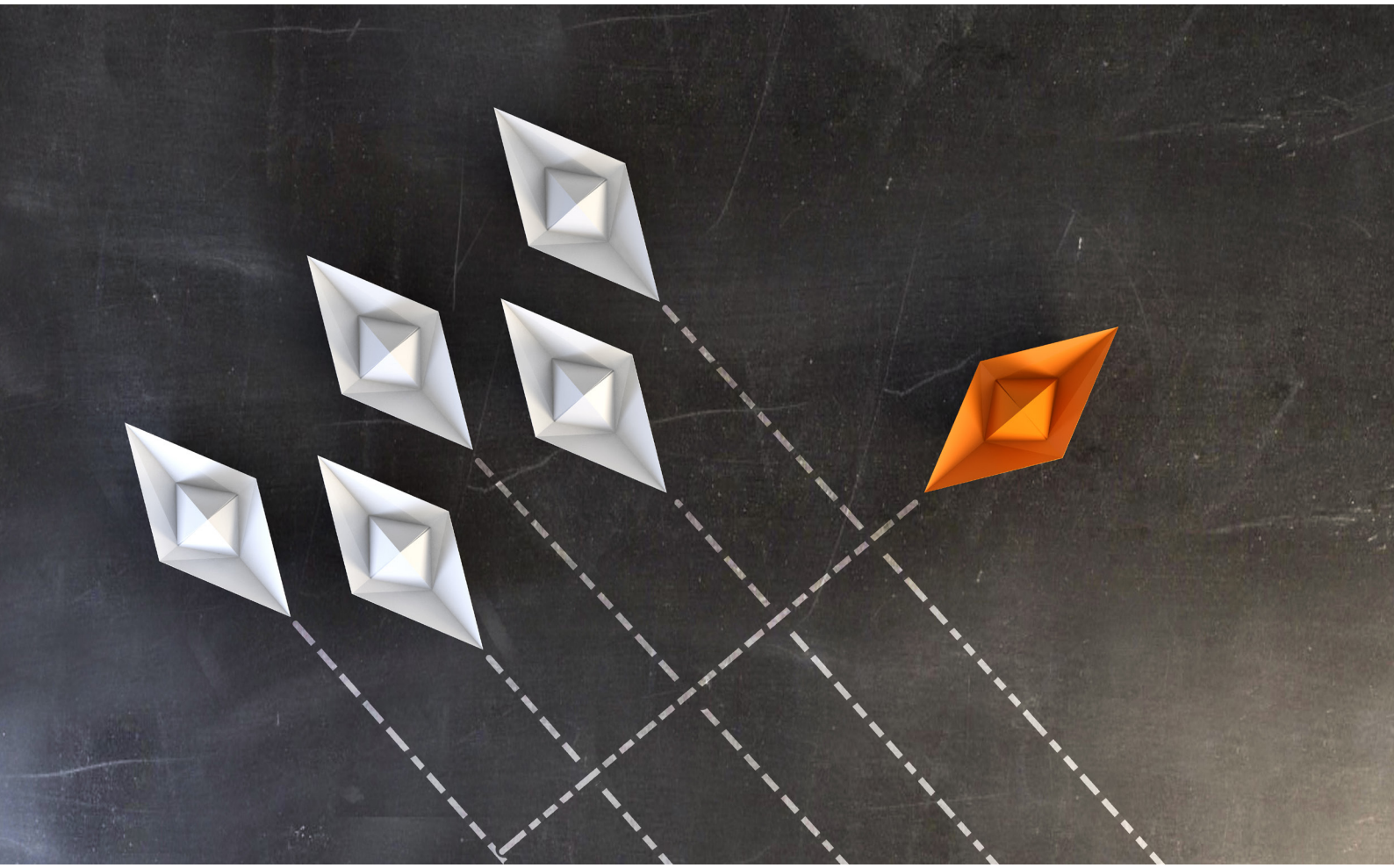
Energy Community



Rocking the Boat: What is Keeping the Energy Community's Coal Sector Afloat?

Analysis of Direct and Selected Hidden Subsidies to Coal Electricity Production in the Energy Community Contracting Parties

Energy Community Secretariat
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This publication is based on:

• the analysis of direct and selected hidden subsidies to coal-based electricity production in the Energy Community Contracting Parties published by the Energy Community Secretariat on 25.3.2019, https://www.energy-community.org/dam/jcr:ae19ba53-5066-4705-a274-0be106486d73/Draft_Miljevic_Coal_subsidies_032019.pdf, and

• the outcome of a subsequent public consultation on this analysis which ran from 25 March to 25 April 2019. The study is based on data gathered from public sources and the public consultation. It was researched and written by Damir Miljević (consultant) and Milka Mumović and Janez Kopač (Energy Community Secretariat).

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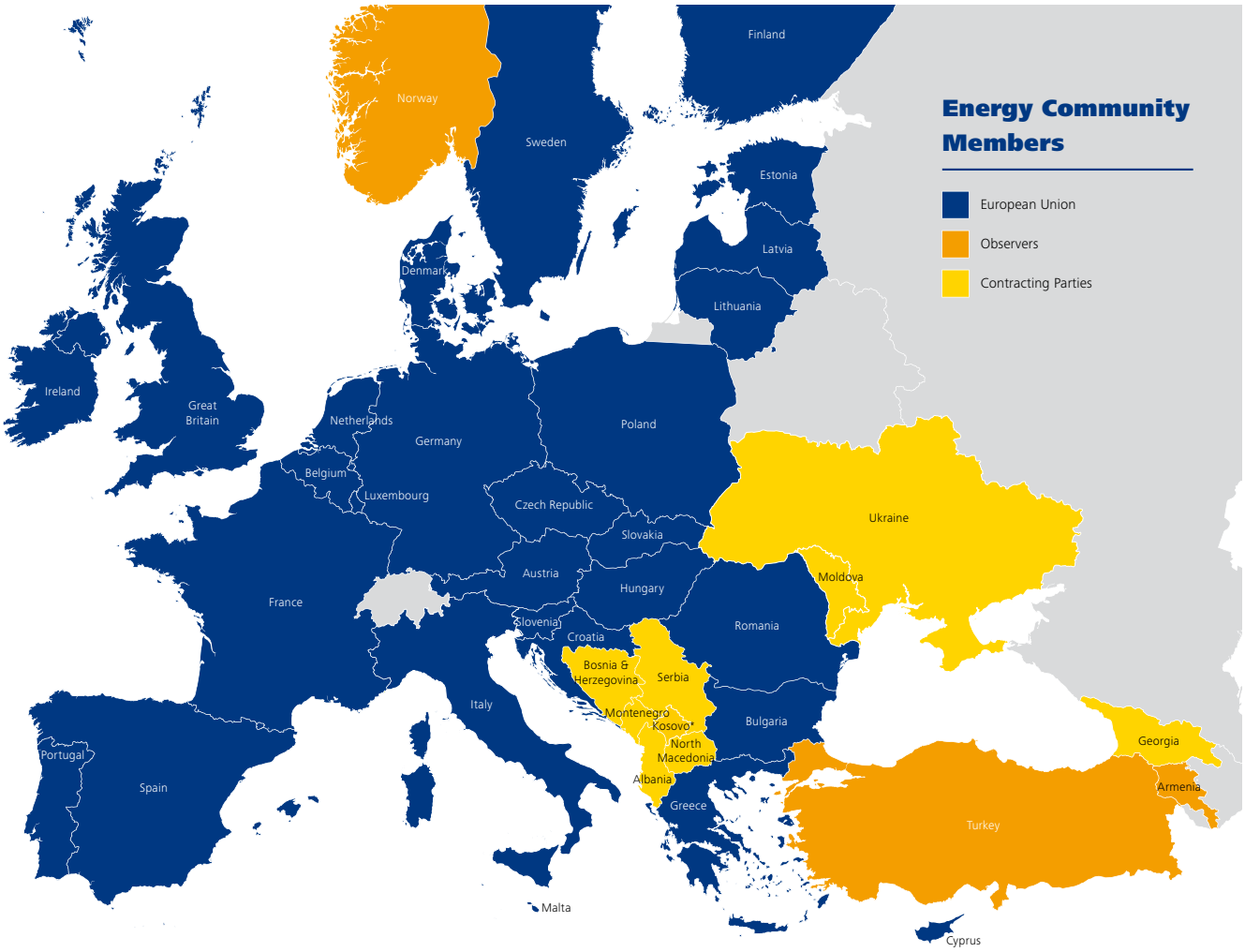
About the Energy Community

The Energy Community is an international organization which brings together the European Union and its neighbours to create an integrated pan-European energy market. The organization was founded by the Treaty establishing the Energy Community signed in October 2005 in Athens, Greece, in force since July 2006. The key objective of the Energy Community is to extend the EU internal energy market rules and principles to countries in South East Europe, the Black Sea region and beyond on the basis of a legally binding framework. Presently, the Energy Community has nine Contracting Parties - Albania, Bosnia and Herzegovina, Kosovo*[1], North Macedonia, Georgia, Moldova, Montenegro, Serbia and Ukraine.



1 This designation is without prejudice to positions on status and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.

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1. Executive Summary

At a time when the European Union has firmly set its sails towards the decarbonisation of its energy sectors by 2050, coal - the most polluting electricity generation source - still represents over 46% of the total installed electricity generation capacities in the Energy Community Contracting Parties. The Contracting Parties are not prepared to follow the EU in its decarbonisation pathway. Vast efforts and financial resources are used to support the continuation of an unsustainable energy policy. In fact, some **EUR 2.4 billion of direct and certain types of indirect (hidden) state subsidies are given up in order to support the coal sector** in the Energy Community on an annual basis.

The overwhelming level of direct subsidies, whose compliance with State aid rules is highly questionable, and lack of persuasive reform strategies risk shifting the Contracting Parties further away from the European Union. Artificially cheap coal-based electricity generation perverts the functioning of the electricity markets and continues to fuel opponents to market reforms. The absence of a carbon pricing mechanism is particularly worrisome. The Energy Community, which aims to create one internal energy market with EU Member States, has failed to take over the EU's flagship instrument to combat climate change, the Emissions Trading Scheme (ETS). This legal gap enables coal-based electricity generators from the Energy Community Contracting Parties to take advantage of a hidden subsidy, which results in their EU competitors having significantly greater operating costs. **The total sum of direct subsidies during the analysed period 2015-2017 reached EUR 1,2 billion** (or on average EUR 400 million annually) in the Contracting Parties analysed. The analysis also shows that **hidden subsidies, if not addressed adequately, may amount to EUR 1,9 billion on an annual basis**.

The calculation of costs of electricity production in thermal power plants conducted as part of this study, including the identified direct subsidies and two analysed hidden subsidies, showed that **any thermal power plant in the Energy Community charging less than 40 EUR/MWh is likely to incur operational losses in a competitive environment**. The reported net operating expenses of power generation in state-owned, aging coal-fired thermal power plants are in the range between 40 and 60 EUR/MWh, not including financial costs, such as incurred interest on loans and any return on investment.

Additionally, the low profitability levels of coal-fired electricity generation is a particularly challenging issue due to the need to invest in the modernization and environmental rehabilitation of thermal power plants required by the countries' membership in the Energy Community and, for some, future membership in the European Union. Additional investment costs needed to comply with obligations under the Large Combustion Plants Directive are not included in the full costs of production of coal-fired power plants calculated by the present study. However, the necessary investments are estimated at EUR 6 billion, of which EUR 5 billion are needed in Ukraine alone.

The implicit losses resulting from the present direct and hidden subsidies for production of electricity from coal are not recognized. The level of subsidies directed towards coal is all the more startling when compared to the total amount of subsidies channelled to electricity generated from renewable sources. The three most coal intensive Contracting Parties (Bosnia and Herzegovina, Kosovo* and Serbia) are in absolute terms subsidizing coal significantly more than renewables.

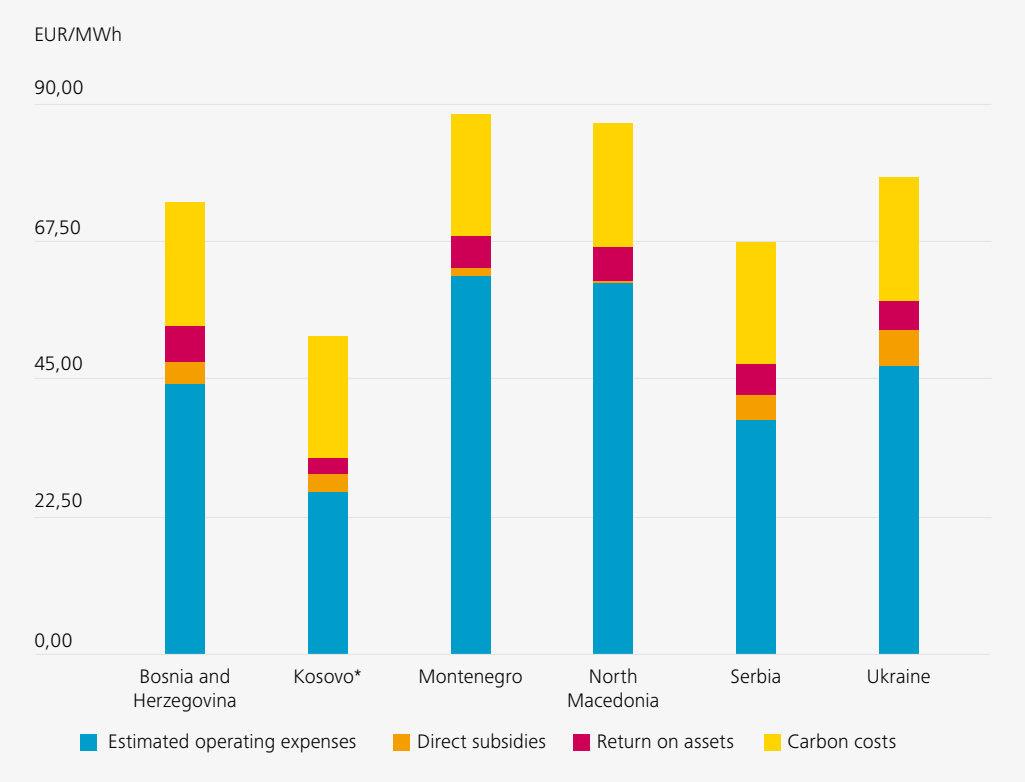
Table 1: Amount of state support to production of electricity from renewables and coal

in '000 eur

Contracting Party	Paid incentives for production from renewables			Paid direct subsidies for production from coal		
	2015	2016	2017	2015	2016	2017
Bosnia and Herzegovina	17.595	20.160	25.040	26.189	35.550	48.245
Kosovo*	1.630	7.670	5.560	30.894	8.768	7.501
Montenegro	960	3.960	4.100	881	1.156	700
North Macedonia	15.462	20.526	20.085	4.379	3.722	2.927
Serbia	17.170	24.470	34.800	90.746	115.751	80.606
Ukraine	151.490	n/a	212.170	194.732	263.399	280.442

The study also shows that without direct and indirect subsidization of electricity generated from coal and other market distortions, in particular cross-subsidization between industry and households, **the price of electricity to supply households and industry would increase from 4% in North Macedonia to up to 52% in Serbia. The price for industrial consumers, after eliminating all subsidies, would have to rise in all Contracting Parties, except Kosovo*, from 13% in North Macedonia to 34% in Bosnia and Herzegovina.**

Graph 1: Estimation of full costs of production of electricity from coal



2. Introduction

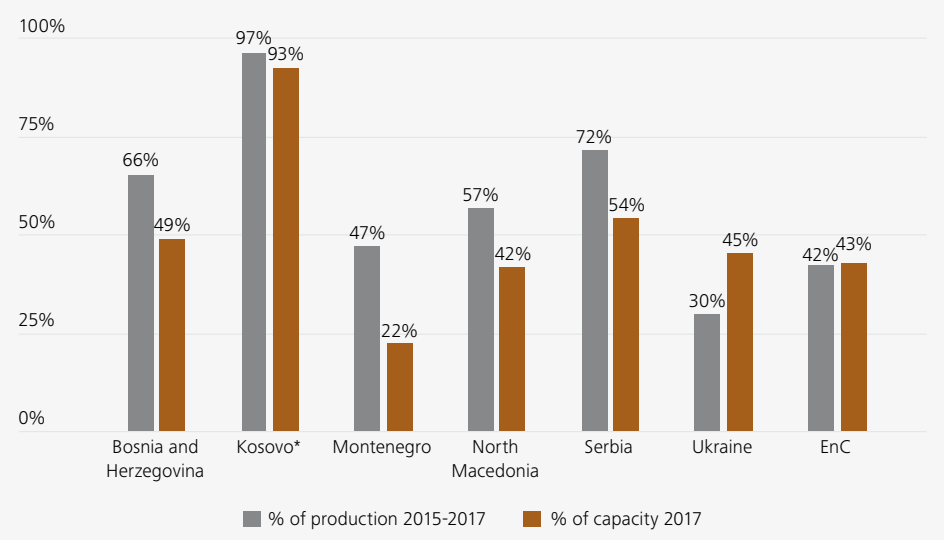
In the Contracting Parties where coal-based production is significant, a frequent motivation for subsidization is the government's intention to maintain low electricity prices for the final customers, in order to avoid potential economic, social and/or political problems that may arise if subsidies were abolished. Governments across the Energy Community continue to turn a blind eye to the grave difficulties in the operation and economics of the coal-based electricity sector.

Subsidization of the coal sector and coal-based production distorts electricity markets. Selling electricity below actual cost undermines the principles of fair market competition, distorts the selling price of electricity in domestic and foreign markets and constitutes a serious obstacle to the establishment of a fair, transparent and open electricity market. It sends wrong signals not only to investors in competitive technologies, but also to electricity consumers, disincentivizing their efforts towards energy savings and energy efficiency.

Entities that are regularly subsidized have no incentive to improve their own operation, to cut costs or operate on market principles; instead, they rely on political support and regular assistance through various subsidization mechanisms, thereby becoming a permanent burden for governments and public finances. Moreover, this support is often difficult to detect and consumers are not aware of it.

Under the Energy Community Treaty, the Contracting Parties committed to improve the environmental situation in relation with energy supply in the region and foster the use of renewable energy and energy efficiency by transposing and implementing the relevant EU laws into their legal frameworks. In 2018, the implementation phase of two directives[2] regulating the emissions of large combustion plants kicked in, which will require financial resources on an unprecedented scale. The Contracting Parties also have legal obligations regarding the prohibition of State aid that distorts or threatens to distort competition[3], which must be respected.

Graph 2: Share of electricity from coal in the generation fuel mix



While the adoption of certain elements of the 'Clean Energy for all Europeans' package is already underway[4], Contracting Parties, especially those who strive to join the European Union, will in the foreseeable future have to impose a carbon pricing mechanism and join the EU Emissions Trading Scheme, rendering the coal sector unprofitable even further. Carbon leakage from EU Member States to neighbouring countries synchronized with the Continental European Area is well documented and an increased focus is being placed on addressing it.[5]

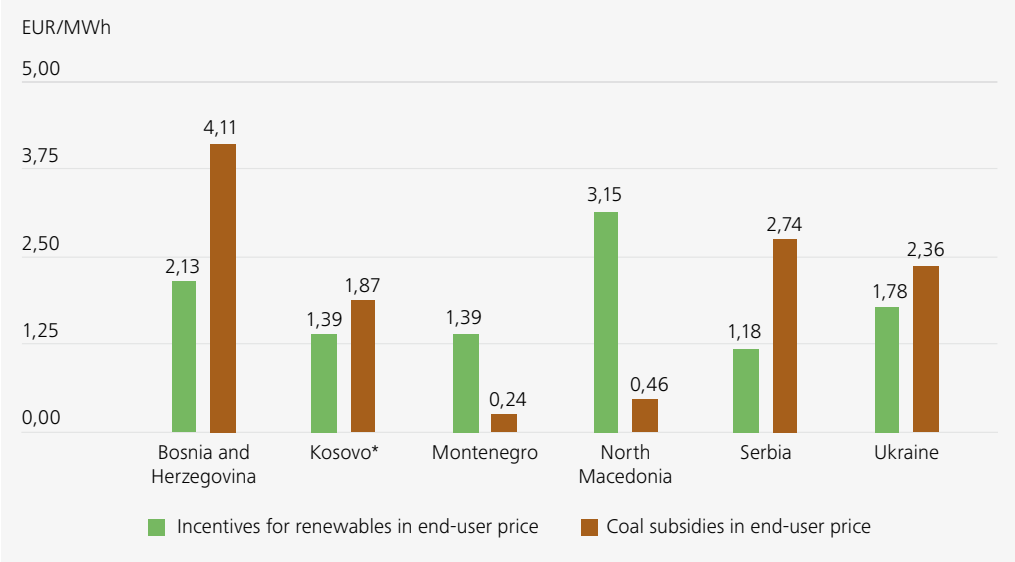
2 Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants (LCPD, for existing plants) and Directive 2010/75/EU on industrial emissions (IED, for new plants).
3 Treaty establishing Energy Community, Article 18, https://www.energy-community.org/legal/treaty.html, Accessed on 10.07.2018.
4 Energy Community Ministerial Council General Policy Guidelines on the 2030 targets for the Contracting Parties of the Energy Community, https://www.energy-community.org/dam/jcr:a70ca2dc-6043-4dbd-8cca-84b755efc71d/PG_2030_Targets_112018.pdf, Accessed on 6.6.2019.
5 See for example: Equilibrium Analysis of Carbon Emission Caps in Regional Electricity Markets, Verena Višković, Published on 20.9.2018.

All Contracting Parties (with the exception of Kosovo*) are also signatories to the Paris Agreement and have undertaken additional commitments to reduce greenhouse gas emissions, strive for a cleaner environment and create the right conditions for climate-resilient development.

Covering the period 2015-2017, the study focuses on those Contracting Parties where coal-fired electricity generation is present: Bosnia and Herzegovina, Montenegro, Kosovo*, North Macedonia, Serbia and Ukraine. Albania, Moldova and Georgia presently lack coal-fired electricity generation capacity, and consequently have no direct or hidden subsidies for this type of production.

This analysis is intended to shed more light on the serious situation in the coal sector by identifying and quantifying direct and two types of indirect (hidden) state support to coal mining and use of coal for generation of electricity, the resulting market distortions, consumption patterns and long-term viability of systems relying on coal-fired power production in the selected Energy Community Contracting Parties.

Graph 3: Incentives for electricity from renewables[6] and subsidies for electricity from coal in 2017 end-user prices (compiled by Energy community Secretariat)

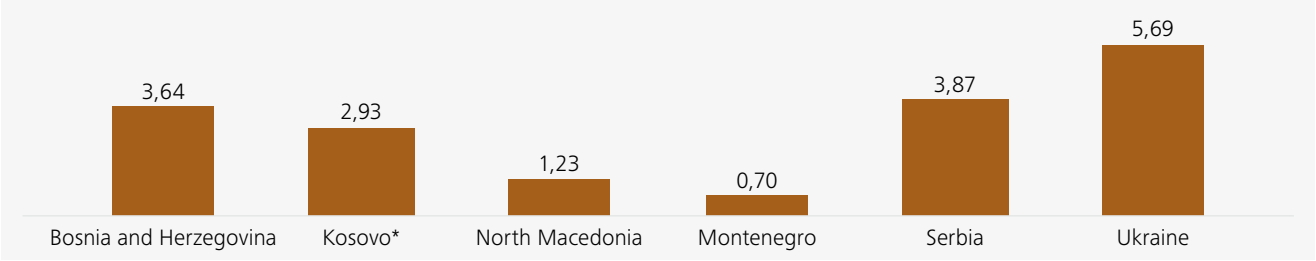


6 The share of feed-in tariffs paid to renewables generators as a special fee or through cross-subsidies out of the final consumer price.

3. Direct Subsidies

The study revealed that, during 2015-2017, direct subsidies for electricity generation from coal were provided in all observed Contracting Parties. **The total sum of direct subsidies during this period reached EUR 1,2 billion or around EUR 400 million annually on average.**

Graph 4: Average direct subsidy to coal-based power generation in EUR/MWh during 2015-2017



Fiscal support made up as much as 67% of the total amount of direct subsidies. This category most often includes direct funding from the state budget and subsidies derived from the writing-off and reprogramming of arrears to the budgets and public funds. It also includes subsidies based on provision of government loans, debt write-offs or repayment of loans from the state budget on the basis of issued loan guarantees, lowering of the fees payable to the state for used resources and VAT exemption. Most frequently, the beneficiaries of the direct subsidies in this category were state-owned coal mines, which would either not survive without subsidies, or would have to pass through the costs to the electricity prices.

Public finance support is used by almost all observed Contracting Parties. The provision of state guarantees for foreign investment loans intended for the reconstruction and revitalization of existing coal-fired thermal power plants and modernization of coal mines is the main instrument the governments use to subsidize the financing cost in the coal electricity generation sector. Low profitability levels of coal-fired electricity generation, particularly when supported by direct subsidies, prevent the sector from generating sufficient revenues that would permit setting aside adequate own funds for investment in modernization and environmental rehabilitation of its plants. Therefore, the only way that the coal sector can borrow money is by having the loans guaranteed by the respective government.

In addition to the guarantees, public finance support also includes subsidies related to the loans extended by government-controlled institutions of some Contracting Parties and loans and grants provided by international organizations to business entities involved in electricity generation from coal.

The study established that electricity generation from coal is also subsidized through state-owned electric power companies. This type of subsidy, classified as SOE investment, takes the form of direct investment of state enterprises in capital, regular advances on production, extending loans and tolerance for non-payment of electricity bills by the entities in the coal production sector. The analysis showed that without the direct subsidies, the concerned power producers would directly or indirectly, through increased cost of coal, incur higher costs, annually reaching nearly EUR 400 million, and EUR 246 million in Ukraine alone.

Table 2: Overview of direct subsidies per Contracting Party

				in EUR million	EUR/MWh
Contracting Party	**2015**	**2016**	**2017**	**2015-2017 total**	**Average**
Bosnia and Herzegovina	26,19	35,55	48,24	**109,98**	3,64
Kosovo*	30,89	8,77	7,50	**47,16**	2,93
North Macedonia	0,88	1,16	0,70	**2,74**	1,23
Montenegro	4,38	3,72	2,93	**11,03**	0,70
Serbia	90,75	115,75	80,61	**287,10**	3,87
Ukraine	194,73	263,40	280,44	**738,57**	5,69
Total	**347,82**	**428,35**	**420,42**	**1.196,59**	4,54

Direct subsidies calculation methodology

For the purpose of calculating direct subsidies, this study[7] is based on the definition of subsidies provided by Article 1 of the World Trade Organization's (WTO) Agreement on Subsidies and Countervailing Measures (WTO 1994).[8] The WTO defines a subsidy as 'any financial contribution by a government, or agent of a government, that confers a benefit on its recipients' (WTO, 1994).[9] It is important to note that the WTO definition of subsidies rests on two fundamental elements. One, that a government or any other public body in the Contracting Party is providing a financial contribution. Two, that this contribution provides a benefit to the recipient. What matters is not what categories or groups the subsidies fall in, but that they target precisely defined entities/sectors or products/services that benefit from such measures. In this context, the WTO methodology does not recognize the classification into direct or indirect subsidies, but instead it focuses on the calculation of the scale of the benefits generated by subsidies, which at the same time presents costs for the government.

The subsidies were classified into three categories:

- fiscal support-type subsidies;
- public finance support subsidies; and
- State Owned Enterprises (SOE) investment support subsidies.

For the purpose of this study, all subsidies with a defined monetary value that may be tracked to a specific final beneficiary, while providing a direct benefit, are considered direct subsidies.

In order to better understand the national policies and instruments that governments use to subsidize electricity generation from coal, the collected data and information are aggregated to show the amount of direct subsidies derived from all types of support. In cases where the costs to governments are lower than the level of benefits obtained by subsidy recipients[10], the amount of the subsidy is calculated as a benefit to the beneficiary.

7 This study does not address the question of State aid and compatibility of State aid in the sense of the Energy Community acquis. Incompatible is State aid which enables an economic advantage that is selective and imputable to the State, granted through State resources and has the potential to distort competition and affect trade. Not every single subsidy constitutes State aid.

8 https://www.wto.org/english/docs_e/legal_e/24-scm.pdf, Downloaded on 20.06.2018.

9 https://www.wto.org/english/docs_e/legal_e/24-scm.pdf, Downloaded on 20.06.2018.

10 For instance: a government may borrow in financial markets under much better terms than a commercial entity. Therefore, when e.g. a government provides a loan or a loan guarantee, the benefit to the subsidy recipient is far greater than the cost to the government and is reflected in the interest rate differential between the interest rate on the loan to the beneficiary and the interest rate to a similar loan extended on commercial terms without government involvement.

3.1. Overview per Contracting Party

Table 3: Average annual direct subsidies by type of direct subsidy during 2015-2017

in EUR million				
Contracting Party	**Fiscal support**	**Public finance support**	**SOE investment support**	**TOTAL**
Bosnia and Herzegovina	6,61	3,83	26,22	36,66
Kosovo*	15,59	0,13	0,00	15,72
Montenegro	0,44	0,45	0,01	0,91
North Macedonia	0,00	3,68	0,00	3,68
Serbia	59,77	34,87	1,06	95,70
Ukraine	183,87	0,00	62,33	246,19
Total	**266,27**	**42,97**	**89,62**	**398,86**

3.1.1. Bosnia and Herzegovina

In Bosnia and Herzegovina (BiH), coal-fired electricity generation takes place in five thermal power plants, of which four are majority state-owned, while one is private. The private thermal power plant is owned by Energy Financing Team Group[11] (capacity 300 MW). The state-owned companies "Elektroprivreda Republike Srpske" (ERS) owns TPP Gacko and RITE Ugljevik, while "Elektroprivreda BiH" (EPBiH) owns TE Tuzla and TE Kakanj with installed capacity of 1,256 MW. Three thermal power plants have integrated coal mines, while the thermal power plants Kakanj and Tuzla are supplied from seven coal mines that operate as independent business entities within Elektroprivreda BiH.

The electricity generation from coal during the examined period was supported by reprogramming and failure to collect tax and social security contribution arrears from coal mines, waiving the applicable fees for exploitation of natural resources for electricity generation to thermal power plants (TPPs), provision of state loan guarantees to TPPs; and SOE investments in coal mines, provision of equity, loans and advances for continued production in the mines.

In early 2018, the Law on Charges for Exploitation of Natural Resources for Electricity Generation of the Republika Srpska (RS) was repealed. The earlier (2016) amendments to this law required the producers of electricity from coal in Republika Srpska to pay a fee of EUR 0,0015/kWh of generated electricity instead of EUR 0,0031/kWh. At the same time, the RS Law on concessions was amended, and it now introduces a concession fee for exploitation of power generating facilities, and for producers of electricity from coal. This fee is now EUR 0,00169/kWh of generated electricity.

In 2018, EPBiH continued to support coal mines and the Federation Government drafted the Programme of Restructuring of the Electric Power Sector. According to available information, the Programme does not envisage the closure of non-profitable mines which is an indication that the existing subsidization policy will continue.

In August 2018, the Federation Government adopted a decision to issue a guarantee for EPBiH to construct the new Block 7 at the Tuzla Thermal Power Plant, with capacity of 450 MW, worth EUR 613.990.000 to the China EXIM Bank. The final decision about the state guarantee was made by the Parliament of the Federation of BiH.

3.1.2. Kosovo*

In Kosovo*, electricity generation from lignite is dominant, reaching 92.5% of the total installed electricity generation capacity. The state-owned Kosovo Energy Corporation (KEK) operates the country's two coal-fired thermal plants (Kosova A and Kosova B), both vertically integrated with mines.

11 EFT Rudnik i termoelektrana Stanari. http://www.eft-stanari.net/, Accessed on 16.08.2018.

In the period under consideration, the subsidies for electricity generation from coal were identified in the form of debt write-off, loans from the budget and provision of state loan guarantees.

The fiscal support subsidies relate to a government loan intended as support for KEK's regular operating activities, considering the low level of efficiency of the thermal power plants and low collection rates for the electricity supplied. In 2015, the Government of Kosovo* wrote off interest payments on loans extended to KEK.

The Kosovo Energy Corporation plans to invest EUR 445 million in expansion and modernization of the coal mines, while an investment of EUR 270 million is planned for extension of the useful life and environmental rehabilitation of the Kosova B thermal power plant.[12]

The Government of Kosovo* has continued activities for the construction of a new thermal power plant with 450 MW capacity (e Re Project), in cooperation with a private investor ContourGlobal Terra 6 Sàrl worth more than EUR 1 billion. The Government of Kosovo* has committed to issue a state guarantee for the implementation of the project[13] and signed eight commercial agreements with the investor.[14] According to the agreements, the Government of Kosovo* will guarantee to the investor the purchase of all produced quantities of electricity at a guaranteed price of 80 EUR/MWh, compensation for all development costs of the project, VAT and custom duties exemption, reimbursement of environmental remediation costs and start-up and hot standby charges.

3.1.3. Montenegro

The electricity generation capacity from coal accounts for 22.5% of the electricity generation sector in Montenegro. Since June 2018, the sole thermal power plant - Pljevlja Thermal Power Plant - operates as part of a majority state-owned company "Elektroprivreda Crne Gore" (EPCG). The Pljevlja Thermal Power Plant is supplied with coal from the Pljevlja coal mine, currently 100% owned by EPCG.[15]

The subsidies for electricity generation from coal in Montenegro were provided in the form of reprogramming and failure to collect tax and social contribution arrears from the coal mine, provision of state loan guarantees to the TPP and SOE investment support to the coal mine.

During this period, there were no direct subsidies to EPCG, but pursuant to the 2014 Budget Law, the Government of Montenegro in 2014 converted EUR 45 million of EPCG's tax and contribution arrears into the company's shares, thereby increasing its own stake.[16]

In 2018, EPCG commenced activities to implement a planned investment in the Pljevlja TPP of EUR 60 million for environmental rehabilitation of Block One and recultivation of the existing slag and ash deposit site. The planned investment should be completed by 2021.[17] The Government of Montenegro is still considering the plans, ranging from the construction of Block Two of the Pljevlja TPP (opted-out under the LCPD) to retrofitting of the existing block.

3.1.4. North Macedonia

In North Macedonia, coal-fired thermal power plants account for 40% of the total installed electricity generation capacity. Electricity from coal is generated in two thermal power plants (REK Bitola and REK Oslomej) which, together with the coal mines, operate as a vertically integrated part of the state-owned company "Elektrane na Severna Makedonija" (AD ESM).

During the period covered by the study, there were no direct subsidies for electricity generation from coal, with the exception

12 Operations and Challenges of the Kosovo Energy Corporation, New Mining Development Plan, Investments in Ensuring Energy Supply, 2018. http://mzhe-ks.net/repository/docs/2._KEK_Presentation_3-rd_HLEF.pdf, Downloaded on 16.10.2018.
13 New Kosovo Project, 2018. http://mzhe-ks.net/repository/docs/1._Kosova_e_Re_20March18_FINAL_EN_REV_(1).pdf, Downloaded on 16.10.2018.
14 Commercial Contracts of TC „Kosova e RE" Project, http://mzhe-ks.net/en/commercial-contracts-of-tc--kosova-e-re--project#.XGPkO9JKjZ4, Accessed on 25.11.2018.
15 RU Pljevlja: http://www.rupv.me/en/vlasnicka-struktura, EPCG: http://www.montenegroberza.com/upload/documents/issuer/EPCG/SIPL%20EPCG%2030.09.2018.pdf
16 See Audit Report for EPCG https://www.epcg.com/sites/epcg.com/files/prilog_1_finansijski_izvjestaji_epcg_sa_misljenjem_revizora-_2016-mne_1.12.2017.pdf, Downloaded on 04.09.2018.
17 https://balkangreenenergynews.com/rs/idejni-projekat-ekoloske-rekonstrukcije-te-pljevlja-radi-kompanija-esena/, Accessed on 06.09.2018.

of public finance support in the form of state loan guarantees. In the coming period[18], ESM plans to invest EUR 41 million in the further modernization of the existing mines, as well as EUR 140 million in the continued modernization and environmental rehabilitation of the Bitola Thermal Power Plant.

The opening of a new coalfield is planned, with the required investment estimated at EUR 122,5 million. As the Oslomej Thermal Power Plant has problems with coal supply and technological obsolescence, AD ESM is considering to convert this plant from coal to gas as well as the feasibility of its revitalization as to supply it with high-grade imported coal. The value of Stage One of the Oslomej Thermal Power Plant revitalization project is estimated at EUR 45 million. In view of AD ESM's financial position, such ambitious plans indicate that additional government assistance would be needed for implementation.

3.1.5. Serbia

In Serbia, electricity generation from coal constitutes 54% of total installed capacity and is run by the state-owned "Elektro-privreda Srbije" (EPS) in two segments. The "Termoelektrane Nikola Tesla" segment includes the TPP Nikola Tesla A (6 blocks), TPP Nikola Tesla B (2 blocks), TPP Kolubara (5 blocks) and TPP Morava (1 block). The "Termoelektrane Kostolac" segment includes the TPP Kostolac A (2 blocks) and TPP Kostolac B (2 blocks). Coal for the TPPs is supplied from EPS's own strip mines located in the vicinity of the thermal power plants. In addition to its own coal, EPS procures coal from underground coal mines from the state-owned company PEU "Resavica".

The electricity generation from coal was subsidized during this period by direct budget transfers, international financial organization grants, reprogramming and failure to collect tax and social security contribution arrears from coal mines, debt write-offs, state loans, loans by state controlled institutions, state loan guarantees and SOE investment.

The direct subsidies that fall into fiscal support relate mainly to direct budget transfers, a government loan for the coal mines and taxes and contributions in arrears, i.e. for the PEU "Resavica", which is not a part of EPS. They also include government write-offs of a portion of EPS debt on the pre-1990 loans from the Russian Federation and a direct budget transfer to EPS.

The subsidies in the form of public support are derived from international loans guaranteed by the government, loans provided by institutions under government control and grants provided by international organizations and by the government through loan guarantees.

The subsidies shown under SOE investment support are derived from EPS support to PEU "Resavica" in the form of loans and electricity bill debts. In 2018, the RS Government and EPS continued to support the mines that operate the underground pits.

As part of the activities on the restructuring and financial consolidation of PEU "Resavica", implemented by the Government of Serbia with the support of the World Bank Group, the closing of two underground coal mines belonging to PEU "Resavica"[19] was announced in 2018, which constituted one of the conditions for the new agreement between the Government of Serbia and the IMF. At the same time, opening of the new "Poljana" underground mine near Kostolac is planned by 2020.

In the coming period, EPS plans to continue activities on the revitalization and modernization of the mines and thermal power plant facilities as well as on the construction of the new block Kostolac B3, with capacity of 350 MW.[20] The construction of the new block Kostolac B3 started in November 2017 with the objective of completion at the end of 2020.[21] The total planned investment in the new block is USD 613 million, 85% to be financed by China Exim Bank (20 years loan, 7 years grace period, 2,5% interest rate) and 15% by EPS.

In accordance with the Action Plan for the Protection of Environment, EPS intends to invest EUR 650 million in the thermal power plants and mine environmental rehabilitation projects.[22] In view of EPS's financial position, such ambitious plans signal that additional government assistance will be required for their implementation.

18 Elem: Development and investment plan 2018 – 2022, 2018. http://www.elem.com.mk/wp-content/uploads/2017/04/Investiciski-Plan-2018-2022.pdf, Downloaded on 23.10.2018.
19 https://www.blic.rs/biznis/drzava-daje-pet-miliona-evra-za-pocetak-zatvaranja-rudnika-resavica/1ztwfgq, Accessed on 22.08.2018.
20 http://195.250.121.20/SiteAssets/Lists/Sitemap/EditForm/Trogodisnji%20program%20poslovanja%20JP%20EPS%20za%202017-2019.pdf, Accessed on 08.10.2018.
21 https://www.b92.net/biz/vesti/srbija.php?yyyy=2017&mm=11&dd=20&nav_id=1327301, Accessed on 02.11.2018.
22 http://rs.n1info.com/Biznis/a349616/EPS-ulaze-860-miliona-evra-u-ekoloske-projekte-do-2025.html, Accessed on 09.10.2018.

3.1.6. Ukraine

Coal represents the second most important energy source for electricity generation in Ukraine, next to nuclear energy. The capacity for electricity generation from coal accounts for 47,44% of the total installed capacity but some of the plants are not operational year-round or are operating using another fuel.

The production is organized in three enterprises: Donbasenergo (1 TPP – capacity 0,88 GW), majority privately held, DTEK (9 TPPs[23] - capacity 16,3 GW), privately held, and Centrenergo (3 TPPs – capacity 7,6 GW), which is majority state-owned. The thermal power plants are supplied with coal from private mines, imports and state-owned coal mines.

According to the Secretariat of the Cabinet of Ministers of Ukraine, there are 102 state-owned coal mines, but most of them are located in the territory that is not controlled by the government due to military operations in eastern Ukraine. Only 33 state-owned coal mines are controlled by the government and only four of them are profitable.[24]

In the examined period, subsidies for electricity generation from coal were provided in the form of direct budget transfers, failure to collect tax and social security contribution arrears, VAT exemption and SOE investment support.

In terms of fiscal support, the state mines receive direct subsidies from the budget of Ukraine for miners' wages, costs and essential modernization and raising the level of protection in the mines.

In 2017, the Government of Ukraine adopted the Energy Strategy of Ukraine until 2035[25], which envisages the restructuring of the coal sector by closing unprofitable mines, privatization and establishment of coal markets to be completed by end-2020. A harmonization of the operation of thermal power plants with environmental standards was envisaged for the next planning period in order to extend their useful life. Plans were also made to build replacement capacities for electricity generation from coal. The privatization of the "Krasnolymanska" state-owned coal mine, as well as Centrenergo, the sole state-owned company for electricity generation from coal, was announced in 2018.[26]

In 2018, the Government of Ukraine issued a government guarantee of UAH 1.054,62 million (EUR 35,15 million) for the implementation of investment projects in five state-owned mines.[27]

Although the Government of Ukraine made significant efforts to reduce the subsidies for electricity production from coal in the previous period, measures like extending the exemption from VAT for operations regarding the supply of coal up to 2022 and issuing new government guarantees for loans to state coal mines indicates that subsidy-related policies will still play a significant role in the future.

23 Excluding Zuivska TPP, over which DTEK lost control in 2017 because of the armed conflict in Ukraine.
24 Secretariat of the Cabinet of Ministers (2018), Head of Government: We should hear the noise of production in the mines, not knocking of helmets due to wages arrears, https://www.kmu.gov.ua/ua/news/glava-uryadu-na-shahtah-maye-buti-shum-virobnictva-ne-stuk-kasok-cherez-borgi-po-zarplati, Accessed on 28.11.2018.
25 Cabinet of Ministers of Ukraine (2017), Resolution of the Cabinet of Ministers №605-№as of 18 August 2017 on the Approval of the Energy Strategy of Ukraine "Security, Energy Efficiency, Competitiveness" for the period up to 2035 (in Ukrainian) https://www.kmu.gov.ua/ua/npas/250250456, Downloaded on 05.11.2018.
26 https://nucc.no/the-government-of-ukraine-has-approved-the-list-large-state-owned-companies-to-be-privatized-in-2018/, Accessed on 16.11.2018.
27 https://open4business.com.ua/govt-provides-guarantees-for-uah-1-1-bln-loans-to-five-coal-enterprises/, Accessed on 15.11.2018.

4. Hidden Subsidies

Hidden subsidies in the context of this study are identified as an exemption or waiver of otherwise reasonable costs of a power producer, due to its status and legal framework, providing to it a competitive advantage in the respective market. As the flow of economic benefits to the receiving undertaking is not obvious and not reported as a financial transaction, the indirect subsidies are hidden and require deeper insight. As part of the study, the Energy Community Secretariat analysed two types of indirect subsidies[28]:

- operation at a low or negative level of profitability, incomparable to conditions for other market participants; and
- non-payment of CO2 emissions or any other externalities.

Only these two hidden subsidies, based on average annual generation data between 2015 and 2017, expectation that a ton of CO2 emissions is 20 EUR/ton and the expected return as described by the cost of production calculation methodology, total EUR 1.873 million.

Table 4: Estimate of two types of hidden subsidies in electricity production

Power producer	Average generation from coal 2015-2017	Foregone return on capital average 2015-2017	Assumed carbon costs 20 EU/MWh	Hidden subsidies
	GWh	000 EUR	000 EUR	000 EUR
EPBIH (BIH)	5.734	49.392	114.673	164.064
ERS-TPP (BIH)	3.144	4.627	62.873	67.500
EFT (BiH)	1.803	0	36.065	36.065
KEK (KOS*)	5.361	0	107.220	107.220
EPCG (MNE)	1.297	22.602	25.948	48.550
ESM (MKD)	2.979	23.176	59.579	82.755
EPS (SRB)	24.758	5.924	495.153	501.077
DTEK (UKR)[29]	43.296	0	865.920	865.920
Total TPPs	88.372	105.721	1.767.432	1.873.153

The calculation of operational costs of thermal power plants conducted as part of this study, adjusted only for identified direct subsidies, revealed that **most of the thermal power plants in the Energy Community charging less than 40 EUR/MWh[30] are likely to be incurring operational losses already today, without any carbon pricing system in place**. The recognition of hidden subsidies, such as costs of capital and carbon, bring the costs of production of electricity from coal to above 65 EUR/MWh.

The full costs of production of coal-fired power plants presented in table 7 are the costs of plants mainly at the end of their original design life, extended after significant rehabilitation and overhaul. On top of that, environmental regulations require urgent investments in filters, scrubbers, precipitators and other pollution abating and monitoring equipment in the existing old plants that will increase the capital costs further. The necessary investments are estimated at EUR 6 billion (EUR 5 billion in Ukraine alone).[31] The corresponding costs, the neglecting of which represents another hidden subsidy, are not assessed in this study, neither is the corresponding depreciation nor the writing off of the opted out plants.

28 Additional indirect subsidies such as non-payment for environmental damage, in particular the recovery of exhausted coal mines, and health costs paid by contributors to the health system were identified but fell outside the scope of the present study. For an in-depth assessment of the indirect health costs, see Health and Environmental Alliance, Chronic coal pollution, https://www.env-health.org/wp-content/uploads/2019/02/Chronic-Coal-Pollution-report.pdf, Published on 19.2.2019.
29 Average 2016-2017, data from DTEK Report 2017
30 KEK should be taken out from the benchmark because of dubious asset values.
31 Study on the Need for Modernization of Large Combustion Plants in the Energy Community, SEEC Ltd, 2013.

Table 5: Full costs of production of coal-fired plants, based on 2015-2017 averages

					In EUR/MWh
Contracting Party	Operating expenses	Direct subsidies	Return on assets	Carbon costs	Estimated full costs of production
Bosnia and Herzegovina	44,17	3,64	6,09	20	73,89
Kosovo*	26,81	2,93	2,31	20	52,05
Montenegro	64,95	1,23	5,11	20	91,29
North Macedonia	60,57	0,70	5,31	20	86,59
Serbia	38,58	3,87	5,07	20	67,51
Ukraine[32]	44,47	5,69	5,00	20	75,16

4.1. Cost of capital and foregone profits

In the incumbent power producers the financing of long-term assets is provided mostly from own equity and that long-term debts are incurred mainly for regular operation in order to finance working capital and current liabilities.

Should the governments have earned a profit equal to at least the yield on the safest state bonds, assumed at 3,5% on average, the required revenues from operation would need to be increased by tens or even hundreds of millions of euros.[33] However, neglecting to consider other opportunities to use this capital, state resources are blocked in the power production sector, earning losses or achieving a profit or result below the amount of interest on state bonds. This is an undisclosed foregone profit[34] which directly affects state budgets.

Table 6: Estimated return on assets in state-owned utilities

Incumbent power producer	Net book value end 2017	Equity to assets ratio	Estimated return 3,5% on equity and 5% on debts	Average generation 2015-2017	Estimated costs of capital
(Values in EUR)				MWh	EUR/MWh
EPBIH (BIH)	1.391.439.255	98%	49.117.806	7.088.013	6,93
ERS-TPP (BIH)	522.949.374	84%	19.558.307	5.287.123	3,70
ERS HE (BIH)	873.359.648	102%	30.567.588	2.079.870	14,70
EPHZHB (BIH)	474.701.723	92%	17.184.202	1.550.310	11,08
EPCG (MNE)	552.762.155	111%	19.346.675	3.788.402	5,11
EPS (SRB)	4.606.351.292	74%	179.187.065	35.375.333	5,07
KEK (KOS*)	284.146.000	43%	12.374.558	5.361.400	2,31
ESM (MKD)	631.111.837	88%	23.224.916	4.370.700	5,31

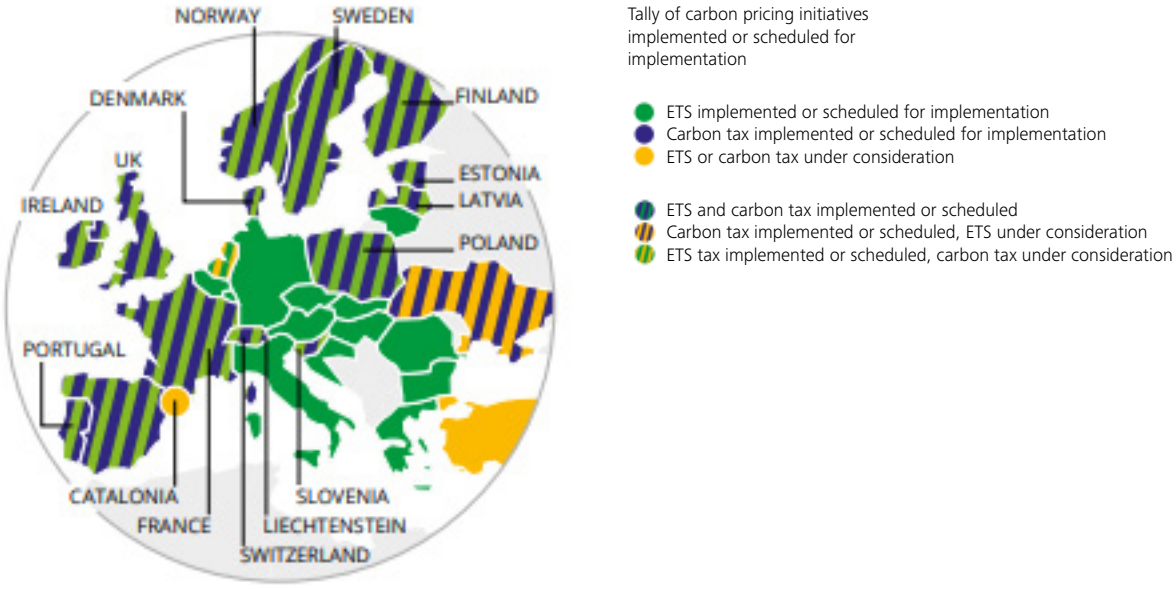
32 The DTEK balance sheets were not available; hence the return on assets is estimated. Financial data of other producers, apart from DTEK, were not available.
33 For calculating the cost of production, the return is determined as the weighted average cost of actual equity and debt and with an assumed rate of 3,5% on equity and 5% on debt.
34 Foregone profit is calculated as a difference between the estimated cost of capital and actual average net operating income in the period 2015-2017.

4.2. Emissions of CO2 – polluter pays principle

Coal-fired power generation is the main source of CO2 emissions into the atmosphere. Following the polluter pays principle, the operational costs of coal-fired power plants should include a levy to cover the emission of CO2. As demonstrated by a 2018 study conducted by the World Bank[35], countries in Europe and around the world are introducing mechanisms to reduce carbon emissions. Putting a cost on this type of pollution is taking two main forms: a carbon tax or an emission trading scheme (ETS) as a market-based mechanism. It is striking that the Energy Community Contracting Parties have not introduced any kind of carbon pricing mechanism yet. The only exemptions are Ukraine, which recently introduced a nominal tax, and Montenegro, which introduced an excise tax on coal used for electricity generation.

Under the EU ETS, the price paid for an allowance to emit 1 ton of carbon dioxide was dwindling below 10 EUR/ton for years. However, the price has picked up since 2018 and recently exceeded 25 EUR/ton at the European Energy Exchange.[36] It is expected that it will grow further in the future.

Figure 1: State and trends of carbon pricing 2018



Source: World Bank Group

Considering the global efforts to reduce CO2 emissions and the increasing focus on the energy sector, it is inevitable that power producers from the Energy Community will be obliged to pay for their emissions. This is particularly important to ensure a level playing field between market participants in the Energy Community Contracting Parties and EU Member States.

35 World Bank and Ecofys. 2018. "State and Trends of Carbon Pricing 2018 (May)", by World Bank, Washington, DC. https://openknowledge.worldbank.org/handle/10986/29687.
36 The traded product is EU Allowances (EUA), which permits the emission of one ton of carbon dioxide equivalent (Directive 2003/87/EC, https://www.eex.com/en/market-data/environmental-markets/spot-market/european-emission-allowances#!/.

Cost of production calculation methodology

The costs of production of electricity from coal-fired TPPs are determined on the basis of published financial reports of the observed undertakings as an average amount for the period 2015-2017. Operating expenses are taken from the income statement, adjusted for overheads for producers performing trade and supply within the same legal entity in the amount of 5% or 10% when distribution activity is also included.

When generation is performed within a vertically integrated undertaking with a distribution branch, the costs of distribution are deducted in the amount reported for distribution, or, if not reported, estimated on the basis of approved revenues for distribution tariffs.

When financial reports for producers from coal and hydro are published in a single report, the costs of hydropower production are estimated as the sum of depreciation at 30 EUR/kW of installed capacity and all other operating expenses at 15 EUR/MWh of produced electricity.

The average operating expenses per unit are determined as a fraction of the sum of operating expenses and production over the period 2015-2017.

The return on assets is estimated as the sum of return on equity at 3,5% and return on debt at 5%, applied on the net book value of property, plant and equipment. In case of EFT and DTEK, foregone return was not included, considering that the private owner has no interest to sell below the market price and if the owner did, it could not constitute state or public support.

The default amount of carbon dioxide emitted from power production was calculated by taking into account the CO2 emissions from hard coal, lignite and sub-bituminous coal at a default conversion factor, as defined in the Intergovernmental Panel on Climate Change (IPCC) Guideline for GHG inventories, 2006 (Volume 2, ENERGY).[37] The default emission value for hard coal is 94.000 kg/TJ, 96.000 kg/TJ for brown coal and 101.000 kg/TJ for lignite. The carbon costs are simply added at an assumed value of EUR 20 per ton of CO2, under the assumption of average emission default values, amounting to approximately 1 ton of CO2 for the production of 1 MWh of electricity. The carbon price is set on the basis of the recent market price of CO2, considering the associated externalities and health costs estimated at 110 EUR/MWh.[38]

37 https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html.
38 Study on the Need for Modernization of Large Combustion Plants in the Energy Community, SEEC Ltd, 2013.

5. Impact of transferring the full cost of coal on end-user prices

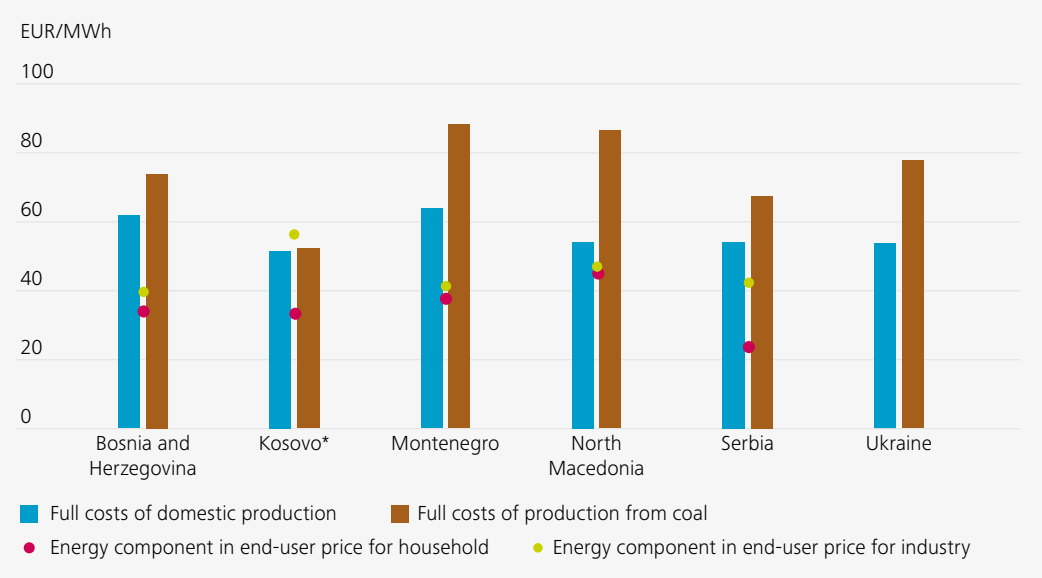
Although the wholesale market is open for competition in most Contracting Parties, the prices which power producers charge in their respective domestic markets and/or to related suppliers are not market-based. Selling electricity below cost, as summarized in table 7, means that producers cannot earn any return on investment or recover the incurred interest on loans.

Table 7: Estimation of costs of production of electricity in Contracting Parties

Contracting Party	Plant type (fuel)	Operating expenses	Return on equity	Direct coal subsidies	Assumed carbon costs	Estimated full costs of production per plant type	Average full costs of production of electricity
		EUR/MWh	EUR/MWh	EUR/MWh	EUR/MWh	EUR/MWh	EUR/MWh
Bosnia and Herzegovina	coal	44,17	6,09	3,64	20	73,89	**61,81**
	hydro	27,20	11,55			38,76	
Kosovo*	coal	26,81	2,31	2,93	20	52,05	**51,50**
	hydro	30,82				30,82	
Montenegro	coal	61,99	5,11	1,23	20	88,33	**63,78**
	hydro	29,71				41,26	
North Macedonia	coal	60,57	5,31	0,70	20	86,59	**54,32**
	hydro	32,32				32,32	
Serbia	coal	38,58	5,07	3,87	20	67,51	**54,36**
	hydro	23,38				23,38	
Ukraine	coal	47,3	5,00	5,69	20	77,99	**53,85**
	other	43,22				43,22	

On top of that, cross-subsidization between customer categories further distorts the recognition and allocation of full costs. The prices of electricity charged to industry and households differ significantly. The prices charged to households, mainly under the regime of universal service, are not only lower than prices charged to industry, often they are also lower than the mere operating expenses per unit. When cross-subsidies between customer categories are eliminated, the final prices for households and industry will have to increase in all Contracting Parties (except for industrial customers in Kosovo*).

Graph 5: Estimated costs of electricity produced in Contacting Parties and prices charged to end-users in their respective markets in 2017



Source: Eurostat data for end-user prices

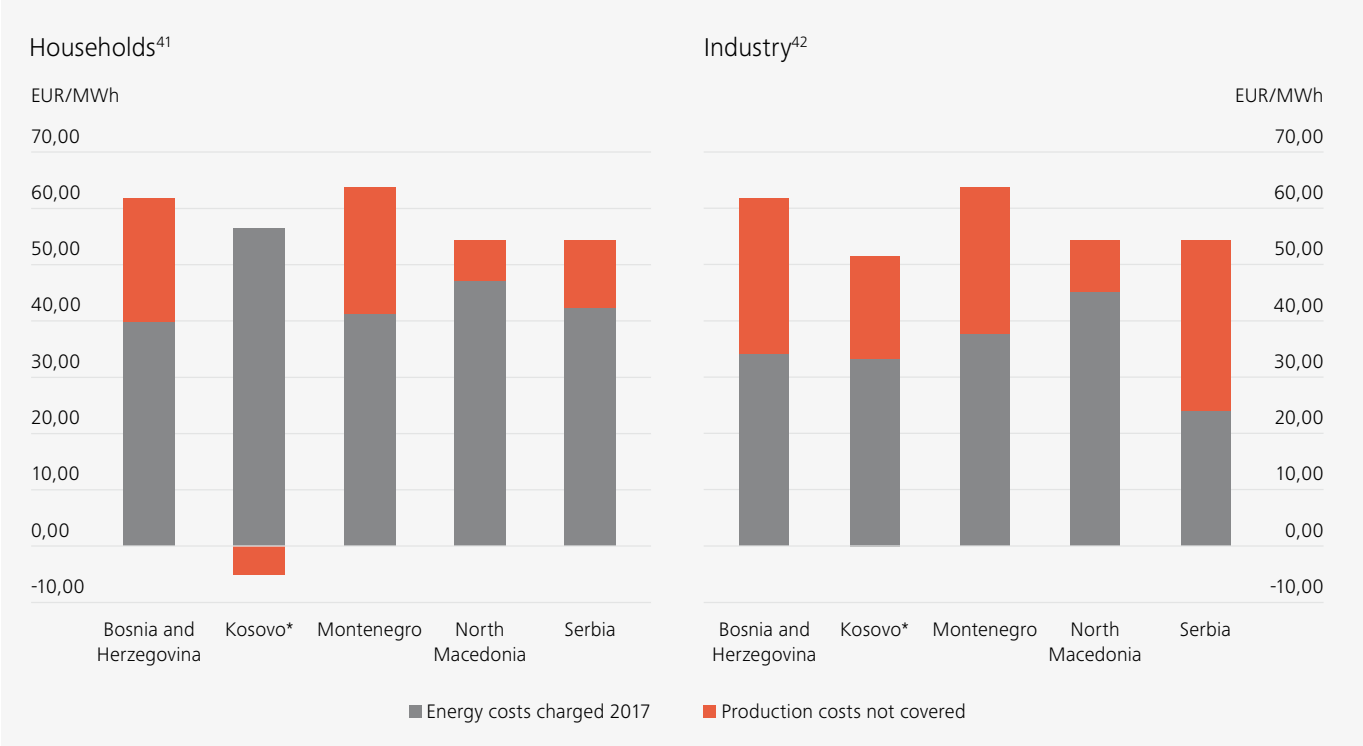
If the incumbent power producers would sell their electricity at the same price to all customer categories, equal to the full costs of production per unit with all costs fairly recognized, including the direct and two analysed indirect subsidies to coal, the price increase in percentage terms would follow as shown in table 8.

Table 8: Full costs of production and energy component charged to end-users[39]

Contracting Party	Energy component in end-user price EUR/MWh		Full costs of domestic production	Change in % of energy component in end-user price charged to	
	Households	Industry		Households	Industry
Bosnia and Herzegovina	34,20	39,80	61,81	81%	55%
Kosovo*	33,40	56,50	51,50	54%	-9%
Montenegro	37,80	41,30	63,78	69%	54%
North Macedonia	45,17	47,10	54,32	20%	15%
Serbia	24,00	42,40	54,36	126%	28%
Ukraine[40]	n/a	n/a	53,85	n/a	n/a

If all domestic production would be sold to supply domestic customers, the impact of the increased costs of production of electricity from coal would result in a change to the energy component in the end-user prices as follows:

Graph 6: Increase of energy component in end-user prices to cover full production costs



39 The prices below do not include network costs nor any other charges and levies included in the end-user price.
40 For Ukraine, electricity prices and price components charged to end-users are not published by EUROSTAT.
41 Band DC consuming between 2500 and 5000 kWh annually.
42 Band IC consuming between 500 and 2000 MWh annually.

When estimated full costs of production are translated into the prices charged to households and industry, with all network costs and other non-recoverable taxes and charges, the end-prices for households would increase in all Contracting Parties and for industry in all Contracting Parties except Kosovo*.

Table 9: Estimated end-user prices charged to households and industry, without any subsidies[43]

in EUR/MWh

Contracting Party	End-user prices for households			End-user prices for industry		
	Charged 2017	Price without any subsidies	Change in %	Charged 2017	Price without any subsidies	Change in %
Bosnia and Herzegovina	73,80	101,41	37%	59,40	81,41	37%
Kosovo*	60,50	78,60	30%	75,80	70,80	-7%
Montenegro	84,10	110,08	31%	77,00	99,48	29%
North Macedonia	68,70	77,85	13%	56,10	63,32	13%
Serbia	58,00	88,36	52%	75,10	87,06	16%

43 These end-user prices include costs of energy, network and other fees and charges.

6. Conclusions

The findings of the study show that the existing electricity generation from coal receives significant subsidies, which disrupt the proper functioning of the electricity market, favour production of a resource with a highly negative impact on the environment and obscure real financial and economic performance of the electric power system in the coal sector.

In view of the state of public finances in the case of some Contracting Parties, the level of national debt, practice of budget deficit financing and exposure arising from issued state guarantees, it is highly questionable whether they can count on securing the financing needed for their plans in the coal electricity generation sector. The fact that many international financial institutions no longer support investment in the construction of new or replacement of the existing thermal power plant capacities also needs to be taken into account.

Like the EU, the Contracting Parties should define their 2050 low carbon strategies which cannot differ significantly from the final goal of net-zero greenhouse gas emissions. They should re-examine their existing strategies in this sector, adjust their policies and measures to comply with State aid rules and environmental and other obligations under the Energy Community Treaty. This should entail the establishment of a carbon pricing mechanism, development of plans to eliminate coal-related subsidies and initiating a process of genuine restructuring, consolidation and potentially closure of some entities or this sector as a whole. Otherwise, the widening energy policy gap will move the Contracting Parties, especially those in the Western Balkan region, further away from the EU.

Coal has become an obstacle on the Energy Community Contracting Parties' paths towards EU accession and meeting their commitments under the Paris Agreement on Climate Change. This study aims to trigger a wide-reaching and all-encompassing stakeholder discussion based on reliable data in order to start changing mind-sets and trigger a change in policy-making.

Energy Community Secretariat
Am Hof 4, 1010 Vienna, Austria
Tel: + 431 535 2222
Fax: + 431 535 2222 11
Internet: www.energy-community.org
Twitter: https://twitter.com/Ener_Community
E-mail: contact@energy-community.org