Waste incineration trends in the Western Balkans

A critical overview of energy and heat generation

CEE Bankwatch Network

April 2026

Author

Nataša Kovačević

Campaigner for District Heating Decarbonisation
in the Western Balkans

Photo: Antoine Taveneaux, CC BY-SA 3.0, via Wikimedia Commons

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

This publication has been financed by the Swedish International Development Cooperation Agency (Sida). Responsibility for the content rests entirely with the creators. Sida does not necessarily share the expressed views and interpretations.

Cover photo: CEE Bankwatch Network

CEE Bankwatch Network

Contents

Photo: Norbert Nagel, CC BY-SA 3.0, via Wikimedia Commons

Executive summary

Western Balkan governments and utility companies are increasingly pursuing waste-to-energy incineration and the co-firing of refuse-derived fuel and solid recovered fuel in ageing coal-fired combined-heat-and-power plants as a short-term response to energy insecurity and persistent waste management failures. Examples include recent attempts in Tuzla and Kakanj (Bosnia and Herzegovina), the proposed 50 megawatt (MW) waste-to-energy plant in Podgorica (Montenegro) and the Vinča incinerator in Belgrade (Serbia). Yet evidence from the region shows that this pathway is technically unviable, environmentally hazardous, financially risky and incompatible with EU waste and energy policy and legislation.

Waste incineration and co-incineration are not circular economy solutions. Instead of keeping materials in use, they destroy recyclable resources, generating carbon dioxide (CO_2) emissions, toxic pollutants and large amounts of hazardous ash requiring specialised disposal. This contradicts EU circular economy priorities, which emphasise prevention, reuse, separate collection and high-quality recycling.

Project promoters also claim that these processes represent modern, circular economy solutions that support decarbonisation. In reality, however, they do the opposite. Burning waste is the very definition of a linear process that undermines decarbonisation, as it requires auxiliary fossil fuels to maintain combustion, with oil-based plastics accounting for the most calorific waste streams.

Recycling rates across the region remain extremely low and separate collection is largely absent. Table 1 summarises the quantity of municipal waste recycled per capita (kg/person), as reported to Eurostat. Most Western Balkan countries report very low values or no validated data at all. North Macedonia, for example, has submitted no consistent recycling data in recent years, while Bosnia and Herzegovina and Montenegro provide only estimates. These values confirm the near total absence of nationwide separate collection and recycling systems in the region, as well as deficiencies in waste management and data collection. Under these conditions, incineration jeopardises recycling, locks systems into dependence on mixed waste, and diverts investment away from circular solutions. This dynamic is already evident in Serbia, where the city of Belgrade spent years planning the construction of the Vinča incinerator instead of developing separate collection and recycling systems.

Environmental and health impacts pose additional risks. Studies by the Toxico Watch Foundation and Zero Waste Europe show that even modern incinerators emit dioxins, polyfluoroalkyl substances (PFAS), heavy metals and fine particulate matter, while generating between 26 and 40% hazardous ash.[1] The Western Balkans, with some of the worst air pollution levels in Europe, lack the monitoring systems and enforcement capacity required to manage these risks safely.

[1] Zero Waste Europe, New data links waste incinerators to toxic contamination in surrounding environments – Spain, France, Netherlands, 1 April 2025.

On the policy side, EU law puts incineration, even with energy recovery, near the bottom of the EU waste hierarchy. The 2023 Renewable Energy Directive requires district heating systems to increase the share of renewable heat, defines only biodegradable waste as renewable, and prohibits subsidies for its incineration where separate collection targets have not been met. The Energy Efficiency Directive mandates decarbonisation plans for district heating, while the Waste Framework Directive [2] prioritises waste prevention, re-use and recycling, which must take precedent over residual waste treatment. Since 2024, municipal waste incinerators have been subject to mandatory monitoring, reporting and verification under the EU's Emissions Trading System, with full inclusion in carbon pricing expected as early as 2028. These developments make new incineration capacity increasingly non-compliant and economically obsolete.

However, Western Balkan governments continue to promote waste incineration for energy generation. In Montenegro, the government's January 2026 proposal for a 50 MW waste-to-energy plant in Podgorica is being advanced despite the country's near-zero recycling rate. In Sarajevo Canton, Elektroprivreda Bosne i Hercegovine (EPBiH) – the largest entity-owned power company in Bosnia and Herzegovina – and the European Bank for Regional Development (EBRD) are promoting the Butila waste-water treatment plant as an 'energy hub' centred on large heat pumps. However, proposals to add sludge incineration threaten to undermine the project's decarbonisation potential and increase emissions.

In Zenica, steel manufacturer Nova Željezara Zenica has been actively promoting plans to construct a waste-to-energy incineration plant as a 'modern solution' for electricity and heat production, despite strong public concern and political opposition. In July 2025, EPBiH's planned refuse-derived fuel co-firing trial in Tuzla was suspended after public and municipal backlash. Coal-based combined-heat-and-power plants in Tuzla, Kakanj and similar plants across the region were built in the 1970s and 1980s, making them unsuitable for co-firing with refuse-derived or solid recovered fuel. Compliance with best available techniques in waste incineration would require extensive retrofitting, including new fuel-handling systems, boiler modifications, multi-stage flue-gas cleaning, continuous monitoring of emissions, and hazardous ash treatment, costing between EUR 80 and 150 million per unit. Even with such upgrades in place, these plants would continue to produce large quantities of toxic ash, for which no adequate disposal infrastructure exists in the Western Balkans.

By contrast, proven alternatives are already in place. District heating powered by sustainable renewable energy sources – such as solar thermal, large-scale heat pumps, geothermal energy, wastewater heat recovery, and excess industrial heat – results in lower emissions, reduced long-term costs, and compliance with EU regulations. Scaling up separate collection, biowaste treatment, composting, anaerobic digestion and recycling would create significantly more jobs and support the transition to a circular economy far more effectively than incineration.

[2] European Parliament, Council of the European Union, Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, 19 November 2008.

Overall, evidence from the Western Balkans and the EU shows that waste incineration is a dead-end pathway, increasing financial and environmental risks, locking municipalities into high-carbon infrastructure, and undermining both the heating transition and EU-compliant waste management reforms.

Since incineration fails to offer a viable, EU-aligned pathway for the Western Balkans, a different approach is needed. The following recommendations outline the steps required to advance the decarbonisation of district heating systems, enhance waste management practices and support the development of a truly circular economy.

Recommendations

For international financial institutions (European Bank for Reconstruction and Development, European Investment Bank, Kreditanstalt für Wiederaufbau, International Finance Corporation, Western Balkans Investment Framework, EU institutions)

- Avoid financing new waste-to-energy or waste co-incineration projects in the Western Balkans due to high regulatory lock-in, environmental risks, and incompatibility with the EU waste hierarchy and circular economy objectives.
- Require all district heating investments to follow the 'energy efficiency first' principle, prioritising demand reduction, network rehabilitation and the integration of renewable and excess heat.
- Condition loans and grants on credible waste management reforms, including separate collection, biowaste systems and recycling infrastructure, while avoiding waste supply guarantees typically required by incinerators.
- Support municipalities in developing heat decarbonisation strategies aligned with the 2023 Renewable Energy Directive[3] and the 2023 Energy Efficiency Directive, with an emphasis on heat pumps, solar thermal and geothermal energy, and industrial excess heat.
- Prioritise funding for non-thermal waste treatment, including recycling infrastructure, reuse networks, composting close to generation points, and anaerobic digestion for biowaste.

For national governments (Bosnia and Herzegovina, Montenegro, Serbia, Kosovo, North Macedonia, Albania)

- Stop planning and permitting new waste-to-energy incineration and co-incineration projects.
- Align national waste legislation with EU requirements by accelerating separate collection, biowaste treatment and preparations for the 65% recycling target by 2035.
- Where not yet done, introduce strict controls on waste imports to prevent dependency on foreign waste streams, and avoid long-term contractual obligations that undermine the development of circular economies.
- Strengthen air quality management, hazardous ash management and enforcement capacity.

[3] This should not be understood as an endorsement of full transposition of this version of the Directive in the region. Although it contains several useful provisions to advance small-scale solar and heat pumps, the permitting provisions contain partial derogations from EU environmental law, which are unproven even in the EU and are likely to be highly damaging in countries with poor environmental governance.

- Integrate circular economy labour strategies into energy and just transition policies, recognising that recycling, repair and reuse create 10 to 50 times more jobs than incineration.
- Ensure full transparency and public participation in all waste- and energy-related decisions, including early-stage consultation and strategic environmental assessments on waste management plans and related spatial plans; and mandatory environmental impact assessments where required by law.
- Where not yet done, fully transpose and properly apply the EU's Industrial Emissions Directive and best available techniques conclusions.

For municipalities and district heating utilities

- Immediately halt plans for co-firing refuse-derived fuel and solid recovered fuel in existing coal-fired combined-heat-and-power units, given that retrofitting ageing infrastructure to meet best available techniques standards for waste incineration is technically complex, prohibitively expensive and operationally risky.
- Focus investment on modernising district heating networks, reducing losses and implementing renewable heat solutions, including solar thermal energy, large-scale heat pumps, geothermal energy and wastewater heat recovery.
- Develop municipal circular economy plans that prioritise waste prevention, reuse, separate collection and recycling, ensuring that local waste streams support EU-compliant waste management rather than feed incinerators.
- Avoid long-term supply contracts for waste combustion that lock cities into paying for guaranteed waste quantities, exemplified by the Vinča public–private partnership project.
- Cooperate with regional waste management operators to scale up mechanical–biological treatment, anaerobic digestion, composting, and local recycling systems instead of pursuing thermal disposal.

Waste-to-energy and the Western Balkans

The term 'waste-to-energy' covers much more than just waste incineration. It encompasses various processes for treating waste and generating energy in the form of electricity or heat, or producing waste-derived fuel. The potential impacts of these processes on the environment and the circular economy can differ significantly, ranging from disposal and recovery to recycling. Anaerobic digestion, for example, produces biogas and digestate and is classified under EU waste legislation as a recycling operation.

From a climate perspective, neither landfilling nor incineration reduces greenhouse gas emissions. Landfills emit large quantities of methane from decomposing biowaste, and this is the dominant source of emissions in the global waste sector.

Incineration does not constitute decarbonisation. It requires auxiliary fuels, such as fossil gas or diesel, to assist in combustion, and the most calorific waste fraction consists of oil-based plastics. According to a study on incinerators in the United States, electricity generated by incinerating municipal solid waste emits approximately 1,700 g of carbon dioxide equivalent per kilowatt-hour (CO_2e/kWh). This exceeds the emissions from coal-fired power stations (up to around 1,000 g CO_2e/kWh) and far surpasses those from non-combustions sources (as low as 2.4 g CO_2e/kWh).[4]

In contrast, the EU waste hierarchy identifies waste prevention, reuse and recycling as the most environmentally preferable options, as they consistently deliver the greatest potential for reducing greenhouse gas emissions. Disposal routes such as landfilling and incineration remain the least favourable.

As coal regions in the Western Balkans develop just transition pathways, Bankwatch's regional guidance emphasises the need to prioritise non-carbon-intensive employment within the circular economy.[5] High-emission options like waste-to-energy risk undermining these priorities. Multiple studies show that landfilling and incineration generate very few permanent jobs, at around one job per 10,000 tonnes of waste. In contrast, recycling, composting, repair and reuse activities can create up to 10 to 50 times more employment, with even higher job intensity in circular economy activities such as remanufacturing.[6]

The region faces two major infrastructure challenges: the phase-out of coal and the general failure of existing waste management systems. In response, some governments have begun to view waste as an asset to extend the lifespan of coal-fired thermal power plants or to fuel new waste-to-energy plants. This approach is often presented as a win-win situation, addressing waste landfilled in substandard infrastructure while maintaining the existing energy system. However, this strategy risks exacerbating both challenges rather than resolving them. As a result, energy companies and municipalities are increasingly

[4] Neil Tangri, Waste incinerators undermine clean energy goals, PLOS Climate, 1 June 2023.

[5] CEE Bankwatch Network, How to advance a just transition in the Western Balkans: Recommendations for the EU and national institutions, 27 September 2024.

[6] Energy Justice Network, Clean Energy and Zero Waste Produce the most Jobs, accessed 1 March 2026.

shifting towards co-combustion of coal and municipal waste, typically starting with a 2 to 20% share of refuse-derived fuel that gradually increases over time.

In late June 2025, EPBiH announced that it intended to conduct a pilot test of coal co-combustion at the Tuzla and Kakanj thermal power plants in July. The plan involved burning 100 tonnes of refuse-derived fuel and solid recovered fuel over two days (2–4% share).[7] EPBiH treated the trial as a technical exercise, intending to proceed on the basis that no environmental impact assessment or environmental permit was legally required under the Federation of Bosnia and Herzegovina's environmental protection legislation. However, the proposed trial was designed under the existing large combustion plants regulatory framework, without establishing a new dedicated monitoring regime aligned with the EU's conclusions on best available techniques for waste incineration.[8]

Although the Federal Ministry of Environment and Tourism approved the test, it was disclosed without prior consultation with the City of Tuzla or the public. One day before the scheduled trial, Tuzla City Council convened an emergency session. They called for an immediate halt to the test and the rejection of all plans for waste co-combustion until legal, environmental and health safeguards could be demonstrated through transparent procedures and public debate. Following the City Council's conclusions, EPBiH agreed to temporarily suspend the trial.[9]

In Serbia, state-owned Elektroprivreda Srbije (EPS) has initiated a project for the co-incineration of solid recovered fuel at the 1,600-megawatt (MW) Nikola Tesla A (TENT A) coal power plant in Obrenovac, targeting units A3–A5, which have a combined capacity of 1,000 MW. EPS has requested that the Ministry of Environmental Protection define the scope and content of the environmental impact assessment for the facility. This follows a July 2022 design tender for project designs at both TENT A and the Kostolac B coal power plant, as well as a 2023 call for a national analysis of biomass availability. According to project documentation, EPS intends to consume around 300,000 tonnes of solid recovered fuel annually.[10]

In addition, the EBRD is currently assessing a EUR 50 million loan to EPBiH to replace unit 3 at the Tuzla thermal power plant. The plan involves generating 65 megawatt-thermal (MWth) for district heating and 25 megawatt-electrical (MWel) for electricity generation through a biomass incineration system.[11] While initial plans suggested that either refuse-derived or solid recovered fuel would make up 10 to 20% of the fuel mix,

[7] Euronews.ba, Elektroprivreda BiH: Spaljivanje goriva iz otpada u termoelektranama je sigurno i kontrolisano, 25 June 2025.

[8] European Commission, Commission Implementing Decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration, 55–91, 12 November 2019.

[9] Vladimir Spasić, Elektroprivreda BiH odustala od probnog spaljivanja otpada u TE Tuzla, Balkan Green Energy News, 18 July 2025.

[10] Vladimir Spasić, Serbia's EPS proceeds with plans to produce energy from waste in Nikola Tesla A coal plant, Balkan Green Energy News, 16 January 2025.

[11] CEE Bankwatch network, Unmasking the biomass dilemma in Serbia and Bosnia and Herzegovina, 17 January 2025.

the current percentage remains unknown.[12] Additionally, the pre-feasibility study for the project has been delayed by two and a half years. And although the installed heat and electricity capacities are expected to reduce slightly, using unsustainable biomass and waste-derived fuel remains a significant environmental and climate concern.

In 2019, the Sarajevo Regional Development Agency developed a feasibility study that identified a waste-to-energy co-generation plant as the preferred option for Sarajevo Canton. The study proposed combining the drying of 45,000 tonnes of sewage sludge per year from the Butila wastewater treatment plant along with the incineration of 13,235 tonnes of dried sludge and up to 203,646 tonnes of mixed municipal waste. At an estimated cost of over EUR 101 million (in 2017 prices), the plant was expected to produce 68,070 megawatt-hours (MWh) of electricity and 94,278 MWh of heat annually, though the project was never formally adopted.[13]

By June 2023, the Sarajevo Cantonal Government and the EBRD had shifted focus to the Butila 'energy hub', focusing on large-scale heat pumps and electricity generation from sewage sludge. Under these plans, two 18 MW heat pumps are expected to replace approximately 20 million cubic metres of fossil gas annually, representing a significant reduction in CO_2 emissions. However, adding sewage sludge incineration jeopardises this goal. Sludge combustion introduces additional direct CO_2 emissions and may reduce the heat pumps' operating hours, limiting fossil gas displacement and undermining the expected reductions in emissions. Costing EUR 50 million, including EUR 15 million in grants through the Western Balkans Investment Framework, the project will involve further analysis of sludge treatment at Butila and the establishment of an energy efficiency fund for residential buildings.

Finally, in Podgorica, Montenegro's capital, there is currently no district heating system in place, and the national energy and climate plan does not include any waste incinerators.[14] Despite the European Commission refusing to fund a similar waste incineration proposal in Niksić in 2017,[15] the government announced plans in January 2026 to develop a 50 MW waste-to-energy incineration facility in cooperation with the Japanese company Itochu. A feasibility study was expected by March 2026 to determine the final technical and financial structure.[16] With an estimated investment of EUR 100 to 150 million, the project would require long-term waste supply guarantees and significant public financial commitments.

[12] European Bank for Reconstruction and Development, Full biomass repowering of Tuzla TPP Unit 3 and establishment of short rotation bioenergy plantations on former coal mine areas, Terms of reference, 3, July 2022. Link not available.

[13] Klix.ba, Donosimo detalje o postrojenju koje bi Sarajevo moglo dobiti: Struja i toplota proizvedeni iz otpada, 10 November 2024.

[14] Ministry of Energy and Mining of Montenegro, National Energy and Climate Plan of Montenegro, 15 October 2025.

[15] Dejan Peruničić, Crna Gora nije odmakla od planova, EU poručuje: Ne planirajte spalionicu, Vijesti, 19 February 2017.

[16] Cabinet of the Prime Minister of Montenegro, Spajić: Podgorica će dobiti modernu spalionicu i postrojenje za energiju iz otpada; interesovanje japanskog giganta ITOCHU, 9 January 2026.

Yet the proposal is advancing despite Montenegro's limited rates of separate waste collection and recycling, and its EU accession obligation to prioritise waste prevention, reuse and recycling in line with the EU waste hierarchy. Committing significant capital to a large incineration facility risks diverting recyclable materials away from developing recycling systems at a time when the country is supposed to be increasing its efforts to meet EU circular economy targets, including a 65% recycling rate by 2035. Civil society organisations have already alerted the government to the risks of high-capacity combustion infrastructure, hazardous ash generation, a lack of disposal infrastructure, and increased pressure on ambient air quality.[17] To date, the public has yet to be consulted on the project.

Technical feasibility, operational and other risks

Most combined-heat-and-power plants in the Western Balkans were built in the 1980s as high-temperature, coal based units designed for a single, homogeneous fuel type with stable moisture and ash characteristics. They were not originally engineered to accommodate fuels with high chlorine content, variable particle size, elevated volatile matter, and increased ash-forming components, which characterise refuse-derived and solid recovered fuel streams. Introducing waste-derived fuels into such boilers without major structural retrofits, such as redesigned burners, corrosion-resistant furnace materials, and upgraded flue-gas-cleaning systems, poses operational and environmental risks.[18]

While older lignite units (typically 40 to 50 years old) already exist, they are structurally mismatched with the advanced flue-gas cleaning, continuous emissions monitoring, and homogeneous fuel feed required for refuse-derived fuel use under the EU's best available techniques for waste incineration. These upgrades, which might not even be feasible in some cases, would require significant investment.

Retrofitting combined-heat-and-power plants for refuse-derived fuel co-firing requires the following set of fuel handling, co-firing, and emissions control upgrades, obligatory under the EU's best available techniques for waste incineration:[19]

- **Fuel reception, pre-treatment and dosing infrastructure**: Ageing plants lack closed refuse-derived fuel storage, pre-processing, and controlled feeding systems. Best available techniques require robust pre-treatment, covered storage, automated feeding and segregation to ensure consistent calorific value and prevent operational upset. EPBiH's own studies identify the need for

[17] Zero Waste Montenegro, REAGOVANJE: Zahtjev za moratorijum na planiranje i izgradnju spalionica otpada u Crnoj Gori, 7 July 2025; Zero Waste Europe, Zero Waste Montenegro, CEE Bankwatch Network, Joint Statement on the Environmental and Economic Risks of the Proposed 50 MW Waste-to-Energy Facility in Montenegro, 15 January 2026.

[18] Ivan Bagus Novendianto, M.S.K Tony Suryo Utomo, Muchammad Muchammad et al., Investigation of the slagging and fouling aspects of co-firing coal and organic refuse-derived fuel, Thermal Science and Engineering Progress, 49(102477), March 2024.

[19] Frederik Neuwahl, Gianluca Cusano, Jorge Gómez Benavides et al., Best Available Techniques (BAT) Reference Document for Waste Incineration | Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control), Joint Research Centre, European Commission, 7 January 2020.

new refuse-derived and solid recovered fuel feeding systems at Tuzla, and the design of conceptual operations.[20]

- **Boiler and combustion modifications**: The higher chlorine, metal and ash content of refuse-derived fuel demands redesigned burners, improved air staging, slag-resistant furnace materials, and corrosion mitigation systems. Research by the Technical University of Denmark on the co-firing of coal and refuse-derived fuel highlights evidenec of elevated fine particle formation and increased deposition risks that require modified combustion control.[21]

- **Flue-gas cleaning upgrades (flue-gas desulphurisation, selective catalytic reduction and de-dusting)**: Best available techniques for waste co-incineration require multi-stage flue-gas cleaning. At Kakanj, EPBiH has already committed EUR 64.6 million for a new flue-gas desulphurisation system, showing the scale of investment needed even without refuse-derived fuel. Additional systems, including activated carbon injection for dioxins and mercury, selective catalytic reduction, nitrogen oxide abatement, burners, and enhanced electrostatic precipitators or bag filters, would be mandatory for refuse-derived fuel operation.

- **Continuous emissions monitoring**: Best available techniques demand expanded continuous emissions monitoring installations covering dioxins, furans, hydrogen fluoride, hydrogen chloride, heavy metals, and multi-pollutant systems. Existing combined-heat-and-power plants in the Western Balkans generally fail to meet these monitoring requirements.

- **Ash and residue management upgrades**: Refuse-derived fuel increases the toxicity of bottom ash and fly ash, requiring dedicated treatment and storage infrastructure consistent with best available techniques for waste treatment.[22]

While the total cost estimate for the refuse-derived fuel retrofits at Tuzla and Kakanj is not publicly available, previous investments provide an indication of the capital expenditure required. For instance, the EUR 64.6 million spent on the flue-gas desulphurisation retrofit at Kakanj covers only one element of several upgrades that would be required to meet best available techniques standards for continued operation.

Completing the entire suite of environmental controls compliant with these techniques, such as selective catalytic reduction systems for nitrogen oxide abatement, high-efficiency particulate controls, upgraded auxiliary systems, and continuous emissions monitoring, would already require investments well above EUR 100 million per unit, regardless of whether waste is burned.

---

[20] BIOFIT, Decarbonizing the Bosnian EPBiH power utility through biomass retrofitting at the Tuzla and Kakanj power plants, January 2022.

[21] Flemming Jappe Frandsen, Hao Wu, Peter Glarborg et al., PSO Project 10085: Final Report – Co-Firing of Coal and RDF in Suspension, Department of Chemical and Biochemical Engineering, Technical University of Denmark, August 2011.

[22] Antoine Pinasseau, Benoit Zerger, Joze Roth et al., Best Available Techniques (BAT) Reference Document for Waste Treatment | Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control), Joint Research Centre, European Commission, 22 October 2018.

On top of this baseline, any waste-to-energy or refuse-derived fuel co-incineration retrofit would require substantial additional upgrades, including dedicated fuel-handling and storage systems, boiler modifications, expanded continuous emissions monitoring system configurations, and additional flue-gas-cleaning stages to handle the more complex emissions profile of mixed waste. International benchmarks for waste-to-energy retrofits indicate that these additional systems typically range between EUR 80 and 150 million per unit, depending on plant layout and constraints.[23] Given the age and structural condition of both Tuzla and Kakanj, such cumulative investments risk becoming stranded assets that would prolong dependency on outdated coal infrastructure without delivering long-term value.

Risks related to fuel supply and waste imports

Across the Western Balkans, municipal waste separation at source is extremely limited, severely increasing the risk of hazardous emissions from undesirable materials, such as PVC and batteries in municipal waste or refuse-derived fuel. Data show that organised waste collection covers 70 to 86% of the region's population, and systematic separate collection of recyclables is not established in any Western Balkan country, apart from a handful of ongoing isolated pilot projects. Mixed waste dominates municipal streams.[24]

Recycling and separation rates are the lowest in Europe, with 2023 estimates indicating around 0.93% in Bosnia and Herzegovina, 3.68% in Montenegro, 0.3% in North Macedonia,[25] 18.84% in Albania and 15.15% in Serbia.[26] Statistical data for the Western Balkans indicate that treatment options do not follow the EU waste hierarchy. The most common waste disposal method is landfilling without prior processing, which accounts for 77%,[27] 99.8%,[28] and 91.1%[29] of the total waste collected in Albania, North Macedonia, and Montenegro, respectively.

[23] Flemming Jappe Frandsen, Hao Wu, Peter Glarborg et al., PSO Project 10085: Final Report – Co-Firing of Coal and RDF in Suspension, Department of Chemical and Biochemical Engineering, Technical University of Denmark.

[24] European Environment Agency, Municipal waste management in the Western Balkan countries, 26 April 2022.

[25] Ministry of Environment and Physical Planning of North Macedonia, IX ОТПАД, 27 August 2024.

[26] Eurostat, Recycling rate of municipal waste, accessed 9 March 2026.

[27] Institute of Statistics of Albania, Urban Solid Waste, 2024, 23 September 2025.

[28] State Statistical Office of North Macedonia, Municipal waste, 2024, 22 April 2025.

[29] Montenegro Statistical Offfice, Generated and treated waste, 28 October 2024.

Table 1. Recycling rates for municipal waste.[30]

TIME		2019		2020		2021		2022		2023	
Albania		:		18.1		18.7		18.9		18.8	
Bosnia and Herzegovina		:		:		:		:		1.0	e
Kosovo		:		0.0		2.5		2.6		3.5	
Montenegro	e	5.3	e	4.6	e	4.7	e	4.2	e	3.7	e
North Macedonia		0.21		1.97		0.71		0.52	e	0.30	e[31]
Serbia		0.2		15.4		16.8		17.6		15.2	

National waste infrastructure remains underdeveloped, with most generated waste landfilled or dumped rather than mechanically sorted. Because proper collection, separation, and recycling have not been established, most of the countries have yet to even consider local production of refuse-derived fuel. The predominantly low-quality refuse-derived fuel that can be extracted typically contains high quantities of moisture, ash and other undesirable substances like chlorine (from PVC plastics) and mercury.[32] Putting energy use before material recovery would yield poor results at a high cost by wasting recyclable materials and producing poor quality refuse-derived fuel.

Given the structural barriers described above and the overall weak implementation of EU waste hierarchy principles in the Western Balkans, the region is still far from developing the upstream waste management systems that would normally precede any consideration of the production of refuse-derived and solid recovered fuels. With limited separate collection, low recycling rates and underdeveloped treatment capacity, current waste management practices cannot support a transition towards environmentally sound, EU-aligned approaches.

For instance, Albania solely relies on feasibility study projections, while Montenegro and North Macedonia have assessed the theoretical applicability of refuse-derived and solid recovered fuels without any national production capacity. Serbia is the only Western Balkan country that has planned a dedicated refuse-derived

[30] Eurostat, Recycling rate of municipal waste. Estimates are denoted by 'e'.

[31] As Eurostat data for North Macedonia is not available, the data presented here is sourced from: Ministry of Environment and Physical Planning of North Macedonia, IX ОТПАД, 27 August 2024.

[32] Wojciech Hryb, Paweł Matyasik, Mercury content in refuse-derived fuels, Archives of Environmental Protection, 44(4), January 2018.

and solid recovered fuel production facility, with a potential annual output of 85,000 tonnes. However, the project remains in the planning stage and has yet to become an operational reality.[33]

As a result, the Western Balkans would ultimately have to rely on imports to secure any meaningful quantities of refuse-derived and solid recovered fuels. All planned or hypothetical co-firing initiatives would heavily depend on imported treated refuse-derived and solid recovered fuels and, eventually, potentially on imports of mixed waste. Such reliance would undermine the development of adequate waste prevention and recycling measures, increase environmental burdens across borders, heighten risks of inadequate monitoring and regulatory enforcement, and expose the region to significant governance challenges in transboundary waste trade.

Albania, Montenegro and Bosnia and Herzegovina prohibit waste imports, either through full legal bans (Albania), bans on hazardous waste disposal (Montenegro, Bosnia and Herzegovina), or strict limits allowing only select non-hazardous materials for recovery. Serbia and North Macedonia, by contrast, permit imports of non-hazardous waste for recovery under controlled conditions, while Kosovo allows only small quantities of recyclable materials. These patterns reflect the region's limited treatment capacity and its heavy reliance on landfilling.[34]

The EU's revised Waste Shipment Regulation introduces a ban on exporting plastic waste to countries outside the Organisation for Economic Co-operation and Development (OECD) from 21 November 2026, with a complete export prohibition for non-hazardous waste to non-OECD destinations applying from May 2027. As part of this process, Bosnia and Herzegovina, North Macedonia and Serbia have formally applied to be placed on the EU's approved list, allowing the continued import of non-hazardous waste for recycling after 2027, a requirement for all non-OECD countries seeking to maintain access to EU secondary materials.[35]

How would co-firing interact with demand in other sectors?

The proposed incineration plants and co-firing activities would compete for a limited supply of waste resources across the Western Balkans.

Industrial users, particularly the cement sector, are already well positioned to dominate any available supply of refuse-derived or solid recovered fuel. Industrial users, especially cement producers, are likely to absorb most of the refuse-derived and solid recovered fuels that might become available in the region. Cement plants in Bosnia and Herzegovina, Albania, North Macedonia and Serbia have long promoted waste

[33] Serbia Energy News, Serbia's Emerging Market in SRF and RDF: Fueling the Waste-to-Energy Revolution, 18 January 2024.

[34] Center for Energy, Environment and Resources, Improving waste management in Bosnia and Herzegovina and Serbia: The success of the Zero Waste Municipalities initiative, 28 March 2023.

[35] Bureau of International Recycling, EU Waste Shipments Regulation: EU Commission confirms list of non-OECD countries that applied for non-hazardous waste imports from EU, 25 February 2025.

co-processing and have actively shaped regional policies. For example, the GIZ-supported 'Waste to Energy for Western Balkans Countries Cement Industry' initiative was co-funded by major cement companies, including Titan Antea (Albania), Titan Usje (North Macedonia) and Titan Kosjerić (Serbia), showing the cement sector's strong and organised demand for refuse-derived and solid recovered fuels.[36]

Meanwhile, in Serbia, the emerging production capacity for refuse-derived and solid recovered fuels is being developed specifically to serve cement kilns and energy-intensive industrial clients rather than municipal energy systems, further showing where demand is concentrated.[37] Taken together, this evidence indicates that any refuse-derived or solid recovered fuels produced in the Western Balkans would likely be captured by cement plants and industrial users long before coal plants could compete for it.

Environmental and health risks

Evidence from EU countries shows that waste-to-energy incineration produces constant toxic contamination that spreads far beyond plant boundaries. A new set of independent Toxico Watch studies (2025), supported by Zero Waste Europe, documents dangerous levels of dioxins, furans, PFAS, and heavy metals in the surroundings of waste-to-energy plants in France, the Netherlands and Spain, with contamination found in soil, moss, surface water, vegetation and even food.[38]

In Zubieta (Spain), eggs from backyard poultry contained 38 picograms of toxic equivalency per gram (pg TEQ/g) of fat, more than 10 times the EU legal limit.[39] Moss samples showed up to 300 times higher dioxin levels than before the incinerator began operating in 2020. PFAS and heavy metals were likewise detected in water and soil. In Harlingen (Netherlands), PFAS in surface water reached 138 times the legal drinking water threshold, while soil dioxins were 7 times higher than before the incineration plant had become operational in 2013. In Ivry-sur-Seine (Paris), contamination above EU limits was found in soil near schools and public parks, confirming that children in urban areas face disproportionate exposure.[40] This is the strongest available empirical evidence that even modern waste-to-energy plants – even when equipped with advanced emission controls – cause long-range, cumulative deposition of carcinogenic and endocrine-disrupting substances in the environment.

---

[36] Deutsche Gesellschaft für Internationale Zusammenarbeit, Analysis of experiences in the production and use of refuse derived fuel (RDF) in Southeast Europe and EU countries, April 2025.

[37] Serbian Business News, Clarion Partners waste to energy project for Cement industry client, energy optimization for heavy industry, 21 November 2023.

[38] Zero Waste Europe, New data links waste incinerators to toxic contamination in surrounding environments – Spain, France, Netherlands.

[39] Levels of dioxins and dioxin-like PCBs in food are expressed as picograms of toxic equivalent (TEQ) per gram of fat. The regulatory maximum levels in the EU, which are often used as a benchmark, range from 1.0 to 2.5 pg/g of fat for various animal products, such as meat, milk and eggs. However, there are some rare exceptions, such as fish liver, which can exceed 20 pg/g of wet weight.

[40] Janek Vahk, Novo istraživanje dokazuje toksičnu kontaminaciju životne sredine u okolini spalionica i postrojenja za proizvodnju energije iz otpada, Zero Waste Montenegro, 15 April 2025.

The risks are even greater in the Western Balkans, where waste governance and environmental monitoring remain critically underdeveloped. The main risks are summarised below:

- Air quality in the Western Balkans is among the worst in Europe, with concentrations of particulate matter 2.5 micrometres or less in diameter ($PM_{2.5}$) frequently exceeding legal limits and WHO health protective recommendations.[41] Introducing an additional high-temperature combustion source intensifies the load of particulate matter, nitrogen oxides, sulphur dioxide (SO_2), heavy metals, and acid gases, especially in topographically closed basins like Sarajevo, Skopje, Tuzla, and Pljevlja.
- Unlike Sweden or the Netherlands, Western Balkan countries lack hazardous ash landfills. This is a critical gap, as 26 to 40%[42] of all incinerated waste remains as toxic bottom and fly ash, which contains higher concentrations of dioxins and heavy metals than the original input waste fuel. In practice, this means ash would likely be stored in inadequate facilities, thus increasing the contamination of soil and groundwater. Alternatively, the ash would have to be exported to treatment facilities in other countries, greatly increasing the operating costs for waste-to-energy facilities, which need to cover the costs of transporting these materials in specialised vehicles equipped with suitable containers, as well as high landfilling fees.
- Finally, the risk of water pollution is exacerbated by the near total absence of functional environmental inspections and enforcement, meaning that flue-gas scrubbing effluents could enter rivers untreated.

Policy and regulatory framework for combustion in district heating and regulatory risks

EU and Energy Community legislation is rapidly tightening waste, energy, and emissions rules, critically reducing the space for mixed-waste incineration within compliant systems. Against this backdrop, the Western Balkans' low recycling rates, reliance on fossil fuels for district heating, and weak governance create significant alignment gaps and pose substantial risks of lock-in for any new incineration projects.

The EU waste hierarchy, a legal organising principle under the Waste Framework Directive, is the filter through which new capacity must be assessed in the Western Balkans. The waste hierarchy prioritises prevention, reuse and recycling over waste incineration. Therefore, investment must be consistent with the hierarchy, since building new incineration capacity in areas with low recycling rates risks locking systems into lower-value treatment for decades. Article 4 of the Waste Framework Directive implies that EU Member States must ensure that new residual waste treatment capacity does not undermine prevention, reuse or recycling.[43] Similarly, the European Court of Auditors has concluded that additional incineration capacity

[41] European Environment Agency, Air quality status report 2025, 9 April 2025.

[42] Zero Waste Europe, Global Alliance for Incinerator Alternatives, Toxic Fallout: Waste Incinerator Bottom Ash in a Circular Economy, 6 January 2022.

[43] European Parliament, Council of the European Union, Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, 19 November 2008.

in systems with low recycling rates undermines EU waste management objectives.[44] In this context, new incineration capacity in the Western Balkans is structurally incompatible with EU accession requirements.

Waste incineration and co-incineration are not solutions for the circular economy. Instead of returning materials to productive use, these activities permanently destroy them, converting reusable and recyclable resources into CO_2 emissions and toxic pollutants, as well as producing a high percentage of hazardous ash that requires specialised disposal. This directly contradicts the EU's circular economy policy, which prioritises waste prevention, reuse, separate collection, material recovery and high-quality recycling. These principles are undermined when mixed waste is diverted to furnaces rather than being sorted and reused.

Incineration depends on a constant supply of mixed waste, locking municipalities into long-term delivery contracts and discouraging investment in recycling systems, biowaste treatment, repair programmes and reuse markets. Incineration also results in the permanent loss of resources. Plastics and paper, which are major components of municipal waste, are made from fossil fuels and forest biomass; once burned, they cannot be recovered. In contrast, true circular economy pathways preserve material value, extend product lifespans and minimise the extraction of new raw materials. From a climate perspective, incineration is also a high-carbon, linear technology. Incineration of municipal solid waste emits a large amount of CO_2, largely due to the fossil-based plastic fraction, which releases around 2.3 kg CO_2eq per kg of plastic burned.[45] Recycling plastics and paper, however, avoids such emissions by reducing the need for virgin production.

Under the 2018 Renewable Energy Directive, the renewable share can only include the biodegradable (biogenic) fraction of waste. The fossil fraction, consisting of plastics, is not considered renewable, and biofuels must fulfil greenhouse gas saving criteria. The Directive also introduced conditions for supporting renewable energy. For instance, biodegradable waste combustion cannot receive subsidies for renewables where separate collection obligations for recyclables and biowaste are not met.[46]

The 2023 Renewable Energy Directive stipulates that Member States must increase their use of renewable energy in heating and cooling by at least 1.1 percentage points per year between 2026 and 2030. Furthermore, they are encouraged to open district heating networks to third-party renewable and ambient waste heat. Along with the higher EU-wide 2030 renewables target (42.5% binding and 45% aspirational), these provisions push district heating systems away from long-lived fossil fuel combustion and towards integrating renewables and excess heat. These binding sectoral trajectories have been summarised by the European Commission in multiple briefing documents.[47]

---

[44] European Court of Auditors, Special Report 23/2025: Municipal waste management – Despite gradual improvement, challenges remain for the EU's progress towards circularity, 26 November 2025.

[45] Peter I. Macreadie, Tanveer M. Adyel, Plastics disposal as a climate decision, Nature Sustainability, 8(1425), 6 November 2025.

[46] European Parliament, Council of the European Union, Consolidated text: Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources, 16 July 2024.

[47] European Commission, Renewable Energy Directive, accessed 9 April 2026.

The 2023 Energy Efficiency Directive prioritises the 'energy efficiency first' principle, setting out requirements for towns with populations of over 45,000 to develop local heating and cooling plans that include decarbonisation goals for 2030 and 2050.[48] This requires the establishment of conditions for efficient district heating and cooling, including a progressive increase in the share of renewable energy sources, excess heat, and high-efficiency combined heat and power. The Directive requires that 50% of the energy used for district heating comes from renewable sources or waste heat by 2030. Currently, however, 97% of district heating in the six Western Balkan nations aspiring to join the EU still relies on fossil fuels. Locking networks into incineration undermines transition and would likely jeopardise this obligation, given that only biodegradable waste is considered renewable.

The reform of the EU's Emissions Trading System placed municipal waste incineration under mandatory monitoring, reporting and verification from 2024. The Commission is to assess inclusion by July 2026, with the aim of full inclusion by 2028, although there will be the possibility of a temporary opt-out until 2030. In practical terms, carbon pricing will decrease the competitiveness of waste incineration in relation to recycling, composting heat pumps, geothermal energy or other renewable heat production even further. It will also entail long-term CO_2 costs for new waste-to-energy projects.[49]

This exposes utility companies in Serbia (59 systems) and Bosnia and Herzegovina (32 systems) to rising CO_2 costs as the Emissions Trading System expands its coverage. The carbon intensity of incineration directly conflicts with the decarbonisation trajectories that the EU now expects from district heating operators, resulting in poor financial viability.

Incinerators require significant upfront capital and long-term debt repayment, while producing toxic residues that necessitate expensive specialist landfill. Sofia's case demonstrates that even heavily promoted EU city projects can fail when health risks, CO_2 emissions and financial non-viability converge. Failure to recycle makes incineration legally incompatible with accession, as the 50% target required by the Waste Framework Directive for 2020 is far from being met, with several countries lacking reliable data altogether. In such a context, adding incineration capacity prevents the development of recycling, contradicts EU waste hierarchy obligations and diverts mixed waste away from biowaste collection, composting and anaerobic digestion – measures that are recognised as essential to closing the region's methane reduction and alignment gaps.

District heating systems in the Western Balkans are set up for regulatory failure. As municipal budgets and governance capacities remain weak, gaps persist between environmental legislation and its actual

[48] European Parliament, Council of the European Union, Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955, 13 September 2023.

[49] Dominic Hogg, Incineration in the EU-ETS: a set of suggestions for its inclusion, Zero Waste Europe, June 2024.

implementation.[50] In this context, new waste incinerators would widen compliance deficits rather than closing them.

Pollution and enforcement deficits increase risks, and exceedances in air quality remain systemic across the region. PM10 and PM2.5 levels frequently surpass national limits, and many thermal power plants across the region, such as Pljevlja, Morava and Kakanj, do not comply with the Large Combustion Plants and Industrial Emissions Directives. Adding new incineration sources to Western Balkan towns that are already polluted and characterised by the illegal operation of coal power plants, weak or non-existent permits, insufficient monitoring and fragmented waste management systems will further increase the risk of governance failures and legal challenges.

[50] Joint Research Centre, European Commission, Western Balkans advances in environmental and climate action, but more efforts needed, 13 February 2025.

Supporting cases

Across Europe, and even in countries with high levels of standardisation, incineration projects have been shown to undermine the EU waste hierarchy, air quality, public health and the circular economy. At the same time, they often lead to an increase in the grey economy and corruption. This clearly demonstrates why Western Balkan governments, and international financial institutions should abandon such plans. The following cases serve as a warning:

- **Albania's three failed waste incinerator projects** in Tirana, Fier, and Elbasan have cost taxpayers over EUR 350 million in long-term liabilities due to corruption, no-bid contracts and failure to deliver. Elbasan received over EUR 24 million, yet the incinerator never became operational. Tirana received EUR 150 million for a facility that was never completed; no functional plant exists despite years of payments. Fier received EUR 35 million by mid-2022, including EUR 4 million in falsified invoices for unperformed work. Eleven individuals linked to the fraud were eventually arrested, including former Deputy Prime Minister Arben Ahmetaj, who was charged with corruption and money laundering before fleeing the country.[51]

- **Sofia's waste-to-energy plant**, funded primarily through the European Regional Development Fund, was expected to consume up to 30% of Bulgaria's EU waste management budget between 2014 and 2020. Despite major flaws, the project received financial support from the European Commission and the European Investment Bank (EIB). However, after eight years of litigation, the Sofia City Administrative Court overturned the environmental impact assessment due to unassessed health risks, a lack of public consultation, unreliable data and a failure to assess toxic emissions. Due to the project's failure, Sofia lost the full EUR 90 million EU allocation and had to repay the EUR 35 million that had already been disbursed.[52]

- **The Pavlikeni–Varbovka project** attempted to disguise one of Bulgaria's largest waste-burning facilities as a rockwool factory, while in reality planning an incinerator with a capacity of 1,160 tonnes of refuse-derived fuel per day, details buried within technical documentation. The environmental impact assessment failed to evaluate landfill sources, offered no measures to prevent pollution, and falsely claimed access to 75,000 cubic metres (m^3) of groundwater from a borehole that the Basin Directorate later confirmed does not exist, thereby putting already water-stressed communities at risk. The Supreme Administrative Court annulled the earlier approval, ruling that the lower court had failed to review key evidence and had violated both environmental law and procedural requirements. The project triggered three years of protests and petitions

[51] Emiliya Dimitrova, Five tons of documents and not a single piece of evidence: The Wolf will not burn garbage near Pavlikeni, Za Istinata, 6 March 2025.

[52] CEE Bankwatch Network, Sofia incinerator, 2019.

backed by around 20,000 residents, ultimately leading authorities to reject the incinerator after a second expert review confirmed its significant environmental and legal deficiencies.[53]

- **The Bobov Dol coal plant**, licensed to co-incinerate biomass and refuse-derived fuel, demonstrates how the burdens of pollution and regulatory failures intensify once waste burning becomes normalised. In 2025, monitoring stations recorded 55 exceedances of legal SO_2 hourly limits – more than double the permitted level – while the operator repeatedly sought approval to increase waste burning fivefold, from 35,000 to 185,000 tonnes per year. Though the facility received dozens of violation reports and fines, enforcement proved incapable of halting chronic pollution.[54]

- **The waste co-incineration project at the Šoštanj coal-fired thermal power plant**, led by the plant operator and state-owned utility Holding Slovenske elektrarne, proposed burning up to 160,000 tonnes of solid recovered fuel annually, replacing about 6% of lignite at unit 6. The operator claimed that the environmental impact assessment showed insignificant impacts, but an independent review commissioned by the Municipality of Šoštanj found that co-incineration would increase heavy metal emissions, degrade air and soil quality, and pose risks to public health. Local authorities rejected the proposal, and expert panels in Velenje concluded that burning solid recovered fuel would harm the environment. After sustained opposition from municipalities and environmental groups, the operator announced in early 2021 that it would withdraw the project and stop seeking an environmental permit.[55]

- **Even countries that invested heavily in incineration decades ago now face an overcapacity crisis**, leading to reliance on waste imports. Sweden's waste-to-energy system has become so oversized that it now imports between 1.3 and 1.5 million tonnes of foreign waste each year, mainly from the United Kingdom and Norway, to keep its 34 incinerators operating at full capacity. This has become a routine feature of Sweden's waste economy. Imported waste supplies district heating for around 950,000 homes and electricity for approximately 250,000 households, effectively tying the country's energy system to a continuous inflow of foreign waste. Instead of reducing waste, this model incentivises securing a steady supply of feedstock, undermining circular economy goals and discouraging higher recycling rates. Sweden now processes around 4.5 million tonnes of household waste annually, burning 56% for energy while recycling only 27% – a ratio that has seen little improvement, precisely because incineration depends on high volumes.[56] The Netherlands has followed a similar path, importing around 1.5 million tonnes of waste annually to maintain incinerator operations. As in Sweden, the expansion of incineration has flattened progress in recycling. Once thermal treatment becomes central to the system, recycling rates tend to stagnate,

[53] Emiliya Dimitrova, Five tons of documents and not a single piece of evidence: The Wolf will not burn garbage near Pavlikeni, Za Istinata.

[54] Svetoslava Ingilizova, Greenpeace: Bobov Dol TPP poisons with sulfur dioxide, wants to burn 5 times more garbage, Fakti.bg, 5 February 2026.

[55] Vladimir Spasić, EIA study for TPP Šoštanj waste incineration project under scrutiny, Balkan Green Energy News, 17 December 2020.

[56] Avfall Sverige, Rapport 2024: Swedish Waste Management, 1 July 2025.

as municipalities and operators must guarantee waste quantities to cover operating costs and loan repayments.

- **The most relevant example in the Western Balkans is Serbia's Vinča incinerator**, repeatedly promoted as a 'modern solution' but in reality shaped by the same structural flaws seen elsewhere. For years, Belgrade focused almost exclusively on developing the incinerator project alongside a new sanitary landfill. Although a new landfill was necessary, the addition of an incinerator significantly increased costs, locked the city into a costly long-term contract requiring fixed volumes of waste, and diverted attention from developing separate collection and recycling infrastructure. The project was financed by the EBRD, the International Finance Corporation (IFC), and the Austrian Development Bank. The EIB, however, refused to finance the project, warning that such large-scale waste incineration would undermine Serbia's alignment with EU recycling and circular economy requirements. The facility was designed to process 340,000 tonnes per year, yet the public–private partnership contract obliges Belgrade to supply 510,000 tonnes annually. Instead of supporting recycling, this contractual obligation structurally prioritises mixed waste and discourages investment in separate collection, effectively locking the city into a system dependent on high waste volumes.[57]

- **Incineration supporters increasingly point to wastewater treatment sludge as an additional feedstock, but this approach only deepens environmental and economic burdens**. Sludge incineration leads to the irreversible loss of phosphorus,[58] produces high emissions of SO_2, dust and CO_2, and requires expensive flue-gas treatment simply to comply with EU limits. In addition, sewage sludge requires additional thermal input, as dewatered sludge typically contains 60 to 80% moisture and has a low heating value of only 3,000 to 6,000 kilojoules per kilogram (kJ/kg),[59], making sludge incineration heavily dependent on auxiliary fuels such as fossil gas or fuel oil to sustain combustion. By contrast, alternative solutions such as anaerobic co-digestion outperform incineration both environmentally and economically. Evidence from the Kraków–Płaszów wastewater treatment plant shows that combining water-treatment sludge with sewage sludge can increase biogas yields by around 20%, turning waste into energy without adding toxic emissions to nearby communities.[60]

[57] Milica Srejić, 100.000 tons more waste than the available capacity arrives in Vinča, more and more garbage from Belgrade, Vreme, 28 May 2024.

[58] Michel, Sewage sludge incineration – disadvantages and sustainable alternatives, 29 August 2024.

[59] Camilla Maria Braguglia, Giuseppe Mininni, Dionigi Marani et al., Sludge incineration: good practice and environmental aspects, Journal of Residuals Science and Technology, 1(1), 1, 2004.

[60] Justynka Górka, Małgorzata Cimochowicz-Rybicka, Dominika Poproch, Sludge Management at the Kraków-Płaszów WWTP—Case Study, Sustainability, 14(13), 30 June 2022.

Annex 1. Planned and existing incineration and co-firing projects in the Western Balkans

The table below compares the projected feedstock needs for these waste-to-energy, sludge-to-energy, and incineration projects against each country's total municipal solid waste generation, even before accounting for EU waste hierarchy principles and recycling targets.

Table 2. Comparative analysis of projected feedstock requirements for thermal waste treatment facilities against national municipal solid waste generation across the Western Balkans.

Country	Location/ Facility	Type	Feedstock	Energy use	Capacity	Volume of municipal solid waste generated in 2023 (kt/yr)[61]	Estimated feedstock demand (kt/yr)	Project phase	Financing
Albania	Tirana – public–private partnership incinerator	Waste incineration	Mixed municipal solid waste	Heat and power	n/a	844	335	Non-operational Seized by Albania's anti-corruption unit[62]	30-year public–private partnership (EUR 128.2 million)[63] EUR 90 million paid[64]
Albania	Elbasan – public–private	Waste incineration	Mixed municipal solid waste	Energy recovery	n/a	844	51	Non operational	EUR 26 million[65]

[61] Eurostat, Municipal waste by waste management operations, accessed 18 March 2026.

[62] Albania's Special Anti-Corruption Structure (Struktura e Posaçme Kundër Korrupsionit dhe Krimit të Organizuar) is an independent prosecution body tasked with investigating high-level corruption and organised crime.

[63] Politiko, Tirana's incinerator will "burn" another 30 million euros by 2028, 13 November 2025.

[64] Euronews Albania, Special Anti-Corruption Structure seizes Tirana incinerator and landfill, 1 August 2023.

[65] Politiko, Tirana's incinerator will "burn" another 30 million euros by 2028.

	partnership incinerator							Seized by Albania's anti-corruption unit	
Albania	Fier – public–private partnership incinerator	Waste incineration	Mixed municipal solid waste	Energy recovery	n/a	844	73	Non operational Seized by Albania's anti-corruption unit	EUR 32 million
Bosnia and Herzegovina	Zenica combined-heat-and-power plant	Planned waste-to-energy combined-heat-and-power plant	Municipal solid waste and refuse-derived fuel	Heat and power	50 MWth	1,186	N/A	Pre-feasibility	N/A
Bosnia and Herzegovina	Butila wastewater treatment plant and energy hub (Sarajevo)	Combined-heat-and-power wastewater treatment plant	Dried sewage sludge or potentially municipal solid waste	Heat and power	18MW heat pumps, rest TBD	1,186	13 dried sludge + potential municipal solid waste input 203	Concept stage, incineration option under evaluation	EBRD programme EUR 50 million total for Energy Hub, including EUR 15 million in WBIF grants
Bosnia and Herzegovina	Tuzla thermal power plant	Co-incineration pilot Co-firing planned for unit 3	Refuse-derived fuel + coal Biomass+ coal +	Heat and power	2% refuse-derived fuel[66] 10-20% of municipal	1,186	100 tonnes per day N/A	Pilot suspended Feasibility study ongoing	EPBiH EBRD loan

[66] Serbia Energy News, Bosnia and Herzegovina: EPBiH suspends waste-coal co-incineration project at Tuzla plant following public opposition, 18 July 2025.

			municipal solid waste		solid waste in Unit 3[67]				
Montenegro	Podgorica waste-to-energy (Livade)	Planned waste-to-energy	Municipal solid waste	Power	50 MWel	353	130	Feasibility study ongoing	Planned PPP, EUR 150 million[68]
Serbia	Novi Sad combined-heat-and-power plant	Planned waste-to-energy combined-heat-and-power	Municipal solid waste or refuse-derived fuel	Heat and power	50 MWth	3,095	40	Concept and pre-feasibility stages ongoing[69]	N/A
Serbia	Belgrade waste-to-energy (Vinča)	Waste-to-energy	Municipal solid waste	Heat and power	30 MWel + 56 MWth	3,095	340	Operational (2024)	Public–private partnerships and international financial institutions IFIs[70]

[67] European Bank for Reconstruction and Development, Full biomass repowering of Tuzla TPP Unit 3 and establishment of short rotation bioenergy plantations on former coal mine areas, Terms of reference, 3. Link not available.

[68] Igor Todorović, Spajić: Japanese company Itochu eyes Montenegro's waste0to0energy project, Balkan Green Energy News, 9 January 2026.

[69] Public Procurement Office of the Republic of Serbia, Израда претходне студије изводљивости постројења за производњу енергије из РДФ/СРФ горива, 19 November 2025.

[70] CEE Bankwatch Network, Belgrade incinerator PPP, Belgrade, Serbia, 18 January 2019.