 from 2014 to 2018 and applied it to the last official emissions data available in 2014.

Graph 5: Historical and derived greenhouse gas emissions in Bosnia and Herzegovina in MtCO₂eq, excluding LULUCF

The results show that the projected emissions for 2018 were 25.74 MtCO₂eq.

Bosnia and Herzegovina Scenario 1 / Linear reduction

When applied to the baseline year of 2018, taking into account the assumptions, the model $\hat{y} = -2.5X + 100$ indicates that each of the Western Balkan countries should reduce its emissions by 30% in 2030, compared to the level of emissions in 2018. For Bosnia and Herzegovina this reduction means that the emissions in 2030 should be 18.02 MtCO₂eq.

2030 linear greenhouse gas emissions target results in MtCO ₂ eq (excluding LULUCF)			
Emissions in 2018	Linear reduction – 30% in 2030	Emissions in 1990	Linear reduction in 2030, as a percentage change compared to 1990 emissions
25.74	18.02	34.04	-47.06%

Bosnia and Herzegovina Scenario 2 / 1.5 pathway

For Scenario 2 we have calculated the global per capita emissions in 2030 and we now apply it to the estimation of Bosnia and Herzegovina's population in 2030.

According to model: 2030 GHG emissions and removals = country population forecast in 2030 * 2030 global per capita emissions.

Bosnia and Herzegovina 2030 GHG emissions and removals = 3,267,174²² MtCO₂eq/capita * 2.59E-06MtCO₂eq = 8.45 MtCO₂eq.

2030 1.5 pathway greenhouse gas target results in MtCO ₂ eq (including LULUCF)		
Bosnia and Herzegovina greenhouse gas emissions in 2030	Emissions in 1990	2030 1.5 pathway greenhouse gas target, as a percentage change compared to 1990 emissions
8.45	26.62	-68.25%

3.3. Kosovo

There is no official available data on greenhouse gas emissions for Kosovo, covering the period from 1990 to 2007, however, official data is available from 2008 to 2017. The trend of greenhouse gas emissions is relatively stable.

The land use, land use change and forestry sector officially plays a small part in accounting the level of emissions as it represents less than 0.4% of natural sinks. Hence, the gross and net emissions in both scenarios are the same for the baseline year 2018. The assumption of this exercise is that Kosovo should work towards increasing the role of the LULUCF sector, as in the rest of the region, to around 20% of natural sinks in 2050.

²² Agency for Statistics, Bosnia and Herzegovina, "Analysis of the state of the population and population projections for the period 2020-2070 in Bosnia and Herzegovina". [Available here.](#)

Graph 6: Historical greenhouse gas emissions in Kosovo in MtCO₂eq, excluding LULUCF

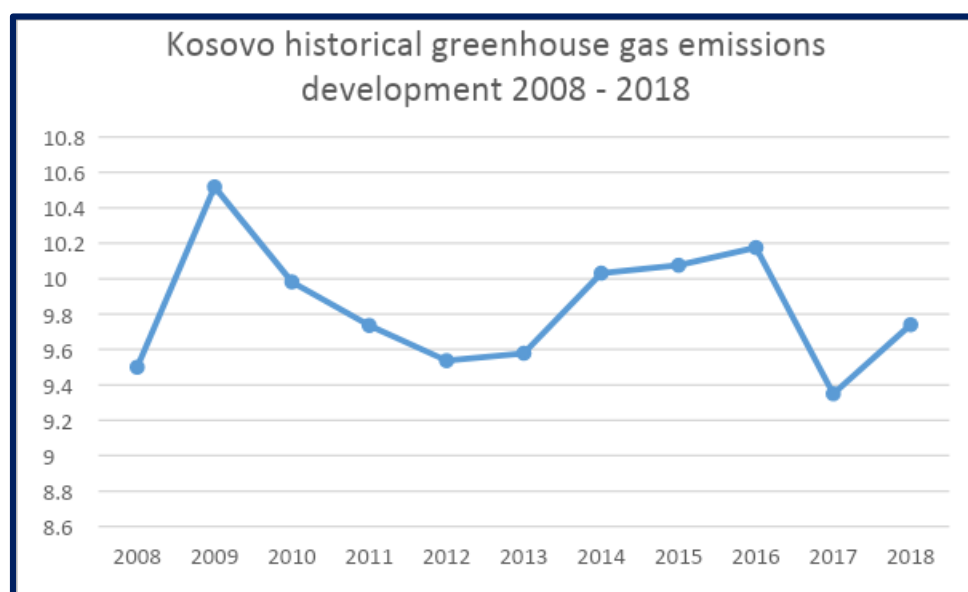


Table 10: Sources of greenhouse gas emissions in 2008 and in 2018 in Kosovo

Year	2008	2018	
Source	Share in %	Share in %	Percentage change
Energy	80	87	8.75%
Industrial processes	3	2	-33.33%
Agriculture	14	6	-57.14%
Waste	3	5	66.67%
Emissions in MtCO ₂ eq	9.5	9.74	2.53%

Kosovo Scenario 1 / Linear reduction

When applied to the baseline year of 2018, taking into account the assumptions, the model $\hat{y} = -2.5X + 100$ indicates that each of the Western Balkan countries should reduce its emissions by 30% in 2030, compared to the level of emissions in 2018. For Kosovo this reduction means that emissions in 2030 should be 6.82 MtCO₂eq.

Kosovo Scenario 2 / 1.5 pathway

For Scenario 2 we have calculated the global per capita emissions in 2030 and we now apply it to the estimation of Kosovo's population in 2030.

According to model: 2030 GHG emissions and removals = country population forecast in 2030 * 2030 global per capita emissions.

Kosovo 2030 GHG emissions and removals = $1,818,674^{23} \text{MtCO}_2\text{eq/capita} * 2.59\text{E-}06 \text{MtCO}_2\text{eq} = 4.7 \text{MtCO}_2\text{eq}$.

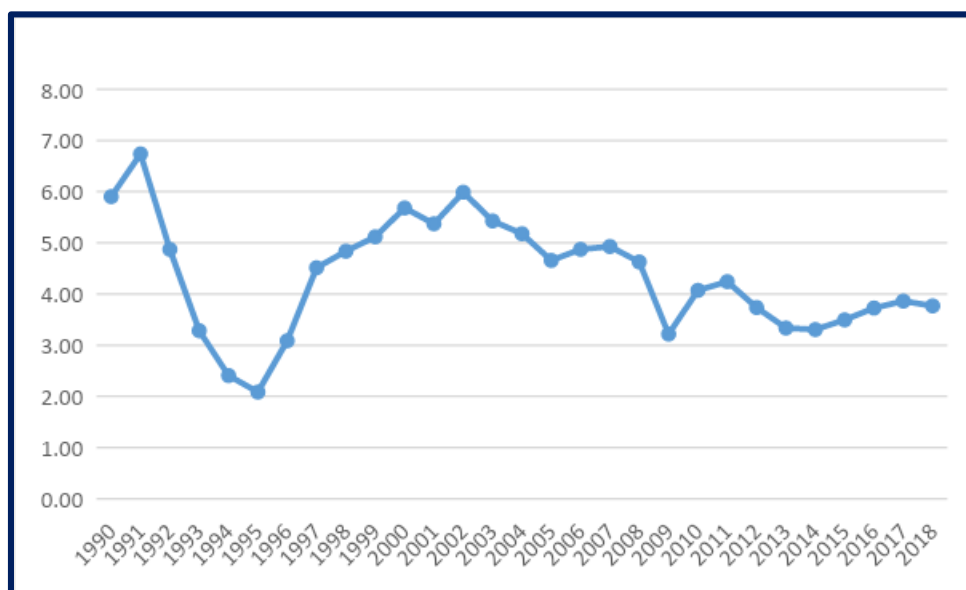
Kosovo Scenario 1 and 2			
Emissions in 2018	Linear reduction – 30% in 2030	Kosovo greenhouse gas emissions in 2030, 1.5 pathway	2030 1.5 pathway greenhouse gas target, as a percentage change compared to 2018
9.74	6.82	4.7	-51.74%

3.4 Montenegro

Historical emissions in Montenegro

Official historical emissions data in Montenegro cover the period from 1990 to 2015. The data were also available for emissions in 2018, which means we do not need to use the PRIMAP dataset forecast for Montenegro to determine the baseline year. Nevertheless, due to missing data for 2016 and 2017 we have derived them using the PRIMAP dataset, giving us the following emissions overview:

Graph 7: Historical and derived greenhouse gas emissions in Montenegro in MtCO₂eq, excluding LULUCF



²³ Kosovo Agency of Statistics, “KOSOVO POPULATION PROJECTION 2017 – 2061”, Available here: <https://ask.rks-gov.net/media/3741/kosovo-population-projection-2017-2061.pdf>

Table 11: Sources of greenhouse gas emissions in 1990 and in 2018 in Montenegro

Year	1990	2018	
Source	Share in %	Share in %	Percentage change
Energy	41.37	74.24	79.45%
Industrial processes	43.06	10.09	-76.57%
Agriculture	13.73	7.6	-44.65%
Waste	1.84	8.06	338.04%
Emissions in MtCO ₂ eq	5.9	3.77	-36.10%

Montenegro Scenario 1 / Linear reduction

When applied to the baseline year of 2018, taking into account the assumptions, the model $\hat{y} = -2.5X + 100$ indicates that each of the Western Balkan countries should reduce its emissions by 30% in 2030, compared to the level of emissions in 2018. For Montenegro this emissions reduction means that the emissions in 2030 should be 2.64 MtCO₂eq.

2030 linear greenhouse gas emissions target results in MtCO ₂ eq (excluding LULUCF)			
Emissions in 2018	Linear reduction – 30% in 2030	Emissions in 1990	Linear reduction in 2030, as a percentage change compared to 1990 emissions
3.77	2.64	5.9	-55.25%

Montenegro Scenario 2 / 1.5 pathway

For Scenario 2 we have calculated the global per capita emissions in 2030 and we now apply it to the estimation of Montenegro's population in 2030.

According to model: 2030 GHG emissions and removals = country population forecast in 2030 * 2030 global per capita emissions.

Montenegro 2030 GHG emissions and removals = 578,307²⁴MtCO₂eq/capita * 2.59E-06MtCO₂eq = 8.45 MtCO₂eq.

2030 1.5 pathway greenhouse gas target results in MtCO ₂ eq (including LULUCF)		
Montenegro greenhouse gas emissions in 2030	Emissions in 1990	2030 1.5 pathway greenhouse gas target, as a percentage change compared to 1990 emissions
1.5	4.37	-65.67%

²⁴ Agency of Statistics Montenegro, "Projections of the population of Montenegro by 2060 with a structural analysis of the population of Montenegro". [Available here](#).

3.5. North Macedonia

Historical emissions in North Macedonia

Official reporting on North Macedonian greenhouse gas emissions covers the period from 1990 to 2016.

Graph 8: Historical greenhouse gas emissions in North Macedonia in MtCO₂eq, excluding LULUCF

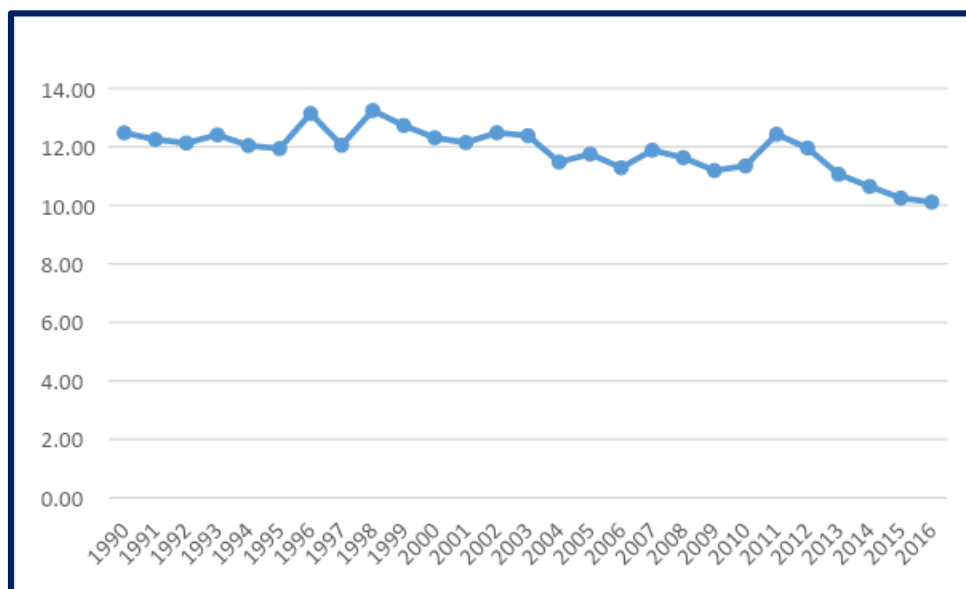


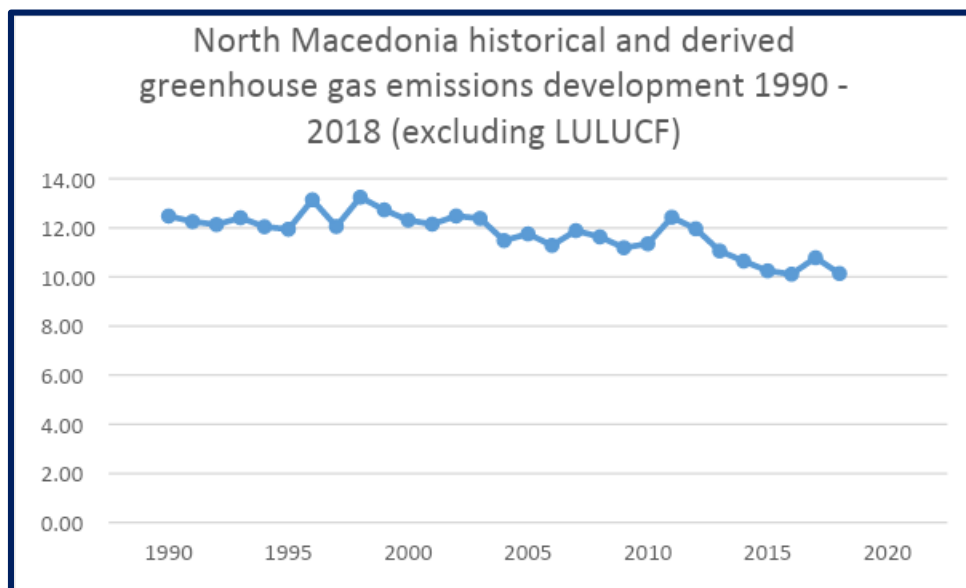
Table 12: Sources of greenhouse gas emissions in 1990 and in 2016 in North Macedonia

Year	1990	2016	
Source	Share in %	Share in %	Percentage change
Energy	77.30	73.70	-4.66%
Industrial processes	7.50	8.50	13.33%
Agriculture	11.90	11.80	-0.84%
Waste	3.30	6.00	81.82%
Emissions in MtCO ₂ eq	12.48	10.11	-18.99%

Baseline year emissions (2018)

For projecting the emissions in 2018, we again turned to the trend change in emissions of the PRIMAP-hist national historical emissions time series (1850-2018) v2.2 from 2016 to 2018 and applied it to the last official emissions data available – 2016.

Graph 9: Historical and derived greenhouse gas emissions in North Macedonia in MtCO₂eq, excluding LULUCF



The results of using the PRIMAP model for deriving the emissions for 2017 and 2018, gave the greenhouse gas emissions baseline of 10.14 MtCO₂eq.

North Macedonia Scenario 1 / Linear reduction

When applied to the baseline year of 2018, taking into account the assumptions, the model $\hat{y} = -2.5X + 100$ indicates that each of the Western Balkan countries should reduce its emissions by 30% in 2030, compared to the level of emissions in 2018. For North Macedonia this reduction means that the emissions in 2030 should be 7.10 MtCO₂eq.

2030 linear greenhouse gas emissions target results in MtCO ₂ eq (excluding LULUCF)			
Emissions in 2018	Linear reduction – 30% in 2030	Emissions in 1990	Linear reduction in 2030, as a percentage change compared to 1990 emissions
10.14	7.10	12.48	-43.11%

North Macedonia Scenario 2 / 1.5 pathway

For Scenario 2 we have calculated the global per capita emissions in 2030 and we now apply it to the estimation of North Macedonia population in 2030.

According to model: 2030 GHG emissions and removals = country population forecast in 2030 * 2030 global per capita emissions.

North Macedonia 2030 GHG emissions and removals = 2,069,000²⁵ MtCO₂eq/capita * 2.59E-06MtCO₂eq = 8.45 MtCO₂eq.

2030 1.5 pathway greenhouse gas target results in MtCO ₂ eq (including LULUCF)		
North Macedonia greenhouse gas emissions in 2030	Emissions in 1990	2030 1.5 pathway greenhouse gas target, as a percentage change compared to 1990 emissions
5.35	12.27	-56.40%

3.6. Serbia

Serbia accounts for more than 50% of all greenhouse gas emissions in the Western Balkans region.

Table 13: Sources of greenhouse gas emissions in 1990 and in 2014 in Serbia

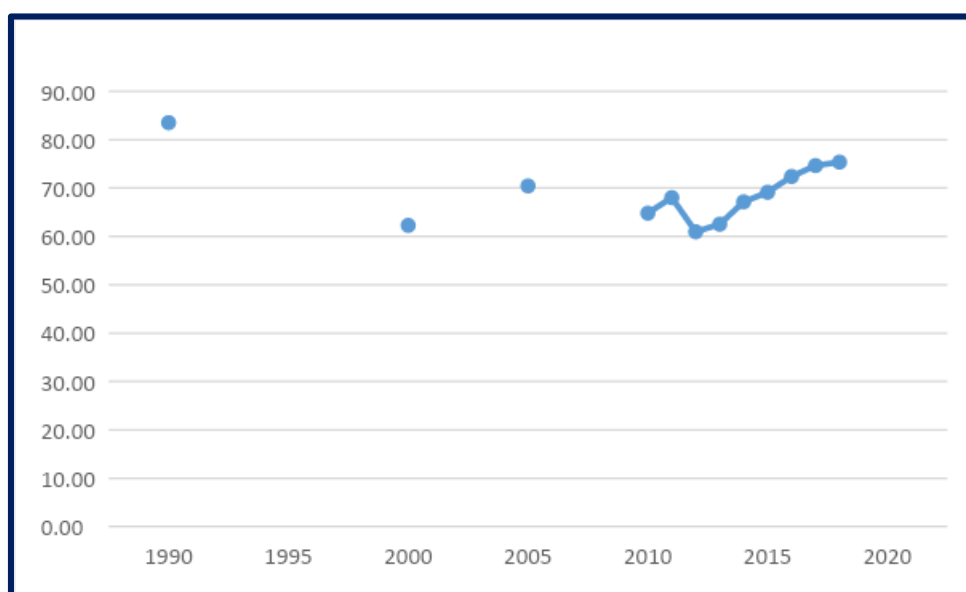
Year	1990	2014	
Source	Share in %	Share in %	Percentage change
Energy	79.04	80.42	1.74%
Industrial processes	5.76	5.09	-11.60%
Agriculture	10.57	9.58	-9.41%
Waste	4.62	4.91	6.15%
Emissions in MtCO ₂ eq	83.52	67.15	-19.60%

Baseline year emissions (2018)

For projecting the emissions in 2018, we again turned to the trend change in emissions of the PRIMAP-hist national historical emissions time series (1850-2018) v2.2 from 2014 to 2018 and applied it to the last official emissions data available – 2014.

²⁵ Ministry of Labour and Social Policy North Macedonia, "Strategy for Demographic Policies 2015-2014", [available here](#).

Graph 10: Historical reported emissions in Serbia in MtCO₂eq, excluding LULUCF



The calculations show that the level of emissions in the baseline year of 2018 in Serbia are 75.36 MtCO₂eq.

Serbia Scenario 1 / Linear reduction

When applied to the baseline year of 2018, taking into account the assumptions, the model $\hat{y} = -2.5X + 100$ indicates that each of the Western Balkan countries should reduce its emissions by 30% in 2030, compared to the level of emissions in 2018. For Serbia this emissions reduction means that the emissions in 2030 should be 52.75 MtCO₂eq.

2030 linear greenhouse gas emissions target results in MtCO ₂ eq (excluding LULUCF)			
Emissions in 2018	Linear reduction – 30% in 2030	Emissions in 1990	Linear reduction in 2030, as a percentage change compared to 1990 emissions
75.36	52.75	83.52	-36.84

Serbia Scenario 2 / 1.5 pathway

For Scenario 2 we have calculated the global per capita emissions in 2030 and we now apply it to the estimation of Serbia's population in 2030.

According to model: 2030 GHG emissions and removals = country population forecast in 2030 * 2030 global per capita emissions.

Serbia 2030 GHG emissions and removals = 6,667,049²⁶MtCO₂eq/capita * 2.59E-06MtCO₂eq = 17.24 MtCO₂eq.

2030 1.5 pathway greenhouse gas target results in MtCO ₂ eq (including LULUCF)		
Serbia greenhouse gas emissions in 2030	Emissions in 1990	2030 1.5 pathway greenhouse gas target, as a percentage change compared to 1990 emissions
17.24	66.66	-74.14%

²⁶ Statistical Office of Serbia, "Demographic Yearbook", [available here](#).

4. Results from model application, their comparison and equity check considerations

The Western Balkan countries are currently at a decarbonisation junction. Most countries so far have postponed, or only partially tackled decarbonisation. At this point in time there are no simple and easy options – any path will require strong action if the region intends to adhere to its political commitment of reaching carbon neutrality by 2050.

This study has shown that the estimated levels of greenhouse gas emissions in the coming years should be significantly reduced and will require the establishment of the correct policy framework to allow the region to achieve its 2050 goals. Setting ambitious 2030 targets would be a stepping stone in this direction. Western Balkan countries therefore need to urgently draft ambitious National Energy and Climate Plans. These plans should be coherent with the development of long term strategies, climate laws, as well as enhanced Nationally Determined Contributions, that are sufficient to meet the goals of the Paris Agreement.

One of the main challenges of the study was determining the current level of emissions. Any future planning, as well as the implementation of long-term strategies, would require constant and accurate monitoring of greenhouse gas emissions. All countries must provide robust, transparent, consistent and accurate monitoring and reporting of greenhouse gas emissions.

The study, taking into account the current circumstances of the Western Balkans, provided two scenarios for each country to show where to set the ambition of their targets for 2030 greenhouse gas emissions reduction. Scenario 1, the linear reduction pathway, should be seen as a minimal level of ambition that countries should follow by 2030 in order to achieve decarbonisation by 2050. Scenario 2, the 1.5 pathway, shows the share of emissions which each Western Balkan country should follow to stay in line with the Paris Agreement goal of keeping the temperature rise to well below 2°C.

For most of the countries, even if they follow Scenario 1, they need to drastically lower their emissions.

For this exercise we did not make assumptions on equity and the fairness of the targets. Nevertheless, we saw it fit to consult the Paris Equity Check²⁷ which presents scientifically peer-reviewed assessments of the ambition of countries' climate pledges (the Nationally Determined Contributions).

²⁷ Paris Equity Check, Available here: <http://paris-equity-check.org/>

Below we will refer to the Pledged Warming Map, which provides an assessment of global warming when each signatory party of the Paris Agreement follows their ambition. It follows the equity principle where each country follows the least stringent of the three equity concepts: historical responsibility, capacity to pay and equality. This assessment uses the bottom-up architecture of the Paris Agreement, with the top-down warming threshold.

The 2°C scenario features a likely (>66%) chance of staying below a 2°C temperature rise over the century and a median (>50%) chance of staying below 1.7°C in 2100. The 1.5°C scenario features a median chance of staying below 1.5°C in 2100, while allowing for a potential overshoot of 1.5°C before. Securing the chance of staying below 1.5°C of warming requires greater mitigation efforts than the trajectories presented here.

Emissions from land use (LULUCF emissions) are not included since there is not a universal method of accounting for positive or negative LULUCF emissions. Moreover, LULUCF emissions are not considered as part of the scope of negotiations on emissions reduction by all parties.

Due to a lack of data, the Paris Equity Check is only available for Bosnia and Herzegovina, North Macedonia (FYROM) and Serbia.

Albania

Albania does not have any coal in its energy mix, however the energy sector accounts for more than 50% of the country's emissions and it is the only country that has increased its current level of emissions by more than 100% compared to 1990. This means that, due to the low level of emissions in 1990, a 30% reduction of the current (2018) greenhouse gas emissions levels, would still leave emissions almost 50% higher compared to 1990, according to Scenario 1.

It is important to underline that only in Albania does the land use, land use change and forestry sector contribute to an increase in overall emissions. If Albania were to commit to achieving 'no debit' in the LULUCF sector by 2030, the country could meet its Scenario 2 requirements.

The Albanian paradox: In both scenarios we assume that Albania reaches 'no debit' in the LULUCF sector by 2030. Scenario 1 foresees emission levels of 6.42 MtCO₂eq, compared to 7.1 MtCO₂eq in Scenario 2, meaning that the emissions in the scenario compatible with the Paris Agreement are higher than the linear reduction emissions.

Bosnia and Herzegovina

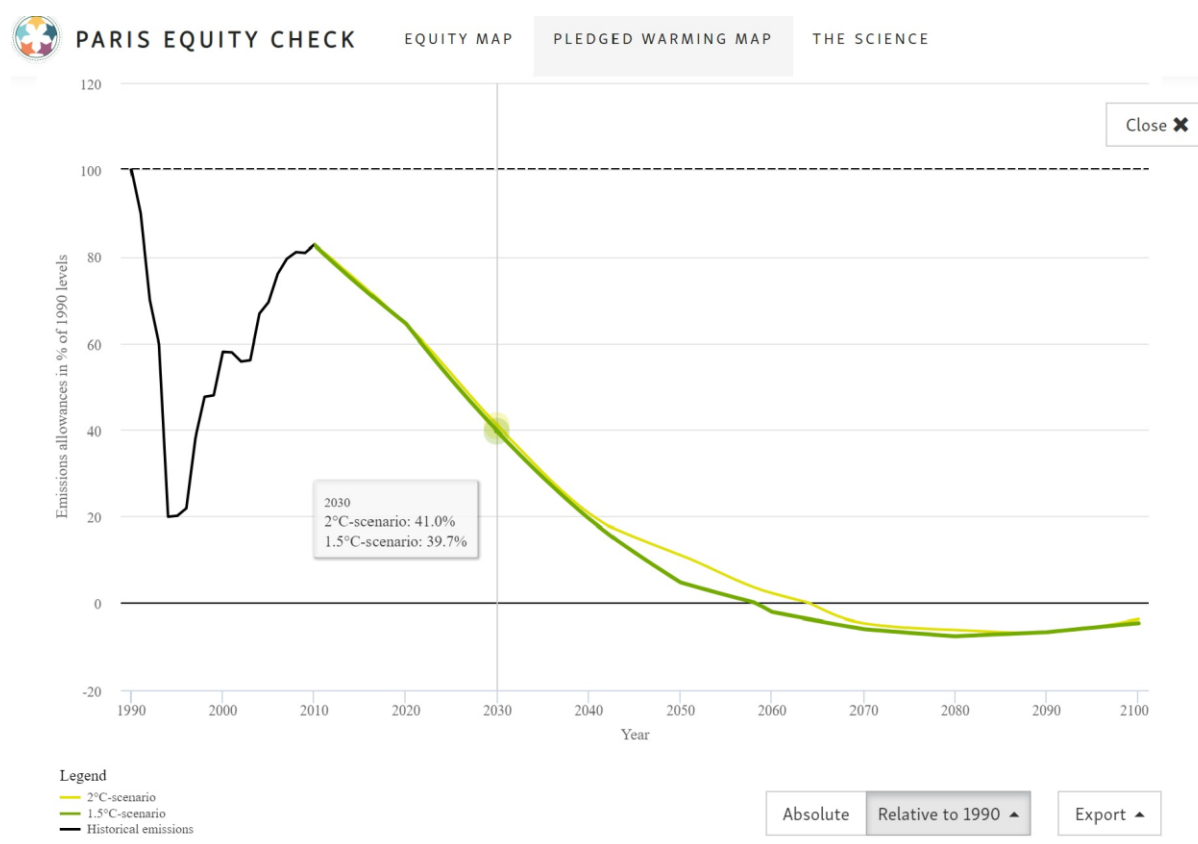
Bosnia and Herzegovina accounts for 20% of regional greenhouse gas emissions and its energy sector accounts for almost 80% of that. Currently, Bosnia and Herzegovina is developing new coal power plants, which will only lead to an increase in overall emissions and to a failure to work towards the decarbonisation of the energy sector.

The linear reduction scenario shows that a 30% emissions reduction in 2030 compared to the baseline (2018), means reducing greenhouse gas emissions by roughly 47% compared to 1990 levels. However, the 1.5 pathway scenario, including LULUCF, shows a reduction of 68%. The latest data on emissions removals suggest that LULUCF absorbs roughly 25% of total emissions.

We assume that LULUCF sinks will account for 20% of total greenhouse gas emissions by 2050 in each Western Balkan country compared to 2018. If we assume that natural sinks account for 20% in 2030, which is still lower than the levels current official data indicate, Scenario 1 (-47% compared to 1990 excluding LULUCF) and Scenario 2 (-68% including LULUCF) are actually compatible with one another when compared to 1990 emission levels.

Bosnia and Herzegovina equity check

The Bosnia and Herzegovina equity check is shown in the graph below:



The equity check for the 1.5 scenario foresees a 60.3% reduction in emissions in Bosnia and Herzegovina compared to 1990 levels, excluding the LULUCF sector. This level of ambition is higher than both of our scenarios.

Overview of the current pledges

Bosnia and Herzegovina has recently adopted and submitted an enhanced NDC²⁸ to the UNFCCC. In its NDC, Bosnia and Herzegovina foresees 1.05 GW of new coal based electricity generation. The NDC does not take into account the political commitment to decarbonise by 2050, while the highest ambition scenario for 2030 foresees a 36.8% decrease in emissions compared to 1990, and a 65.6% reduction in greenhouse gas emissions by 2050 compared to 1990.

Kosovo

Kosovo has a limited amount of historical greenhouse gas emissions data. Until new data is available, we are taking the current situation in the country into account. The energy sector still accounts for more than 80% of total national greenhouse gas emissions.

One of the main assumptions relates to the LULUCF sector for which calculations are yet to be determined. The available data for LULUCF in 2008 and 2009, show that the sector accounted for less than 0.4% of natural sinks, making it insignificant in our calculations. Therefore, we ran both models on the current level of emissions. While the linear reductions scenario foresees 30% of emissions reduction by 2030 compared to 2018, the 1.5 pathway suggests almost 52% of emissions reduction compared to 2018.

Montenegro

The energy sector in Montenegro has increased its role significantly as a dominant source of greenhouse gas emissions – a notable 80% surge from 1990 to 2018, making it a sector with urgent need for decarbonisation measures. Montenegro's baseline emissions in 2018 are 36% lower compared to 1990.

The 30% emissions reduction in Scenario 1, compared to 2018, indicates that Montenegro's emissions in 2030 should be 55.25% lower than in 1990, excluding LULUCF. While the 1.5 pathway scenario foresees a reduction of 65.67% of emissions compared to 1990, including LULUCF. Here, we again have results showing the lowest ambition of emissions reduction (from Scenario 1) to be compatible with the 1.5 pathway.

It must be highlighted that Montenegro has reported high values of LULUCF. In 2018, the sector accounted for 65.73% of natural sinks, or 2.45 MtCO₂eq, while gross emissions in 2018 were 3.77 MtCO₂eq. Montenegro should assess the role of the LULUCF sector in detail and the sector should not dictate the ambition of greenhouse gas emissions reduction.

Overview of the current pledges

In June 2021 Montenegro submitted its enhanced NDC²⁹ to the UNFCCC. Montenegro is now committing to lower its greenhouse gas emissions by 35% compared to the 1990 level, excluding LULUCF, while our linear scenario suggests 55.25% of emissions reductions compared to the same year.

²⁸ [Nationally Determined Contributions \(NDC\) of Bosnia and Herzegovina for period 2020-2030](#)

²⁹ [Updated NDC for Montenegro](#)

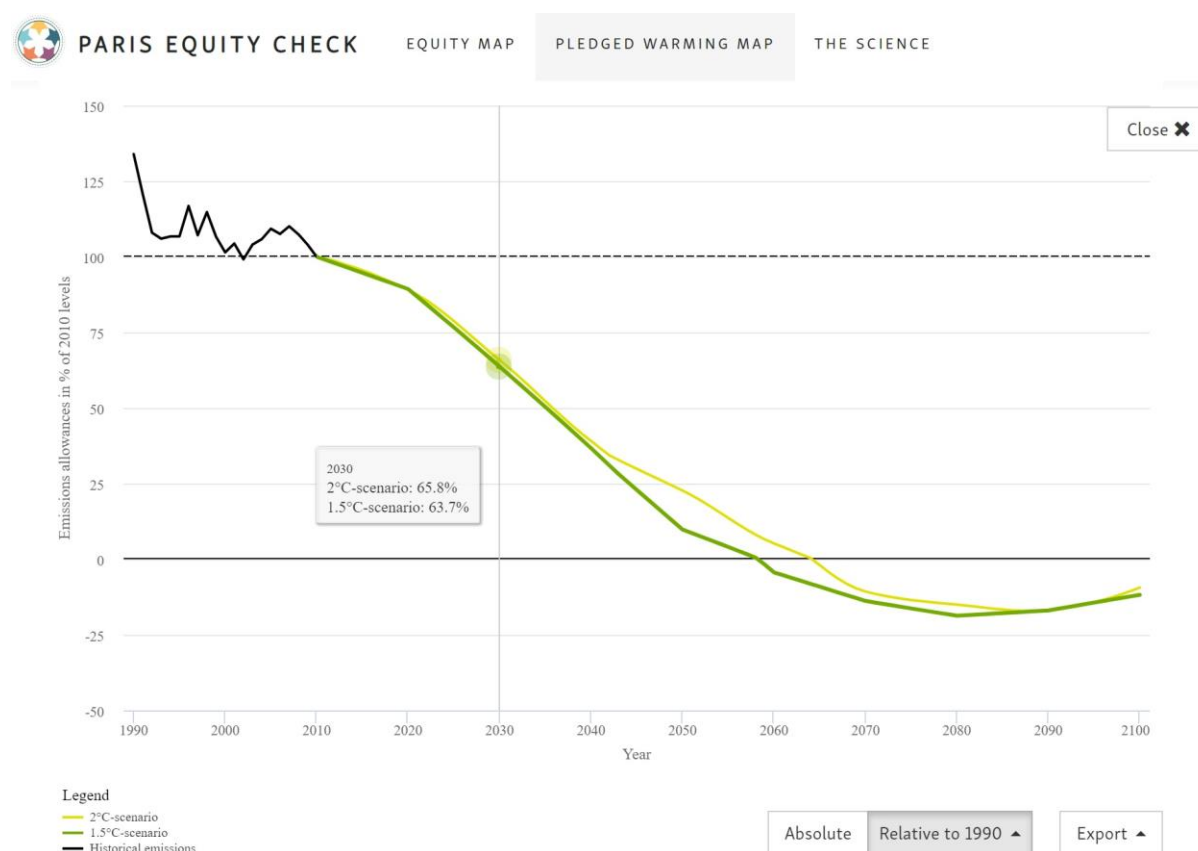
North Macedonia

North Macedonia's current emissions are almost 20% lower than 1990 levels. Although emissions in the energy sector are around 5% lower, they still account for more than 73% of all greenhouse gas emissions.

The Scenario 1 30% emissions reduction in 2030, compared to 2018 levels, means a 43.11% emissions reduction compared to 1990, excluding LULUCF. While the 1.5 pathway foresees a decrease of 56.4% of emissions compared to 1990.

North Macedonia has submitted its enhanced NDC³⁰, which is in line with the draft NECP³¹ and its 2040 energy strategy. These foresee a coal phase out by 2027.

The NDC and NECP foresee a 51% reduction in emissions, excluding LULUCF, which is more ambitious than both of the scenarios, and even more ambitious than the Paris Equity Check scenario, presented in the graph below:



³⁰ [Ministry of Environment and Physical Planning North Macedonia, "Enhanced Nationally Determined Contribution"](#)

³¹ ["National Energy and Climate Plan of the Republic of North Macedonia: DRAFT"](#), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2020

Serbia

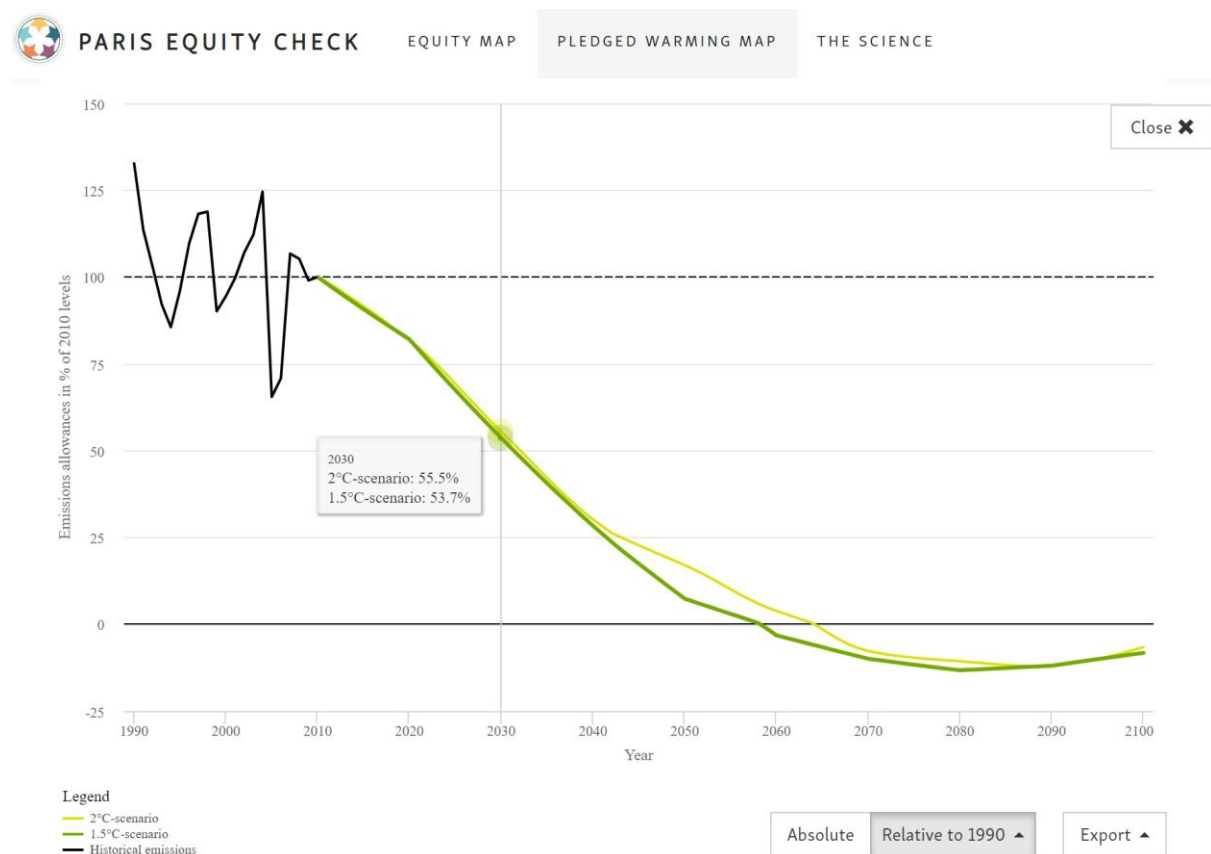
Serbia accounts for more than 50% of all greenhouse gas emissions in the Western Balkans region, and the energy sector accounts for the largest share of these emissions at 80%.

Applying Scenario 1 to the derived emissions in 2018 shows that to achieve a 30% emissions reduction compared to the baseline, emissions need to be reduced by almost 37% compared to 1990 levels, excluding LULUCF. While the 1.5 pathway suggests a 74.14% emissions reduction compared to 1990 (including LULUCF).

In Serbia, there are no official indications of the level of ambition on reducing greenhouse gas emissions by 2030. Serbia is significantly lagging behind in developing long term strategies as well as drafting the National Energy and Climate Plans, which are the key tools for achieving decarbonisation by 2050, using 2030 as a stepping stone.

It must be underlined that Serbia is one of two countries in the Western Balkans which is developing, or planning to develop, new coal power plants.

The Paris Equity Check tool also provides useful insight on what the 2030 ambition for Serbia should be, which is presented in the graph below:



The graph indicates that Serbia should reduce emissions by 46.3% (not including LULUCF), which represents a middle ground between the results from both of the scenarios, once equity is taken into account.