CREA

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Western Balkan coal power plants polluted twice as much as those in the EU in 2019

BRIEFING PAPER BY

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Coal power plants in the Western Balkans repeatedly breach pollution control rules

The non-compliance of Western Balkan[1] coal power plants with the emission limits enshrined in the Energy Community Treaty is reflected in the region's high sulphur dioxide (SO_2), nitrogen oxides (NO_x) and dust emissions. This briefing looks mainly at the SO_2 emissions between 2015 and 2019, and compares them to those of the then EU28 member states. It also studies NO_x and dust emissions in relation to the electricity produced by coal-fired power plants.

The results make an urgent case for the discontinuation of coal-fired electricity production as well as urgent improvements in pollution control for those plants which need to operate for a few more years. Leaving coal behind is in the interest of Western Balkan countries seeking to improve their populations' health and accede to the EU and would set course for an all-inclusive transition away from highly polluting coal for the entire EU and Energy Community region within the next 10-15 years.

17 of the 18 coal power plants in the Western Balkans have had the legal obligation to implement the EU's Large Combustion Plant Directive (LCPD) since 2018.[2] This should have resulted in significant immediate drops in SO_2, NO_x and dust pollution, as well as further gradual reductions of these pollutants until the end of 2027.

However, progress towards compliance has been slow and incomplete. In some cases, the construction of desulphurisation equipment to meet the required emission reductions began after the deadline for LCPD implementation — such as for the Nikola Tesla A in Serbia, where installation started in February 2019 (Serbia Energy, 2020). For Tuzla 6 and Kakanj 7, in Bosnia and Herzegovina, it has not even started yet. In other cases, the fitted equipment does not yet have an operating permit, years after being fitted — such as for Kostolac B, in Serbia, where it is only now undergoing testing (CEE Bankwatch Network, 2020). As a result of this, SO_2 emissions greatly and repeatedly exceed the emission ceilings.

SO_2 emissions from Western Balkan coal power plants twice those of the EU

In 2019, the SO_2 emissions of the 18 Western Balkan coal power plants were twice as high as the SO_2 emissions of all the 221 coal power plants combined in the then 28 EU member states (see Figure A1). This is in stark contrast to 2015 when the EU28 SO_2 emissions from coal were 20% higher than those from the Western Balkans.

The EU saw drastic reductions in SO_2 emissions in the five years between 2015 and 2019. The reductions are partly due to 30 plants in the EU closing down since 2016, and more of the remaining plants in the EU becoming compliant with the Industrial Emissions Directive and its requirements to install pollution reduction equipment.

The Large Combustion Plants (LCP) Directive was implemented within the EU starting in 2001 (European Parliament, 2001) and has been superseded by the Industrial Emissions Directive (European Parliament, 2010). These have played a crucial role in reducing pollution from fossil fuel electricity generation and in ensuring uniform levels of health and environmental protection with regard to SO_2, NO_x and dust emitted by LCPs.

Western Balkan power plants, on the other hand, have not reduced their SO_2 emissions at all, despite the LCP Directive being an integral part of the Energy Community Treaty upon its signing in 2005. This means the countries had twelve years to prepare for the implementation deadline of January 2018, but most did almost nothing.

The total SO_2 emissions for the Western Balkan coal power plants remained the same throughout the period from 2015 to 2019, at around 700,000 tonnes per year (Figure 1).

[1] *For the purposes of this briefing the "Western Balkans" refers to Bosnia and Herzegovina, North Macedonia, Montenegro, Serbia and Kosovo. Albania, also in the same region, does not have any coal power plants.*

[2] *In addition, the Stanari plant came online in Bosnia and Herzegovina in 2016, which had to apply the Directive from the outset.*

Although a slight decline in SO_2 emissions occurred in the Western Balkans in 2016 and 2017, the region's emissions surpassed the EU total SO_2 emissions in 2016, because the EU levels decreased. After the drop in 2016 and 2017, the Western Balkans' emissions increased again, close to 2015 levels in 2019, **resulting in a mere 5.8% decrease** in the five-year span. During this time, however, the EU SO_2 emissions drastically declined from 960,000 tonnes per year in 2015, to 360,000 tonnes per year in 2019 — **a 62.2% decrease**. This significant drop is indicative of the EU's successful pollution control legislation and renewable energy stimulation measures, as well as its ambitious political target to become the world's first climate-neutral bloc by 2050 (European Commission, 2019).

EU and Western Balkans

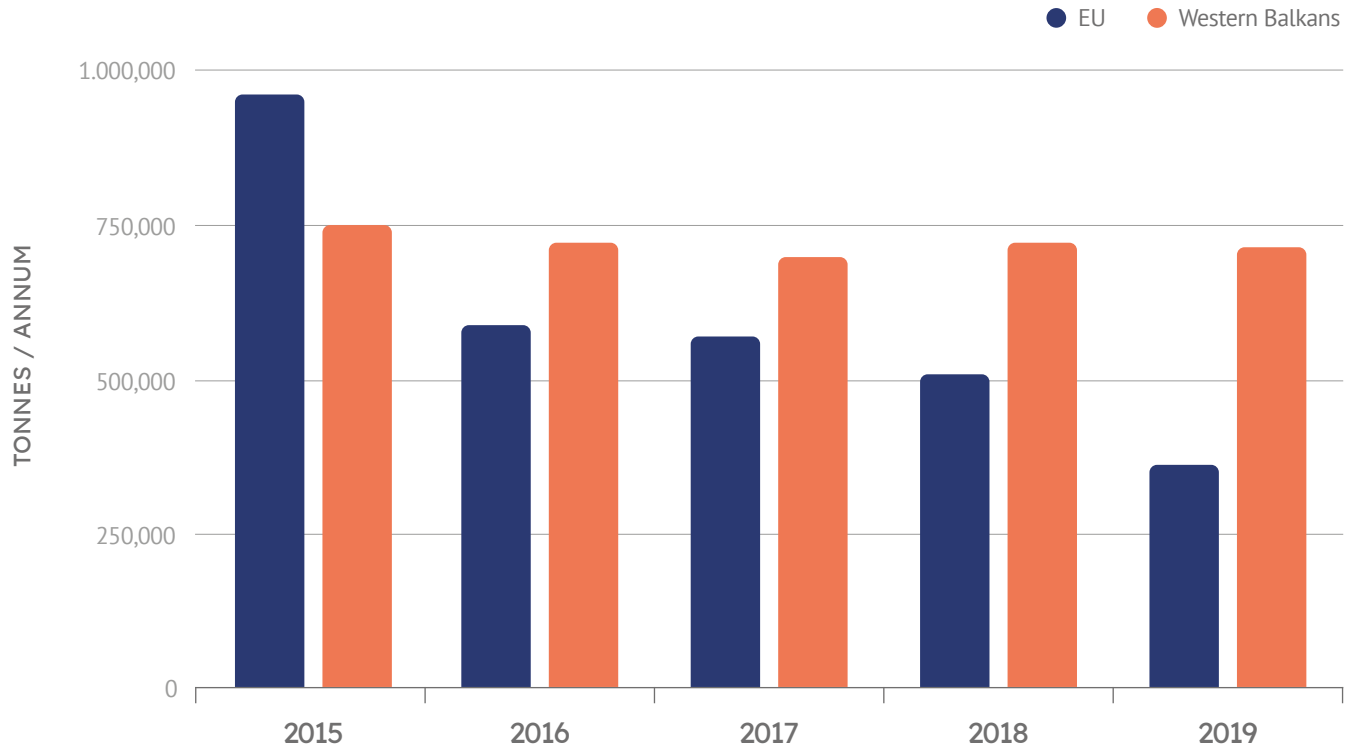

Figure 1: *Total SO_2 emissions in the EU and Western Balkans from 2015 to 2019*

RiTE Gacko, Bosnia and Herzegovina
Photo credit: Center for Environment

Individual coal power plants in the Western Balkans emit more than entire countries in the EU

A side-by-side comparison of SO_2 emissions in the Western Balkans and the EU shows that four out of five Western Balkan countries are among the ten countries with the highest SO_2 emissions from coal power plants.

EU countries that also ranked continuously high in terms of their emissions were Poland and Germany, at fourth and fifth, respectively, in 2019. However, Serbia's emissions were still over three times those of the two countries individually, and Bosnia and Herzegovina's emissions were over twice as high. Other EU countries ranking among the Western Balkan countries in the top ten highest emitting countries were Bulgaria, Czech Republic, Romania, and Greece.

SO_2 emissions by country in 2019

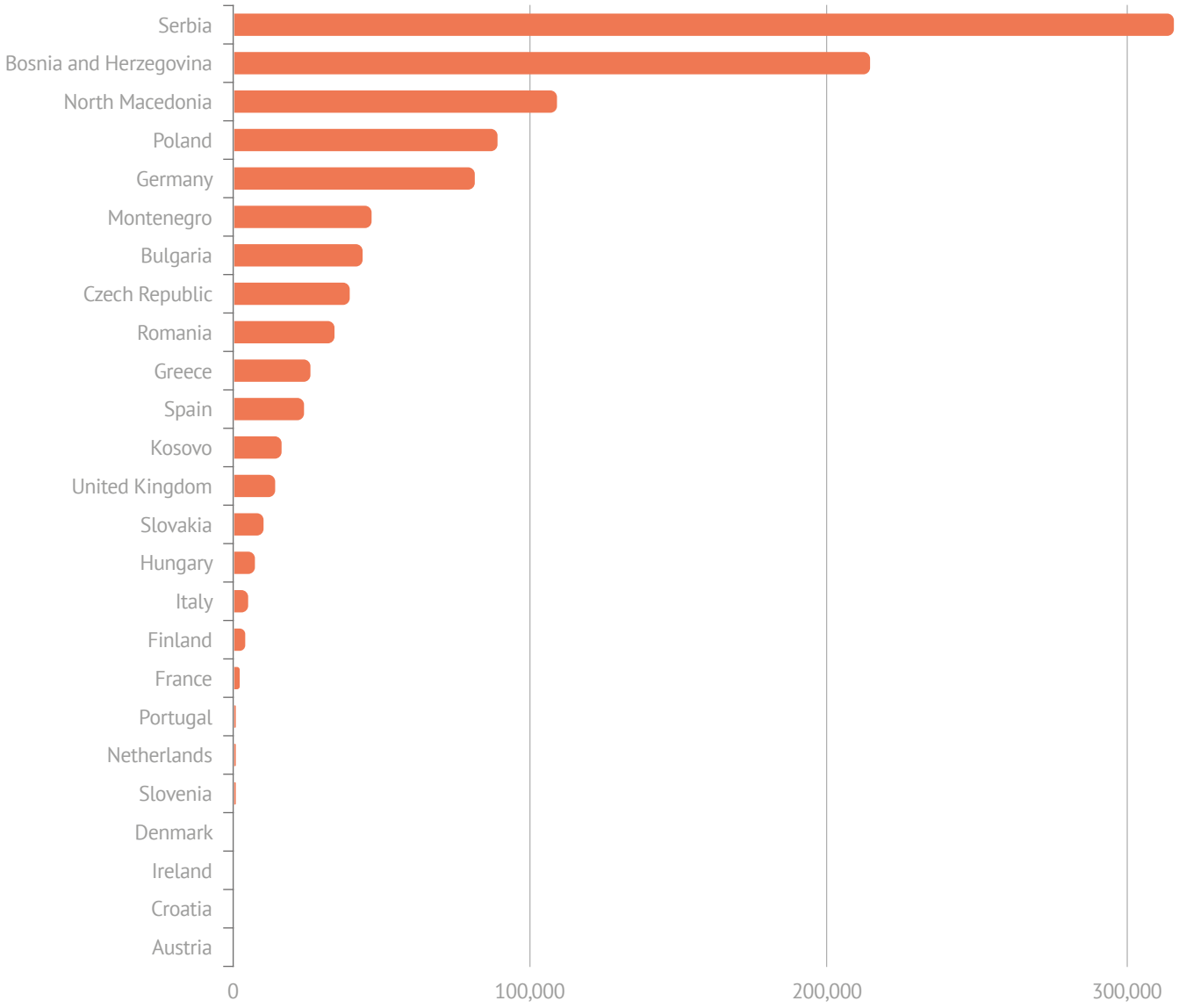

Figure 2: *2019 SO_2 emissions by country in the Western Balkans and the EU*

Serbia was the highest emitting country in 2015 and 2019, releasing 320,000 tonnes in 2019.

Bosnia and Herzegovina also retained its second place throughout the five years, despite a 23.6% decrease, from 280,000 tonnes in 2015 to 210,000 tonnes in 2019. The reasons for this decrease are not clear, however, as no plants were closed and no desulphurisation equipment became operational.

North Macedonia saw an increase of emissions in absolute and relative terms, climbing from 13th place in 2015 with 19,800 tonnes to third place in 2019 with 108,000 tonnes.

Kosovo's two power plants bring it to 12th place out of the 25 modelled countries[3] in 2019, at 14,200 tonnes — almost double the emissions of 2015.

Montenegro's SO_2 emissions doubled between 2015 and 2019, from 22,400 tonnes in 2015 to 46,600 tonnes in 2019, bringing it from 12th to sixth place.

In addition, single power plants in the region emit more than the total coal fleet of many countries in the EU.

The 93,200 tonnes of SO_2 emissions from Serbia's Nikola Tesla A plant exceed the total emissions of the highest emitting EU country, Poland. Together with the nearby Nikola Tesla B plant, this number is brought up to 172,100 tonnes: more than the total emissions of Poland (88,500 tonnes) and Germany (79,200 tonnes) together.

The 88,300 tonnes of SO_2 emissions from Bosnia and Herzegovina's most polluting power plant, Ugljevik, were higher than all of Germany's SO_2 emissions and nearly equivalent to all of Poland's SO_2 emissions.

Highest polluting power plants in the Western Balkans in relation to electricity production

In addition to releasing SO_2 emissions, power plants also release other pollutants including NO_x, and dust. Table 1 indicates the worst power plants with respect to the tonnes per GWh of SO_2, NO_x and dust. The ratios provide insight into exactly how highly-emitting the electricity produced at each respective plant is, rather than focusing on the highest absolute values of emissions.

Power plant	SO_2 (tonnes/GWh)	Power plant	NO_x (tonnes/GWh)	Power plant	Dust (tonnes/GWh)
Ugljevik	50.00	**Kakanj**	3.9	**Kolubara A**	50.00
Kakanj	38.1	**Oslomej**	3.8	**Oslomej**	38.1
Pljevlja	33.5	**Kosovo A**	3.3	**Kosovo B**	33.5
Bitola	33.5	**Pljevlja**	3.2	**Bitola**	33.5
Oslomej	29.7	**Kolubara A**	3.1	**Gacko**	29.7

Table 1: *Top 5 offenders of SO_2, NO_x and dust emissions in tonnes per GWh of electricity produced*

[3] *Non-modelled countries do not have coal in their energy mixes*

In terms of SO_2 emissions compared with the generation of the power plants, the most polluting plant in the Western Balkan region was by far **Ugljevik**, in Bosnia and Herzegovina, with **50 tonnes/GWh** of electricity produced in 2019. This is in stark contrast to the EU's worst polluter, **Bełchatów** in Poland (Europe Beyond Coal, 2019), which emitted **1.1 tonnes of SO_2/GWh**.

Kakanj, also in Bosnia and Herzegovina, had the second highest emissions of 38.1 tonnes per GWh. Close behind were Pljevlja, in Montenegro, and Bitola, in North Macedonia, both with 33.5 tonnes per GWh.

Oslomej in North Macedonia also makes it into the top five offenders with respect to SO_2 emissions, at 29.7 tonnes per GWh.

Kakanj and Oslomej are also the worst polluters when it comes to NO_x emissions, with 3.9 and 3.8 tonnes per GWh, respectively. Other highly polluting power plants were one of Kosovo's two power plants, Kosovo A, with 3.3 tonnes per GWh, followed by Pljevlja again at 3.2 tonnes per GWh. Kolubara A, in Serbia, is among the highest NO_x polluters, and it is the worst power plant in terms of dust emissions.

Kolubara A's dust emissions were 5.4 tonnes per GWh. The second highest emitter, Oslomej and its emissions were not even half of Kolubara A's. Oslomej emitted 2.1 tonnes of dust per GWh produced. Kosovo's other coal power plant, Kosovo B, ranked third in dust emissions, with 1.2 tonnes per GWh. Bitola ranked high in dust emissions again with 1.1 tonnes per GWh, and Gacko in Bosnia and Herzegovina, emitted the same amount of 1.1 tonnes per GWh.

Several of these highest-polluting plants per output are extremely old and need to be closed. Pljevlja, in Montenegro, is already continuing to operate illegally as its 20,000 hours under the LCPD opt-out regime expired in late 2020. Oslomej, in North Macedonia, and part of Kolubara A, in Serbia, work for only a couple of months per year but during this time emit large amounts of all three pollutants, while previous Kosovo governments several times pledged to close Kosovo A but have so far failed to do so, wasting too much time on a failed replacement coal project instead of installing sufficient renewable energy capacity and reducing energy wastage.

Prishtina, Kosovo
Photo credit: Arben Llapashtica

Conclusions and recommendations

Continuing with business as usual is not an option. Public health is being seriously compromised by the massive pollution being pumped out by the Western Balkan coal plants. More than three years have passed since the Western Balkan countries' power plants were obliged to comply with the Large Combustion Plants Directive. In the meantime, these coal power plants continue releasing high levels of SO_2, NO_X and dust, with very little action to either plan for the plants' closures, or to at least fit functional desulphurisation equipment. Even in cases where such equipment has been fitted — Ugljevik and Kostolac B3 — it has not yet received an operating permit and is not in commercial operation, representing an unjustifiable waste of public money and a threat to public health.

Public outrage is starting to grow. In addition to numerous protests across the region, in early 2021, Serbia's Renewables and Environmental Regulatory Institute (RERI) took action against Elektroprivreda Srbije for failure to comply with pollution legislation. More such actions will inevitably follow if action is not taken.

This needs to take the form of a transparently planned move away from coal and towards an energy efficient power sector based on sustainable forms of renewable energy. With solar and wind prices lower than ever, the countries should lose no time with increasing appropriately-sited investments in these technologies and accelerating efforts to cut energy wastage.

For heavily coal-dependent countries such as Serbia, Kosovo and Bosnia and Herzegovina, clearly not all coal plants can be closed overnight, but it is important to start now. For plants which will still operate for several more years, pollution needs to be drastically cut by installing pollution control equipment and making sure it operates.

In the interest of public health, the environment, EU accession and a transition away from coal, we recommend all the Western Balkan governments to:

- Take disciplinary and/or legal action against plant operators failing to take action to remedy coal plant pollution,
- Ensure compliance with the operating hours for plants which are under the Large Combustion Plant's opt-out regime — 20,000 hours between January 2018 and 31 December 2023, after which the plant is to be closed,
- Draw up realistic coal phase-out plans to ensure that obsolete plants are closed as soon as possible,
- For plants which need to operate for several more years, ensure compliance with the National Emissions Reduction Plans,
- For plants which need to operate for several more years, ensure pollution control, such as desulphurisation, equipment is in place and operational in order to ensure compliance,
- Install more efficient pollution control equipment for plants that are expected to remain in operation for several more years, by adhering to LCP Best Available Techniques reference documents (BREFs) 2017 standards, rather than the lower standards set forth in the LCPD.

To the European Union:

- Propose stronger, effective and dissuasive enforcement tools for penalizing breaches to the Energy Community Treaty, in particular non-compliance regarding the LCPD,
- Send stronger messages to the countries on the need to comply, for example by conditioning IPA funds and other assistance for the energy sector on compliance with the Large Combustion Plants Directive and other EU legislation

About the Authors

Centre for Research on Energy and Clean Air (CREA) is a new independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution. CREA uses scientific data, research and evidence to support the efforts of governments, companies and campaigning organizations worldwide in their efforts to move towards clean energy and clean air, believing that effective research and communication are the key to successful policies, investment decisions and advocacy efforts. CREA was founded in December 2019 in Helsinki and has staff in several Asian and European countries.

CEE Bankwatch Network is an environmental network with 16 member groups from 14 Central and Eastern European countries and more than 20 years of experience in transforming public finance and environmental and climate policies relevant to the CEE region and the European Union. Bankwatch has succeeded in pushing Europe's key financial enablers of climate change to halt investments in coal. In the last few years, Bankwatch has played a central role in shaping European policies towards a just transition of coal regions across Central and Eastern Europe.

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Reports for data on generation: Bosnia & Herzegovina (here and here); Kosovo; Montenegro; North Macedonia; Serbia;

Appendix

Country	Pollutant (tonnes/annum)	2015	2016	2017	2018	2019
Austria	SO_2	289	141.96	124.878	144.6696	110.9868
Belgium	SO_2	582	98.28	NA	0	0
Bulgaria	SO_2	73,904	60,072	65,208	56,509.92	42,382.28
Croatia	SO_2	2,903	3,114.37	1,052	370	229
Czech Republic	SO_2	67,555	58,246.97	55,499.57	48,571.78	38,464.27
Denmark	SO_2	793	809.122	427.78	500.3394	314.2642
Finland	SO_2	5,957	7,681	5,941.28	5,674.291	4,679.952
France	SO_2	6,240	4,056.243	5,690.777	3,461.742	3,097.963
Germany	SO_2	124,410	110,208.2	103,544	100,421.1	79,159.33
Greece	SO_2	42,128	21,594.93	28,866	25,360.32	22,287.52
Hungary	SO_2	5,402	5,261	10,034	8,900	6,418
Ireland	SO_2	3,365	2,222.44	2,104.5	958.6	250.5
Italy	SO_2	16,042	11,189.92	8,625.349	8,154.905	5,891.682
Netherlands	SO_2	5,898	5,149.062	3,915.73	2,785.301	2,211.108
Poland	SO_2	26,1205	145,490.2	134,067.7	125,623.4	88,473.08
Portugal	SO_2	6,798	5,079.1	6,352.696	5,342.284	2,473.938
Romania	SO_2	86,908	49,011.66	43,902.69	35,312.56	31,528.21
Slovakia	SO_2	48,987	7,715.065	8,151.649	7,408.184	6,809.819
Slovenia	SO_2	1,665	1,277.097	1,753.095	2,143.291	1,998.145
Spain	SO_2	12,4050	77,842.92	80,328.12	55,345.45	18,718.25
Sweden	SO_2	58	74.1	51.57	56	35
United Kingdom	SO_2	76,779	29,114.72	24,579.52	18,373	8,008
EU, total	**SO_2**	**961,918**	**605,450.3**	**590,220.9**	**511,418**	**363,541**
Bosnia & Herzegovina	SO_2	281,063.86	279,978	279,978	236,937	214,778
North Macedonia	SO_2	19,846.97	32,053	32,053	53,854	108,032
Montenegro	SO_2	22,458.59	25,459	25,459	64,475	46,640
Serbia	SO_2	299,163	377,374	348,228	352,868	323,819
Kosovo	SO_2	128,566	5,298	5,298	11,733	14,236
Western Balkans, total	**SO_2**	**751,098.42**	**720,162**	**691,016**	**719,866**	**707,505**

Table A1: *SO_2 emissions for all EU and Western Balkan countries with coal-fired power plants from 2015 to 2019*

EU and Western Balkans SO_2 emissions, 2019

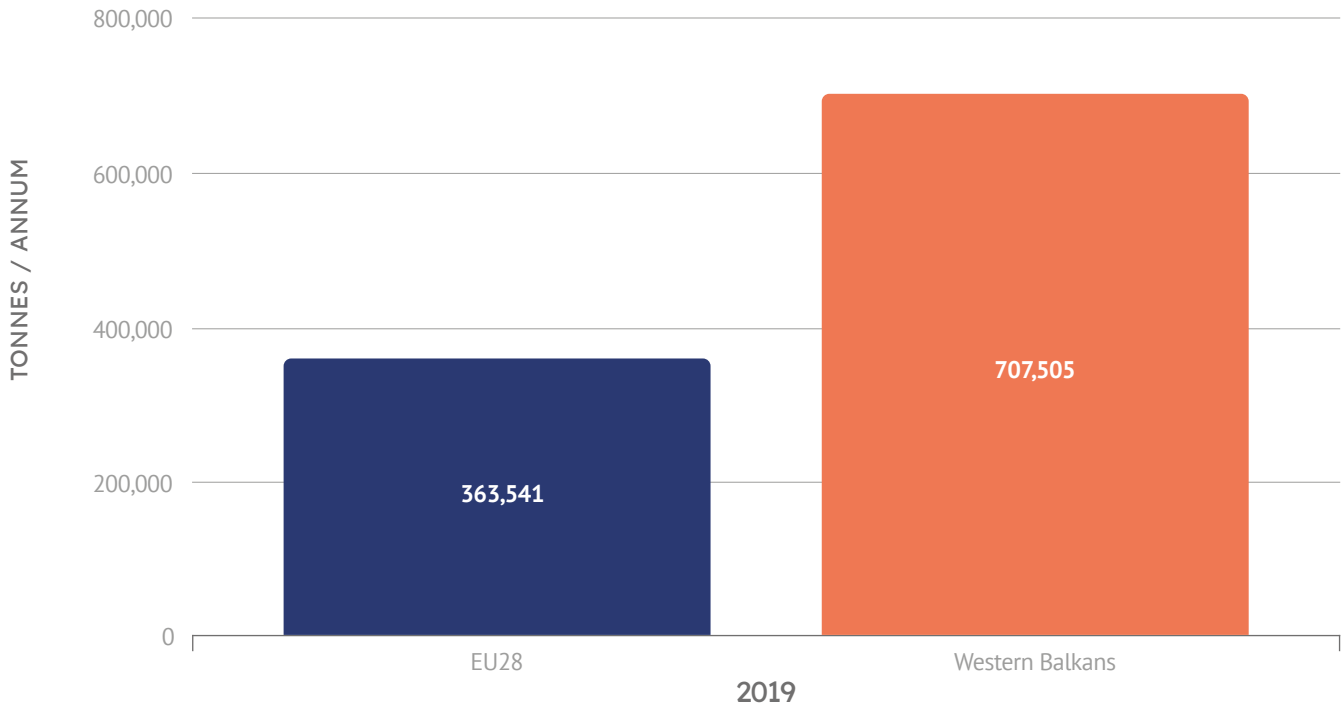

Figure A1: *SO_2 Emissions comparison between the EU and the Western Balkans in 2019, tonnes/year*

Pljevlja, Montenegro
Photo credit: Nevena Petković

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