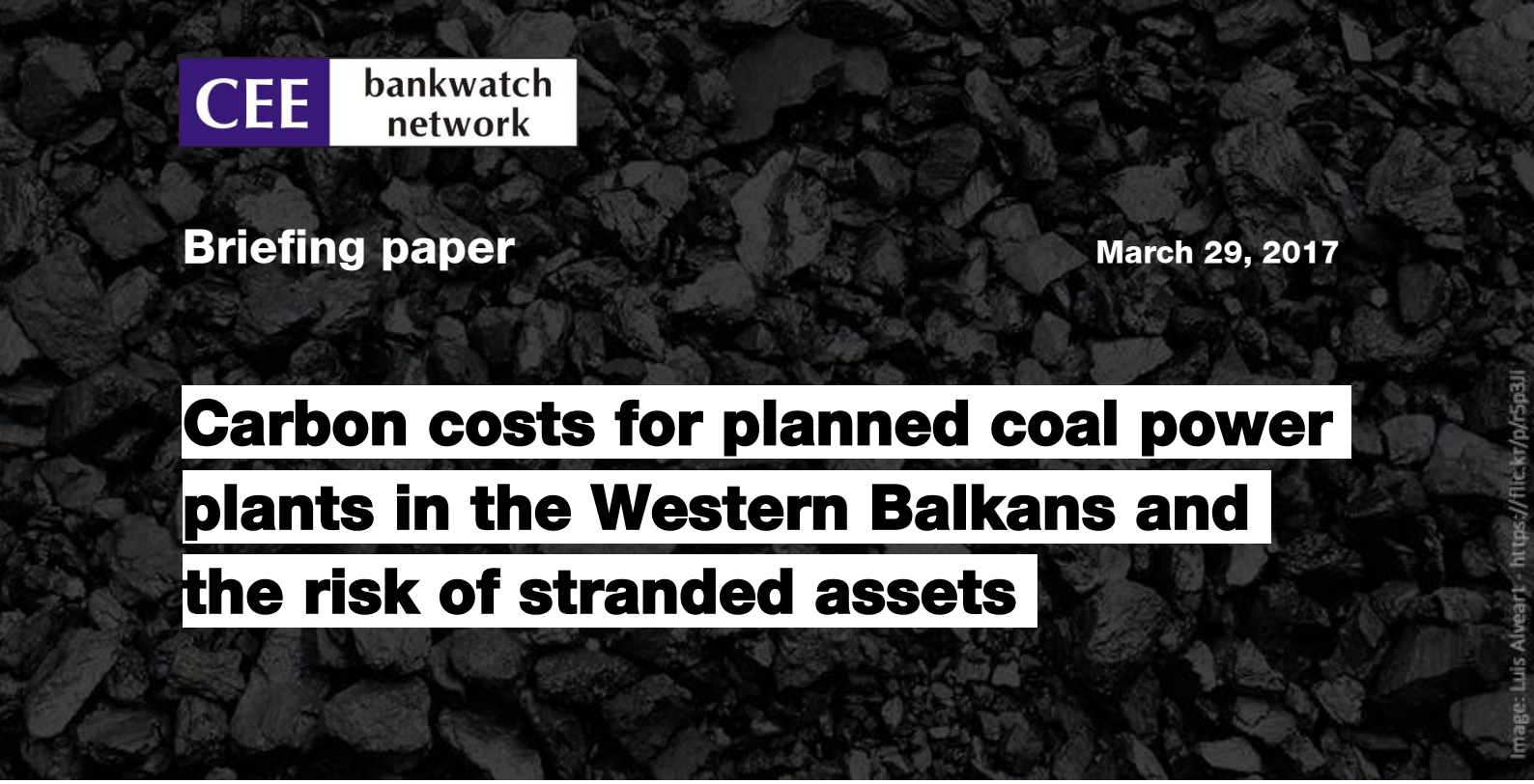
CEE bankwatch network

Briefing paper

March 29, 2017

Carbon costs for planned coal power plants in the Western Balkans and the risk of stranded assets



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Executive summary

All of the Western Balkan countries[1] plan to join the EU within the next decade or two and need to take Accession into account when planning investments in the energy sector. The EU's policy direction is clear: by 2050 its energy sector must be virtually decarbonised – indeed, it has already started to move in this direction. By contrast, each country in the Western Balkans, except Albania, relies heavily on low-grade lignite coal for its electricity supply, and as well plans to construct new coal power plants.

One of the key EU mechanisms to address climate change is the Emissions Trading Scheme (ETS), in which companies have to buy an allowance for each tonne of CO_2 they emit. This briefing looks at nine of those planned plants, and as well at the recently opened coal plant at Stanari in Bosnia-Herzegovina, and explores what will happen once the plants are subject to the ETS. The briefing also examines the feasibility studies for the planned projects (insofar as they were available to the authors) and analyses whether and how CO_2 payments were taken into account during feasibility calculations.

The findings are alarming, both for the companies involved and for the public: even with a very low CO_2 price of EUR 5 per tonne, one of the smallest planned plants (Pljevlja II in Montenegro) would have to pay nearly EUR 8 million every year, and with a CO_2 price at EUR 35 tonne - a price that may well be reached by 2030 - annual payments would come to no less than EUR 55.6 million. For the largest planned plant in the region, Ugljevik III in Republika Srpska, annual payments would range between nearly EUR 21 million and EUR 146 million per year, depending on the CO_2 price.

These huge costs also do not appear to have been properly accounted for when planning the new projects. In most cases hardly any information is available to the public on the feasibility of the

1 Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro, Serbia. At the current time we are not aware of any serious plans for new coal power plants in Albania.

planned coal plants, even though most of the companies involved are state-owned. In those few cases where some information on feasibility has been made available (Pljevlja II in Montenegro, Kostolac B3 in Serbia, Gacko II in Bosnia and Herzegovina), CO_2 prices have been taken into account incorrectly. For example, in the case of Kostolac B3 in Serbia, the feasibility study summary states that CO_2 prices have not been included because it is assumed that the state will pay these – an assumption which is certainly not in line with state aid rules. But in the sensitivity analysis where a CO_2 price is included, it becomes obvious that even a low CO_2 price is enough to render the plant uneconomic.

Failure to include CO_2 prices in feasibility calculations dramatically increases the risks of building coal plants that will be unfeasible to operate and thus risk becoming stranded assets. Since most of the plants are planned by state-owned companies, this is a risk not only for the companies themselves but also for their owners – governments and the public. We therefore make the following recommendations:

- Revise investment assumptions to include CO_2 payments and review investment decisions.
- Apply shadow carbon pricing in order to assess the likely costs of new capacity.
- Governments need to more closely supervise state-owned utilities' investment decisions.
- Strengthen the climate policy aspect of the Energy Community, starting with key aspects of the Greenhouse gas Monitoring Mechanism Regulation (MMR).
- Prioritise demand-side energy efficiency as the most sustainable long-term way to avoid shocks from prices of either CO_2 or imported fuels.
- Provide investor certainty beyond 2020 for renewable energy by adopting 2030 targets in the Energy Community and diversify renewable sources to avoid an over-reliance on hydropower.

Introduction – the planned coal power plants in the Western Balkans

All of the Western Balkan countries plan to join the EU within the next decade or two. While Serbia and Montenegro are the frontrunners and are hoping to join in the early 2020s, all countries need to take EU accession into account when planning investments in the energy sector, as these can have a lifetime of 40 or more years. The EU policy trajectory is clear: it aims for a virtual decarbonisation of the energy sector by 2050.[2] A move away from dependence on fossil fuels will also be crucial for the EU to meet its commitment under the Paris Agreement to reduce greenhouse gas emissions by at least 40 per cent by 2030 compared to 1990 levels.[3]

However all of the Western Balkan countries except Albania rely heavily on low-grade lignite coal for their electricity supply. Their plants are old and polluting, contributing to the health-damaging smog that plagues many cities in the region every winter. Between now and 2023, more than 90 per cent of the plants need investments to bring them in line with the countries' commitments under the Energy

2 https://ec.europa.eu/clima/policies/strategies/2030_en
3 https://ec.europa.eu/clima/policies/international/negotiations/paris_en

Community Treaty.[4] Otherwise, they should be closed. This is an enormous challenge, but if these countries use this opportunity wisely, they could greatly mitigate the impacts of climate change by increasing the efficiency of energy use and the proportion of solar and wind energy in their energy mixes.

However, all of these countries except Albania[5] are planning new coal power plants, and Bosnia and Herzegovina has recently opened a new 300 MW plant at Stanari. Confusion reigns over exactly how many more plants are planned in the region. Numerous potential projects are mentioned by governments and companies, but much fewer have made any tangible progress.

In the table below, the most frequently discussed projects are presented in the left-hand column. These are the projects which have either reached a relatively advanced stage of preparation, with at least some of the permits secured, or which have not progressed as far but which clearly have a huge amount of political support. Examples of the latter are Kosova e Re in Kosovo and Pljevlja II in Montenegro, which do not have financing secured at the time of writing but are top priorities for the respective governments.

In the second column, other planned projects are listed that are at a much earlier stage of planning and whose future is even less certain than the so-called first generation plants. The majority of these are located in Serbia and appear in the national energy strategy[6] as potential candidates for construction, but scant details are available about when they are planned and which ones would be prioritised. Very few details are available publicly about most of these plants, and so they are not analysed further for this reason, except for Gacko II in Republika Srpska, Bosnia-Herzegovina, for which we have had access to the feasibility study.

1st generation	MW	2nd generation	MW
Stanari, RS, BIH – in operation since September 2016	300	Kolubara B1, SRB	350
Ugljevik III, RS, BiH	600	Kolubara B2, SRB	350
Banovići, FBiH, BiH	350	Stavalj, SRB	300
Tuzla 7, FBiH, BiH	450	Kovin 1, SRB	350
Kakanj 8, FBiH, BiH	300	Kovin 2, SRB	350
Kosova e Re, KOS	500	Nikola Tesla B3, SRB	750
Pljevlja II, MON	254	Gacko II, RS, BiH	350
Kostolac B3, SRB	350		
Oslomej reconstruction, MK	129.5		

4 For more details, see: https://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/Obligations/Environment/Acquis_Large_Combustion_Plants

5 In May 2016 it was reported that Albania and Kosovo are considering building a lignite power plant together, however given the length of time that the Kosova e Re plant is taking to develop, it is unlikely that it would happen very soon. http://www.energetika.net/eu/novice/electricity/albania-and-kosovo-could-construct-joint-tpp

6 Strategija razvoja energetike Republike Srbije do 2025. godine sa projekcijama do 2030. godine, http://www.srbija.gov.rs/vesti/dokumenti_sekcija.php?id=45678

While other planned projects sometimes appear in the media, like Bugojno and Kongora in Bosnia and Herzegovina, these do not appear in strategic government documents and cannot be expected to develop any time soon.

The EU emissions trading scheme (ETS)

Launched in 2005, the EU ETS is a so-called 'cap-and-trade' scheme. It puts a limit on overall greenhouse gas emissions from the installations it covers, which is reduced each year. Within this limit, companies can buy and sell emissions allowances as needed. The EU ETS covers approximately 11 000 power stations and manufacturing plants in the 28 EU Member States plus Iceland, Liechtenstein and Norway, as well as aviation activities in these countries. In total, around 45 per cent of total EU greenhouse gas emissions are regulated by the EU ETS.

An emissions allowance gives the holder the right to emit one tonne of CO_2, the main greenhouse gas, or an equivalent amount of nitrous oxide (N_2O) and perfluorocarbons (PFCs). Allowances can be used only once. Companies have to surrender allowances for every tonne of CO_2 (or the equivalent amount of N_2O or PFCs) covered by the ETS that they emitted in the previous year. Fines are imposed if they do not hand in enough allowances to match their emissions. In some sectors a transition is still ongoing, in which some permits are distributed for free. However power generators have had to buy all their allowances since 2013.[7,8]

The Energy Community Treaty does not yet include legislation governing the ETS, so the Western Balkan countries are not yet part of the scheme. However, all of them are working on laying the foundations for monitoring and reporting greenhouse gas emissions, which is a precondition for the implementation of the ETS.[9] A High Level Reflection Group tasked with evaluating the strengths and weaknesses of the Energy Community and making proposals for its future also recommended in 2014 that the Directive governing the ETS[10] be included into the Treaty.[11]

Countries joining the European Union will also have to apply the ETS on accession. For Serbia and Montenegro, this will most likely be significantly earlier than would be the case under the Energy Community Treaty. Montenegrin decision-makers have stated that the country aims to join the EU around 2021.[12]

As well as direct legal obligations related to the ETS, countries may choose to impose their own measures to de-stimulate carbon-intensive investments, such as carbon taxes, a carbon price floor, or emissions performance standards. They may also adopt domestic renewable energy, energy efficiency

7 The (controversial) exception is that eight of the Member States which have joined the EU since 2004 - Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Lithuania, Poland and Romania – are allowed to continue receiving some free allowances for the power sector until 2019 in return for investing at least as much as the value of the free allowances in modernising their power sector. Such practices are not expected to be allowed to continue in the next phase of the ETS, meaning that from 2019, the power sector is expected to pay for all its allowances.

8 The information in the section above comes from: https://ec.europa.eu/clima/sites/clima/files/factsheet_ets_en.pdf

9 Information presented by national representatives at the 12th Meeting of the Environmental Task Force Energy Community Secretariat, 14 September 2016

10 Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading by the Energy Community.

11 https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3178024/0633975AD9F97B9CE053C92FA8C06338.PDF

12 https://euobserver.com/enlargement/131626, http://portalanalitika.me/clanak/214378/arhiv

or greenhouse gas emissions reductions targets stricter than those required by the EU. For example, Germany aims to cut greenhouse gas emissions by 40 per cent by 2020 and up to 95 per cent by 2050, compared to 1990 levels,[13] whereas the EU's binding target for 2020 is only a 20 per cent reduction[14]. In 2013 the UK introduced a carbon price floor to ensure that it remains at a high enough level to incentivise investments in renewable energy.[15]

For all of these reasons, it is crucial that countries of the Western Balkans account for the impacts of legislation – current or future – related to climate change when planning investments. Energy sector investments have a lifetime of several decades, so ill-advised decisions made now can make these prohibitively costly in the long run.

In this briefing we highlight the Emissions Trading Scheme as a piece of legislation that clearly has not been given sufficient attention so far by Western Balkan governments when planning investments in the energy sector. However a number of other issues that may render investments either future-proof or stranded assets, such as the Best Available Techniques standards.

The issue of carbon pricing and the ETS was raised in our 2015 briefing with Change Partnership.[16] However since then a number of changes have taken place in the planned coal projects in the region and clear evidence has come to light that the threat from greenhouse gas emissions costs is not being adequately assessed. This briefing therefore aims to provide an update on this situation and raise the alarm that the Western Balkan countries risk making expensive investments into projects that turn out to be stranded assets.

CO_2 emissions from the new planned coal plants in the Western Balkans

Stanari, Republika Srpska, Bosnia and Herzegovina

The 300 MW Stanari power plant began commercial operations in September 2016 and annually generates an estimated 2000 GWh.[17] As no publicly available environmental impact assessment (EIA) was carried out for the newer version of the project (originally planned at 420 MW), no official data on greenhouse gas emissions is available. However EFT, the project sponsor, did publish a paper in 2011 that stated that specific emissions would be 1.01 kgCO_2 per kilo of lignite and that the plant would use 2 315 000 tonnes of lignite per year.[18] This would mean 2 338 150 tonnes of CO_2 per year, a result which is similar to that obtained using the IPPC default emissions factor (see Annex 1).

13 https://www.cleanenergywire.org/factsheets/germanys-greenhouse-gas-emissions-and-climate-targets
14 https://ec.europa.eu/clima/policies/strategies/2020_en
15 https://www.gov.uk/government/publications/excise-notice-ccl16-a-guide-to-carbon-price-floor/excise-notice-ccl16-a-guide-to-carbon-price-floor
16 Change Partnership and CEE Bankwatch Network: Climate Change: Time for the Energy Community to take action, March 2015, http://bankwatch.org/publications/climate-change-time-energy-community-take-action
17 http://www.reers.ba/lat/node/929
18 S. Mirković: Tehničke karakteristike termoelektrane „Stanari" sa posebnim osvrtom na neke specifičnosti, TERMOTEHNIKA, 2011, XXXVII, 1, 65-73, http://termotehnika.vinca.rs/content/files/tehnicke-karakteristike-termoelektrane-stanari-sa-posebnim-osvrtom-na-neke-specificnosti.pdf

The investment was carried out by a private company, EFT, and no economic information is available, so it is not clear whether future CO_2 costs have been adequately taken into account.

Ugljevik III, Republika Srpska, Bosnia and Herzegovina

The 2x300 MW Ugljevik III plant would generate around 4380 GWh annually.[19] Its EIA[20] did not contain information on greenhouse gas emissions from the plant itself, but calculations using the IPPC standard emissions factor suggest 4.18 million tonnes of CO_2 annually (see Annex 1).

The project would be undertaken by a private company, Comsar Energy, and no economic information is available about it. It is therefore not clear whether future CO_2 costs have been adequately taken into account.

Gacko II, Republika Srpska, Bosnia and Herzegovina

The 350 MW Gacko II plant is at an early stage of planning, with no contractor chosen, no environmental permitting process carried out and no financing secured. Its feasibility study states that it would produce 316 tonnes of CO_2 per hour and work 7304 hours per year,[21] equalling 2 308 064 tonnes of CO_2 annually.[22] The feasibility study does state that it includes a carbon price, but only of EUR 5 per tonne. However in the actual calculation tables for each year, there is a line for CO_2 included but a value of 0 for each year.[23] This means that an important element of future costs has been left out of the feasibility calculations.

Banovići, Federation of Bosnia and Herzegovina

Confusion surrounds the data on the planned Banovići lignite power plant near Tuzla. Originally the plant was designed with a capacity of 300 MW, generating 1706 GWh annually[24]. However it was later changed to a 350 MW plant. The amended EIA, however, still stated 1706 GWh as the annual generation capacity[25]. More realistic seems to be the data provided to the Independent System Operator by the project company, RMU Banovići, which states that the plant would generate around 2200 GWh annually.[26]

The 2015 version of the plant's EIA states that it would emit 1.59 million tonnes of CO_2 per year.[27] However it also says the same for a 300 MW plant in the original 2012 EIA[28], raising suspicions that

19 http://www.nosbih.ba/files/dokumenti/Indikativan%20plan%20razvoja/2016/IPRP%202017-2026%20-%20Prijedlog.pdf
20 Studija uticaja na životnu sredinu za nove blokove termoelektrane Ugljevik 3, Konačna verzija, May 2013.
21 Instituta za građevinarstvo „IG“ d.o.o., Banja Luka, Poslovni centar Trebinje, Studija ekonomske opravdanosti sa elementima zaštite životne sredine za izgradnju i korišćenje „Termoelektrane Gacko II“ snage 350 MW na području Opštine Gacko, February 2016, p. 424 and 426
22 This is a slightly higher value than gained through the IPPC methodology using calorific value of the fuel, which comes out at 2 133 219 tonnes per year.
23 Instituta za građevinarstvo „IG“ d.o.o., Banja Luka, Poslovni centar Trebinje, Studija ekonomske opravdanosti sa elementima zaštite životne sredine za izgradnju i korišćenje „Termoelektrane Gacko II“ snage 350 MW na području Opštine Gacko, February 2016, p.424-455
24 Rudarski institut d.d. Tuzla: Studija o uticaju na okoliš TE „Banovići“, May 2012, Section 1, p.30
25 Rudarski institut d.d. Tuzla: Izmjene i dopune studije o uticaju na okoliš za TE „Banovići“, Tuzla, May 2015, Section 1, p.31.
26 http://www.nosbih.ba/files/dokumenti/Indikativan%20plan%20razvoja/2016/IPRP%202017-2026%20-%20Prijedlog.pdf
27 Rudarski institut d.d. Tuzla: Izmjene i dopune studije o uticaju na okoliš za TE „Banovići“, Tuzla, May 2015, Section 6, p.281.

this cannot be correct. Multiplying the claimed specific emissions – 817 kg/MWh[29] – by 2 200 000 MWh per year, comes out as 1 797 400 tonnes per year.[30] Using the IPPC default emissions factor results in annual CO_2 emissions of just over 2 million tonnes per year (see Annex 1).

Even though RMU Banovići, the project promoter, is a predominantly publicly-owned company, and the loan for the project is expected to receive a guarantee from the Federation of BIH government, there is a dearth of information available about the project, particularly about its economic aspects. It is therefore unclear whether future CO_2 costs have been taken into account during the project development and what impact changes in this field would have on the project's feasibility, or lack thereof.[31]

Tuzla 7, Federation of Bosnia and Herzegovina

Like Banovići, Tuzla 7 has been through two processes of obtaining an environmental permit. The second, for which a permit was issued in July 2016, was necessary after the first one expired in late 2015.

The non-technical summary of the December 2015 EIA states that specific emissions would be 0.918 kg CO_2/kWh, resulting in 2 308 000 tonnes of CO_2 per year[32]. The full version of the EIA from 2009[33] states a slightly higher figure of 2 378 220 of CO_2.[34] Calculations using the IPPC default emissions factor come up with yet another figure – approximately 2 454 300 million tonnes of CO_2 per year, based on the use of 2.7 million tonnes of coal per year.[35][36]

In 2014 a document was published about Tuzla 7 that contained at least some data about the project's economics, albeit limited.[37] It showed that the project's economics were shaky,[38] and the project later underwent renegotiation to lower the price of the engineering and construction contract to EUR 722 million. However since then no information has been published about the revised

28 Rudarski institut d.d. Tuzla: Studija o uticaju na okoliš TE „Banovići", May 2012, Section 5, p.272

29 These are also identical in both EIAs.

30 Interestingly, if one multiplies 817 kg/MWh by 1 706 000 MWh annually, the result is not 1.59 million tonnes of CO_2 in this case either, but 1.39 million tonnes.

31 Some well-informed observers have claimed that the project is unlikely to be feasible. For more details see: http://bankwatch.org/our-work/projects/banovici-lignite-power-plant-bosnia-and-herzegovina

32 Dokumentacija uz zahtjev za okolinsku dozvolu, blok 7 u TE Tuzla, Netehnički rezime, December 2015, http://www.fmoit.gov.ba/userfiles/file/2015/Netehnicki%20rezime_Blok%207.pdf, p.6

33 The environmental permit expired in November 2015 and a new request was only submitted in December 2015. However instead of revising the full EIA and undergoing a new process, only the non-technical summary was revised and published for public consultation. The rest of the documentation, which the NGO Ekotim obtained from the Federal Ministry of Environment and Tourism on request, was the same as that published in 2009, in spite of the significant legislative, economic and technical changes which have taken place in the energy sector since then. The process, as well as the content of the environmental permit issued in July 2016, is currently being challenged in a court case at the Sarajevo Cantonal Court.

34 Rudarski institut d.d. Tuzla: Studija o utjecaju na okoliš bloka 7 u TE TUZLA, November 2009, p.18

35 This figure is higher than the one cited in the 2009 environmental impact assessment but as it comes from EPBIH's long-term development plan, published in May 2014, it is more up to date.

36 Elektroprivreda BIH: Dugoročni plan razvoja Elektroprivrede BiH do 2030. sa Strategijskim planom, May 2014, p. 142 and 253.

37 Elektroprivreda BIH: Informacija o aktivnostima na izboru projektnog partnera za zajedničko ulaganje u projekat izgradnje bloka 7 u TE Tuzla, Treća faza tenderskog procesa, May 2014, https://predstavnickidom-pfbih.gov.ba/upload/file/sjednice/31_sjednica/28.pdf.

38 Vladimir Cvijanović, Critical analysis of the project for the construction of Tuzla thermal power plant unit 7, December 2014, http://bankwatch.org/sites/default/files/critical-analysis-economics-Tuzla7-16Dec2014.pdf

economics of the project, and there is no sign of whether potential future CO_2 costs have been taken into account or not.

Kakanj 8, Federation of Bosnia and Herzegovina

Kakanj 8 would have a capacity of 300 MW and generate 1820 GWh per year over 7000 hours of operation, according to project sponsor Elektroprivreda BiH.[39] The plant's original environmental permit has expired, and no new EIA has been published. However based on EPBIH's long-term development plan, annual CO_2 emissions would be around 1.8 million tonnes using the IPPC default emissions factor. No feasibility study or other economic information has been published regarding the plant, so it is unclear whether future CO_2 costs are being taken into account in the planning.

Kosova e Re, Kosovo

There has been no visible progress with the project for more than a year. The last major development that was disclosed to the public was a change of capacity from 2x300 MW units to 1x500 MW unit. No environmental documents have been disclosed for the new version of the project. However the scoping document released in late 2014 for the 600 MW version, which is expected to generate 4500 GWh annually, stated that:

"Under the assumption of 7500 operating hours a year and 23.6% carbon content in the coal, annual CO_2 emissions from KRPP will be about 4,600,000 t/year, and total equivalent emissions of GHG from the coal mine and KRPP will be about 5,000,000 t/year."

It also says that the effect of different CO_2 pricing on the selection of project alternatives will be examined.[40] However without seeing any calculations or receiving assurances that the CO_2 pricing is taken into account on any final decisions about the project, it is impossible to comment further.

Oslomej replacement, Macedonia

The Oslomej power plant currently consists of one 125 MW unit. It is planned to be replaced with a 129.5 MW unit using imported bituminous coal with a calorific value of around 26 MJ/kg, which would generate around 800 GWh per year.[41] Coal use data from the EIA suggests that CO_2 emissions would be around 919 000 tonnes per year. Little economic information is available regarding the project, and it is unclear whether future CO_2 costs have been taken into account or not during project development.

39 Elektroprivreda BIH: Dugoročni plan razvoja Elektroprivrede BiH do 2030. sa Strategijskim planom, May 2014, p. 142 and 254.

40 Orion 3E et al: Kosovo power project: Scoping Study (ESSS) Rev. 2, undated: http://mmph-rks.org/repository/docs/kpp_final_comments_WB_eng_713082.pdf

41 Република Македонија Универзитет Св. Кирил и Методиј во Скопје Машински Факултет-Скопје. Студија за оцена на влијанието врз животната средина и социо-економски аспекти (ESIA) на проектот за модернизација на ТЕЦ Осломеј, Осломеј

Pljevlja II, Montenegro

The 254 MW Pljevlja II plant planned in northern Montenegro is currently subject to an EIA process, however the first version, published in October 2016, contained no information on CO_2 emissions from the plant. However, more information is available in a government document based on the feasibility study from July 2016.[42]

The CO_2 price is predicted to rise as shown in the table below. Estimates were first carried out by the consultancy Poyry and then later used by Deloitte to work out the feasibility of the plant. However in the medium scenario that is used for the calculations, Deloitte for unclear reasons reduced the CO_2 price by 10 per cent along with the wholesale electricity price[43]. This makes sense for the electricity price, in order to make a more conservative calculation, but reducing the CO_2 price produces the opposite effect, bending the calculation towards profitability. Moreover, in the medium scenario, it is assumed that CO_2 payments would not start until the beginning of 2026[44], and even then only 13 per cent of the costs would be paid, with a phase-in to 100 per cent in 2031.[45]

The assumption that CO_2 payments can be phased in gradually after 2026 is risky, as it has neither been approved by the European Commission nor stated as a negotiating position in Montenegro's national Chapter 27 negotiation strategy.[46] Croatia, the most recent country to join the EU, had to participate in the Emissions Trading Scheme immediately upon accession, and there is no reason why Montenegro would be any different. Montenegrin decision-makers have in recent years cited 2021 as its target date for accession, so this should be assumed as the starting date of its ETS participation, not 2026. However the Montenegrin government, in its conclusions adopted on the Deloitte study on 11 July 2016, requested the Ministry of Sustainable Development and Tourism to negotiate with the Commission a maximum possible delay of ETS implementation after joining the EU.[47]

The amount of payments foreseen for each year for Pljevlja II are published in the Deloitte study, but with the random 10 per cent cut and inflation included, they are not comparable to other figures in this briefing. Therefore we have recalculated in the table below what the Pljevlja II plant would have to pay according to Poyry's projections for CO_2 costs, both if it pays 100 per cent of costs and if it somehow managed to negotiate a delay in payments as planned.

42 Elektroprivreda Crne Gore AD: Završni izvještaj o aktivnosti na a izgradnji II bloka TE Pljevlja, 05.07.2016 http://www.gov.me/sjednice_vlade/165, first document

43 Deloitte: Projekat Everest: Studija izvodljivosti za izgradnju TE Pljevlja II, http://www.gov.me/sjednice_vlade/165, first document, p.11

44 Deloitte: Projekat Everest: Studija izvodljivosti za izgradnju TE Pljevlja II, http://www.gov.me/sjednice_vlade/165, first document, p.11

45 Deloitte: Projekat Everest: Studija izvodljivosti za izgradnju TE Pljevlja II, http://www.gov.me/sjednice_vlade/165, first document, p.55

46 Montenegro Ministry of Sustainable Development and Tourism: National strategy with action plan for transposition implementation and enforcement of the EU acquis on environment and climate change 2016-2020, July 2016

47 Izvještaj o aktivnostima na izgradnji II bloka TE Pljevlja sa Studijom izvodljivosti za izgradnju TE Pljevlja II - Zaključci, http://www.gov.me/sjednice_vlade/165, 11 July 2016

Year	CO2 emissions	CO2 price (Poyry projections)	100% payments	Deloitte/EPCG forecast % of ETS payment (%)	Deloitte/EPCG forecast payment
2021	873 921	21.8	19 051 478	0	0
2022	1 472 831	24	35 347 944	0	0
2023	1 500 099	26.6	39 902 633	0	0
2024	1 576 816	29.4	46 358 390	0	0
2025	1 572 123	32.2	50 622 361	13	6 580 907
2026	1 431 336	34.7	49 667 359	30	14 900 208
2027	1 572 123	36.6	57 539 702	48	27 619 057
2028	1 576 816	37.9	59 761 326	65	38 844 862
2029	1 572 123	39.2	61 627 222	83	51 150 594
2030	1 572 123	40.6	63 828 194	100	63 828 194
2031	1 431 336	42	60 116 112	100	60 116 112
2032	1 576 816	43.5	68 591 496	100	68 591 496
2033	1 572 123	45	70 745 535	100	70 745 535
2034	1 572 123	46.5	73 103 720	100	73 103 720
2035	1 572 123	48.2	75 776 329	100	75 776 329
2036	1 576 816	49.8	78 525 437	100	78 525 437
2037	1 572 123	51.6	81 121 547	100	81 121 547
2038	1 572 123	53.3	83 794 156	100	83 794 156
2039	1 525 194	55.1	84 038 189	100	84 038 189
2040	1 436 029	57.1	81 997 256	100	81 997 256

From the table it is visible that instead of paying EUR 483.7 million between 2021 and 2030, EPCG expects it can get away with paying EUR 202.9 million. This discounted figure is realistic only in the unlikely scenario that CO_2 prices average below EUR 13 per tonne for the period 2021-2030.

Kostolac B3, Serbia

The planned 350 MW unit Kostolac B3 in northeast Serbia has been subject to one EIA process, but the decision to approve it expired in December 2015. The project is now undergoing a new process. The scoping document states that the plant will have a CO_2 intensity of 0.88 t/MWh, or about 307 tonnes per hour[48]. Its generation levels are due to vary over time, with 2765 GWh per year in the first

48 Elektroprivreda Srbije: Sadržina zahteva za određivanje obima i sadržaja studije o proceni uticaja na životnu sredinu za projekat izgradnje bloka B3 na lokaciji TE Kostolac B, undated page.32

ten years, then 2520 during the next ten, and 2275 GWh for the last five years.[49] This means emissions would be:

Year	Hours of operation annually	Generation (GWh)	CO_2 emissions (tonnes per year)
2020-2029	7900	2765	2433200
2030-2039	7200	2520	2217600
2040-2044	6500	2275	2002000

The project feasibility study[50] shows coal consumption of 317 tonnes per hour and an average of 7340 hours operation per year based on the above. Using the IPPC default emissions factor, this makes 2 203 262 tonnes per year on average.

However the feasibility study then goes on to discard CO_2 costs in the basic scenario. It states that: *"The costs of purchasing the rights to CO_2 emissions are not included in the costs in the basic variant of the calculation, as it is assumed that the state will take on any potential obligations to pay these costs. The financial impacts of the aforementioned costs are processed in the framework of the sensitivity analysis, where the fee for buying CO_2 emissions rights is calculated for two variants: at a price of 6.55 USD/t and at a price of 13.10 USD/t"*[51]

The assumption that the state will cover this cost is astonishing, and there is almost no chance that it would be allowed within the EU ETS, as it would distort competition on the electricity market.

The second alarming issue is that the variants calculated in the sensitivity analysis both include only very low CO_2 prices. If we take the conversion rate used in the study,[52] the price ranges between EUR 5.79 and 11.5 per tonne. As we shall see, these prices may be surpassed within the next few years before Kostolac B3 could even be built.

Later in the sensitivity analysis it turns out that no matter what CO_2 price is used, even a price of EUR 5.79 per tonne renders the Kostolac B3 investment unfeasible, with a net present value of USD -59.19, if all other factors such as electricity price[53], coal price[54] and investment costs[55] stay the same

49 Energoprojekt Entel a.d.: JP "Elektroprivreda Srbije" TE "Kostolac" B Studija opravdanosti sa idejnim projektom izgradnje bloka B3 snage 350 MW na lokaciji TE Kostolac B skraćeni prikaz projektne dokumentacije, aktuelizovana verzija, December 2015, p.84-85

50 Energoprojekt Entel a.d.: JP "ELEKTROPRIVREDA SRBIJE" TE "KOSTOLAC" B Studija opravdanosti sa idejnim projektom izgradnje bloka B3 snage 350 MW na lokaciji TE Kostolac B skraćeni prikaz projektne dokumentacije, aktuelizovana verzija, December 2015

51 p.85 Original: Troškovi kupovine prava na emisiju CO2 nisu uključeni u troškove u osnovnoj varijanti proračuna, jer je pretpostavljeno da će država da preuzme eventualnu obavezu plaćanja ovih troškova. Finansijski efekti pomenutih troškova obrađeni su u okviru analize osetljivosti, gde je naknada za kupovinu prava na emisiju CO2 računata u dve varijante: po ceni od 6,55 USD/t i po ceni od 13,10 USD/t.

52 1 EUR = 1.31 USD given on p.82 of the documentation summary

53 Assumed at 60.65 USD/MWh, or 53.67 EUR according to the 1:1.31 exchange rate given on p.82 of the document (p.84)

54 Assumed at 17.56 USD/t or 15.5 EUR/t according to the 1:1.31 exchange rate given on p.82 of the document (p.85)

55 Assumed at: 726 297 000 USD or 642.7 million EUR according to the 1:1.31 exchange rate given on p.82 of the document (p.82)

as in the basic variant.[56] If the electricity sale price is 10 per cent higher than projected, but the CO_2 price is USD 13.10 USD per tonne, the result is similar. Though if the electricity sales price is 20 per cent higher, the investment recovers its profitability.

This seems like a very big "if", both in terms of the electricity price and the carbon price, which as we will see below, is expected to be much higher in the future. The electricity price in the feasibility study is expected to be USD 60.65/MWh, or according to the exchange rate in the document, EUR 53.67/MWh.

Electricity prices in the Western Balkans were temporarily high in early 2017 as a result of the cold winter and the failure to implement sufficient energy efficiency measures. But prior to December 2016, spot prices on the Serbian electricity exchange had exceeded EUR 50/MWh only a few times per year,[57] making it hard to rely on this as an average price for the coming years, let alone a price 20 percent higher.

Future greenhouse gas prices in the EU ETS and implications for the planned coal plants in the Western Balkans

At the time of writing, ETS emissions allowances cost around 5 EUR per tonne.[58] Trying to predict future prices is a tricky business, as it largely depends on the success of ETS reform policies that have not yet been finalised, and also on external factors like the EU's economic situation and events such as Brexit. In 2015 the European Commission produced an impact assessment for its ETS reform proposal, with an assumption that in phase 4 of the ETS (2021-2030), CO_2 prices would average EUR 25 per tonne, with sensitivity analyses for EUR 10 and EUR 40 per tonne.[59] Thomson Reuters has suggested that the CO_2 price may be nearer to EUR 15 per tonne in 2025,[60] while Poyry in its assessment for Pljevlja II expected an average CO_2 price of EUR 32.2 between 2021 and 2030. Other estimates made in early March 2017 suggest a CO_2 price of EUR 15 per tonne in the early 2020s.[61] The table below accounts for these different estimations, so we calculate CO_2 costs for the planned plants in scenarios in which the average CO_2 price is 5, 15, 25 and 35 EUR per year for 2021 to 2030.

As we have seen above, CO_2 costs may have been left out of the feasibility studies for most of the planned power plants, but the case of Kostolac B3 shows that even a low CO_2 price can make the difference between a profitable and a loss-making project.

56 p.89 Original: Uvođenjem troškova kupovine prava na emisiju CO2 projekat nije u stanju da iz ostvarenih prihoda pokrije dodatne troškove, što za rezultat ima negativne pokazatelje opravdanosti. U slučaju da se plaća taksa od 6,55 USD/t, postiže se negativna NSV u visini od 59,19 miliona USD.

57 http://seepex-spot.rs

58 https://www.eex.com/en/

59 European Commission Staff Working Document – Impact Assessment accompanying the document Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments https://ec.europa.eu/clima/sites/clima/files/ets/revision/docs/impact_assessment_en.pdf

60 Haege Fjellheim, Thomson Reuters: How to boost CO2 prices in the European carbon market, December 22, 2016, http://energypost.eu/boost-co2-prices-european-carbon-market/

61 https://carbon-pulse.com/31778/

Plant/Unit	Annual CO_2 emissions	Annual CO_2 costs 5 EUR/t	Annual CO_2 costs 15 EUR/t	Annual CO_2 costs 25 EUR/t	Annual CO_2 costs 35 EUR/t
Stanari	2 310 092	11 550 461	34 651 383	57 752 305	80 853 227
Ugljevik III	4 185 515	20 927 575	62 782 724	104 637 874	146 493 024
Banovići	2 010 939	10 054 697	30 164 090	50 273 483	70 382 877
Gacko II	2 133 219	10 666 095	31 998 285	53 330 475	74 662 665
Tuzla 7	2 454 300	12 271 500	36 814 500	61 357 500	85 900 500
Kakanj 8	1 813 882	9 069 411	27 208 233	45 347 056	63 485 878
Kosova e Re (600 MW)	<4 248 955	<21 244 774	<63 734 323	<106 223 872	<148 713 421
Oslomej	919 100	4 595 500	13 786 500	22 977 500	32 168 500
Pljevlja II	1 588 028	7 940 140	23 820 421	39 700 701	55 580 982
Kostolac B3	2 203 262	11 016 312	33 048 937	55 081 562	77 114 187

Even a CO_2 price of EUR 5 per tonne can cause unpleasant surprises for power plant operators who have not taken such a development into account during their investment planning, but it is highly unlikely that the ETS price will still be this low by the early 2020s when the planned plants are due to come online. It is also unlikely that the price will stay at EUR 15 or 25 per tonne beyond the 2020s, as these are averages for the decade, and the whole idea of the ETS is that the cap will continue to be reduced and cause an increase in the carbon prices. Considering that coal power plants generally have a lifetime of 40 years, higher carbon costs need to be taken into account for the 2030s and 2040s when planning investments.

Power companies should in no way assume that such costs can be paid by the state or be easily passed on to consumers. There are clear rules on how the ETS operates in the EU and that govern who has to pay what. EU state aid rules – which already apply to Energy Community countries – also mean that governments cannot step in to help companies having difficulties making ETS payments, as the rules must apply equally to all market players. CO_2 costs will to some extent be passed on to consumers, but rising electricity prices would encourage more competition on the market than is currently the case. Generation companies with a low-carbon generation portfolio will have an advantage over those with a coal-heavy fleet because of not having to pay a carbon price.

Ultimately, those who build carbon-intensive electricity generation infrastructure today are risking stranded assets tomorrow.

Stranded assets already reality in some EU countries

Generating as much electricity as possible has been the main goal of Western Balkan governments in the electricity sector for the last few decades. It has generally been assumed that economic growth will result in increased demand and that any surplus can be exported. But this perception is going to have to change, as the Energy Community Treaty requires the electricity market to be run on market principles. This means that electricity must not only be available, but must be cheaper than that from other sources. Those who generate expensive electricity will have difficulty in selling it. Power plants generating expensive electricity risk becoming so-called "stranded assets" - too expensive to run and essentially worthless.

This has already happened with coal and gas power stations in the EU during the last few years. In 2012 and 2013, 10 large European utilities announced the mothballing or closure of 21.4 gigawatts of combined cycle gas turbine power plant capacity.[62]

In 2014, Enel announced that 23 coal and gas power stations in Italy with a capacity of 13 GW – more than all the Western Balkans' nine GW of existing coal plants put together - are to be scrapped within five years. The company has also announced that it will not be building any more coal plants anywhere.[63] In 2015 E.ON announced that it was selling 4.5 GW of coal and gas plants in Italy to Czech company EPH.[64] Italy's electricity demand has not only decreased since 2008 but renewable energy has also increased at an unexpectedly high rate.[65] This means that the country now has severe overcapacity in the electricity sector - at the end of 2013, total installed and efficient net power capacity was 124.7 GW, more than double the level of peak demand observed in 2013 and in 2014.[66] Some electricity imports continue, but not because of a shortage – rather because cheaper electricity is available from eg. France.[67]

In Germany, Vattenfall sold its 8 GW of lignite-fired power plants to EPH in 2016. Vattenfall admitted that it would lose money in the deal but stated that this would be cheaper than the alternative of keeping the facilities.[68] Both RWE and E.ON had to undergo restructuring in recent years as a result of their gas and coal plants losing value.[69] In 2014 E.ON announced it would close 13 GW of coal and gas capacity across Europe,[70] and as of the beginning of 2016 it spun off all of its remaining coal and gas power plants into a separate company called Uniper.[71] The main reason for these drastic changes has been the penetration of renewable energy coupled with very low electricity prices in most parts of Europe. All this has happened even without high CO_2 prices, but even the current low prices have played some role in making coal and gas electricity generation more expensive.[72]

62 http://af.reuters.com/article/idAFL5N0KR0S220140117,

63 http://www.economist.com/news/business/21678218-italys-largest-power-company-faces-up-stranded-assets-problem-anyone-want-power, http://energydesk.greenpeace.org/2015/03/17/enel-commits-coal-investment-phase/, https://www.bloomberg.com/news/articles/2016-07-14/what-happens-to-old-polluting-power-plants-italy-has-an-answer, https://www.enel.it/en/futur-e/a201611-the-project.html, https://www.theguardian.com/environment/2015/oct/22/former-foes-greenpeace-and-energy-giant-enel-stand-together-in-low-carbon-push

64 http://www.eon.com/en/media/news/press-releases/2015/1/12/eon-decides-to-divest-its-coal-and-gas-generation-assets-in-italy-to-czech-energy-company-eph.html

65 https://www.enel.it/en/futur-e/a201611-the-project.html

66 http://www.ispionline.it/it/energy-watch/oversized-electricity-system-italy-12135

67 http://download.terna.it/terna/0000/0845/64.PDF

68 https://corporate.vattenfall.com/press-and-media/press-releases/2016/vattenfall-to-sell-german-lignite-operations/, https://www.bloomberg.com/news/articles/2016-07-02/sweden-clears-sale-of-vattenfall-s-german-lignite-plants-to-eph

69 https://www.ft.com/content/316ce884-1cdc-11e6-a7bc-ee846770ec15

70 http://www.reuters.com/article/eon-enel-results-idUSL6N0M930420140312

71 http://www.eon.com/en/investors/spin-off-of-uniper-group.html

72 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2874841, http://www.svenskenergi.se/Global/Nyheter%20-%20dokument/Rapport%20Hirth%20april%202016/Reasons%20for%20the%20price%20drop_ppt.pdf,

Conclusions

Lignite power stations are being planned across the Western Balkans today with little clarity about the impact that inclusion in the EU ETS will have on their operating costs. Several of the plants have already been identified as economically risky, while for others there is hardly any information publicly available about their feasibility.

Pljevlja II is the only plant for which CO_2 costs have clearly been taken into account, but even this calculation has assumed that payments can be delayed until 2026, which is not likely to be the case. For Kostolac B3 in Serbia, CO_2 costs have been intentionally discarded for the main feasibility calculation, based on the completely unsupported assumption that the state will pay for them. Once CO_2 costs are taken into account in the sensitivity analysis, the plant is unprofitable. Yet this crucial conclusion has been ignored in the decision-making, and the plant is planned to go ahead.

Our calculations show that even for a relatively small unit like Oslomej (129.5 MW), CO_2 costs would be between EUR 4.5 and 32 million annually during the 2020s. They would most likely be even higher in the 2030s. For a larger plant like Ugljevik III, CO_2 costs could range between EUR 20.9 – 146 million per year or even more, making it an extremely risky investment. Yet in most of the cases we examined it seems that CO_2 costs may not have been taken into account at all, leaving the projects at serious risk of becoming stranded assets.

Recommendations

- **Revise investment assumptions**: Power companies in the Western Balkans need to check whether CO_2 pricing has been taken into account in the feasibility studies for their planned power plants and if not, to revise the studies, and as well the decisions made on the basis of those studies.
- **Use carbon pricing in decision-making**: The Energy Community Contracting Parties need to ensure that CO_2 pricing is taken into account in decision-making on the energy sector, for example in energy and low-carbon strategies. Although Energy Community Contracting Parties are not obliged to introduce a carbon price signal, shadow carbon pricing should be applied to help assess the likely costs of new capacity.
- **Governments need to supervise investment decisions**: Governments also need to send a clear signal to power companies that carbon pricing is coming and that it cannot be ignored or delayed, and that the costs cannot be socialised.
- **Strengthen the climate policy aspect of the Energy Community**: The Energy Community and its Contracting Parties need to continue developing and implementing the Paris Agreement and EU climate legislation as soon as practically possible, starting with key aspects of the Greenhouse gas Monitoring Mechanism Regulation (MMR).

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http://www.lazardnet.com/us/docs/sp0/22839/StrandedAssetsInTheUtilitiesSectorAs_LazardResearch.pdf?pagename=Investment+Research

- **Energy efficiency first**: Energy efficiency is the most sustainable long-term way to avoid shocks from prices of either CO_2 or imported fuels. Residential energy efficiency in particular provides employment and health benefits and reduces energy poverty.
- **Provide investor certainty beyond 2020 for renewable energy and diversify renewable sources:** The European Council in 2014 adopted a climate and energy framework[73] that set three targets for 2030. In November 2016 the European Commission proposed a revised version of the Energy Efficiency Directive.[74] If the revised EED is adopted, the targets will be:
    - At least 40 per cent cuts in greenhouse gas emissions (from 1990 levels)
    - At least a 27 per cent share for renewable energy
    - At least a 30 per cent improvement in energy efficiency

These need to be adapted and adopted as soon as possible in the Energy Community to create more certainty for investors that efforts will continue to be made to increase renewable energy after the 2020 targets are fulfilled. At the same time, renewable energy in the Western Balkans continues to be over-reliant on hydropower and biomass. With a changing climate it is increasingly risky to rely so heavily on hydropower, and more investments in wind, rooftop solar and heat pumps are needed.

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

74 http://eur-lex.europa.eu/resource.html?uri=cellar:efad95f3-b7f5-11e6-9e3c-01aa75ed71a1.0009.02/DOC_1&format=PDF

Annex 1 – CO_2 emissions according to IPPC default emissions factor

These emissions have been calculated for comparison with the figures from the EIA documents and other project documentation. In cases where CO_2 emissions were not quantified, these should act as a guide to how many tonnes per year of emissions can be expected. The exception is Kosovo, where it is clear that the figures below are overestimated, because the project has been changed to 500 MW but with no details available publicly on what this means for the fuel consumption.

Plant/unit	Annual lignite consumption (t)	Calorific content (TJ/t)	Emissions factor IPPC 2006 (kgCO2 per TJ)	CO2 emissions annually (t)
Stanari	2 315 000	0.00988	101 000	2 310 092
Ugljevik III	3 693 800	0.011219	101 000	4 185 515
Banovići	1 416 800	0.014053	101 000	2 010 939
Gacko II	2 607 528	0.0081	101 000	2 133 219
Tuzla 7	2 700 000	0.009	101 000	2 454 300
Kakanj 8	1 395 000	0.012874	101 000	1 813 882
Kosova e Re (600 MW)	<5 502 794	0.007645	101 000	<4 248 955
Oslomej	350 000	0.026	101 000	919 100
Pljevlja II	1 670 000	0.009415	101 000	1 588 028
Kostolac B3	2 726 810	0.008	101 000	2 203 262

Emissions factor from Darío R. Gómez et al: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2, Stationary Combustion, 2006, http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

CEE Bankwatch Network gratefully acknowledges EU funding support.

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