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Risks for the Pljevlja II project due to inadequate environmental standards of the preliminary offers

Summary

An examination of the environmental parameters of the preliminary offers for the 220 MW Pljevlja II lignite power plant published by the Montenegrin government shows the following:

- **None of the offers reach the efficiency levels associated with Best Available Techniques** as defined in the EU 2006 BREF document[1].
- **Only one of the offers is in compliance with the EU Industrial Emissions Directive** for dust emissions.
- **None of the offers is in line with the new pollution standards for new coal plants in China**. This means that all companies – including the European ones - are offering technology in Montenegro which they would not be allowed to construct in China.
- **These weaknesses present high economic risks for the project** due to additional costs to ensure compliance once the Industrial Emissions Directive becomes binding in Montenegro.

Introduction

Pljevlja II is planned in Montenegro's northernmost and most polluted city, Pljevlja. There is already one lignite power plant operating there, Pljevlja I, with 210 MW capacity, which should operate till 2025. Pljevlja II is expected to have a capacity of around 220 MW, and should be constructed at the same site and use local lignite from the Pljevlja basin.

In July 2013 the Montenegro government published information about the preliminary offers which had been received for Pljevlja II,[2] shown in the table below. As energy infrastructure lasts for several decades, and as the legislative environment relating to pollution from coal plants is rather dynamic in the EU and accession countries at the moment, it is crucial that any new planned energy installations take into account likely future legislative changes that would affect the installation.

In the case of Montenegro, one of the most imminent pieces of legislation is the EU Industrial Emissions Directive,[3] the successor to – among other Directives - the Large Combustion Plants Directive[4], which is already legally binding as a result of Montenegro's obligations under the Energy Community Treaty[5]. Far from being a distant piece of legislation to be considered only in the far future, the possibility of including the Industrial Emissions Directive in the Energy Community Treaty is already to be discussed at the Ministerial Council of the Energy Community on 24 October this year in Belgrade. According to the proposal[6] of the European Commission to the Energy Community on the implementation of IED (Chapter III) the parties shall implement special provisions for combustion plants of the IED from 1 January 2018 for new plants, and by 1 January 2022 at the latest for existing plants. Even if the proposal is not finally adopted at the meeting, Montenegro will still have to comply with the legislation some time in the next few years.

This analysis aims to examine the preliminary offers' compliance with the Industrial Emissions Directive. Compliance with current efficiency parameters - EU Best Available Techniques - is also examined. In addition, the offers' compliance with new Chinese pollution standards[7] is examined, to understand whether the companies are offering technology which would currently be allowed to be constructed in China.

Analysis

In the table below, copied from the Montenegro government's information document about the preliminary offers which

1 http://eippcb.jrc.ec.europa.eu/reference/BREF/lcp_bref_0706.pdf

2 http://www.gov.me/sjednice_vlade/28, the first document in the table (in Montenegrin)

3 Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

4 Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants

5 http://www.energy-community.org/portal/page/portal/ENC_HOME/ENERGY_COMMUNITY/Legal/Treaty

6 http://www.energy-community.org/pls/portal/docs/2062182.PDF

7 Emission standard of air pollutants for thermal power plants GB 13223-2011 replacing GB13223-2003 and putting into effect as of Jan.1, 2012, http://english.mep.gov.cn/standards_reports/standards/Air_Environment/Emission_standard1/201201/t20120106_222242.htm, unofficial English translation at: http://switchboard.nrdc.org/blogs/bfinamore/NRDC%20Unofficial%20English%20Summary.docx.

had been received for Pljevlja II, the column in darker blue represents the project outline set by the Montenegro government, which required a sub-critical circulating fluidized bed (CFB) installation with net efficiency of around 40.82 percent.

The seven columns to the right show various elements of the offers made by six different companies:

1) China Gezhouba Group International Engineering Company (CGGC)
2) Istroenergo Group IEG/SES Tlmace, Slovakia
3) Skoda Praha, Czech Republic,
4) China Machinery Engineering Corporation (CMEC) - two different offers made, one for a 350 MW unit and one for a 220 MW unit.
5) China National Electric Engineering Co. Ltd., CNEEC
6) Powerchina - Hubei Electric Power Survey & Design Institute

China Environmental Energy Holdings CO. LTD. (CEE HOLDINGS) is also reported by the government to have made an offer but it is not included in the table for unknown reasons.

Osnovni tehnički parametri dostavljenih ponuda su dati u tabeli ispod.

	PARAMETAR	j.m.	Idejni projekat TEP	CGGC	IEG	SKODA	$CMEC_1$	CNEEC	HUBEI POWER CHINA-finalna	$CMEC_2$
1	SNAGA	MW	220	220	220	220	350	220	220	220
2	Neto stepen efikasnosti TE	%	40,82	34,9 %	37,18%	39,4%	39,1%		38,1%	37,91%
3	POKAZATELJI EMISIJA									
	SO2	mg/nm^3	<200		<200	<200	<200		<200	<200
	NOx	mg/nm^3	<150		<200	<150	<200		<150	<200
	Prašina	mg/nm^3	<10		<35	<10	<30		<30	<30
	CO	mg/nm^3	<150			<150				
	CO2 (100% opterećenje)	t/h	186,5			186,5				
4	KOTAO									
	Sistem sagorijevanja		CFB		CFB (PC)	CFB	PC		PC	CFB
	Sistem pritiska		Subcritical		Subcritical		Supercritical		Subcritical	Subcritical
5	EKONOMSKI PARAMETRI									
	Cijena, 000 €		366.000			307.000				
	Specifična cijena, €/kW		1.538,2	0	0	1.397,7	0	0		
	Vrijeme gradnje i puštanja u rad									

Compliance with the EU Industrial Emissions Directive

The relevant parameters which can be examined for compliance under the IED here are SO_2, NOx and dust ('Prašina' in the table).

To begin with, we will disregard CMEC's offer for a 350 MW plant as the Montenegro government stipulated a 220 MW one on the basis of the remaining lignite reserves available. It is also doubtful whether the Pulverised Coal (PC) technologies should be regarded as valid in the selection procedure considering that the outline project stipulated Circulating Fluidised Bed combustion, which has lower NOx limits under the IED (see below). However since the barriers here are procedural rather than technical, for analytical purposes we leave them in.

Looking at the other offers, the limits set by the IED (Annex V Part 2)[8] for new plants are those which were set by the Montenegro government in its outline project:
SO2: <200 mg/nm^3 for plants >300 MWth licensed after 7 January 2013
NOx: <150 mg/nm^3 for plants >300 MWth licensed after 7 January 2013, except pulverised lignite, which has a limit of <200 mg/nm^3
Dust: <10 mg/nm^3 for plants >300 MWth licensed after 7 January 2013

All the offers shown are in line with the SO2 requirements. For NOx, two offers comply with the IED (Skoda and Hubei). One does not - CMEC2, which should comply with <150 mg/nm^3 but commits only to <200 mg/nm3. One is ambiguous (IEG) as the table mentions both CFB and PC, which makes it unclear whether it should comply with <150 mg/nm^3 or <200 mg/nm3.

8 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:334:0017:0119:EN:PDF

Only one of the offers - that of Skoda - is in line with dust requirements, as all others shown are at 30 mg/nm^3 or in one case, even more. In the case of IEG from Slovakia, the company is offering a technology that it would no longer be able to build in Slovakia because it does not comply with IED dust limits for new plants.

These high dust levels open the risk that additional investments will have to be made in a few years in order to decrease dust emissions and bring the plant into line with the IED.

Work is also in progress on a new BAT reference document (BREF), which is to be binding under the IED. The new BAT have to be applied within four years of their adoption, so are scheduled to come into force already by 2018 for EU member states. The draft document[9] indicates that pollution control is likely to be tightened, specifically on SO_X and dust. It also introduces emission limits for mercury (<5 mg/Nm3 for new plants of more than 300 MWth for sub-bituminous coal and lignite) and CO (12-80 mg/Nm3 for > 300 MWth for Fluidised Bed Combustion). It would thus be advisable to already anticipate these new standards, including for the additional pollutants.

In addition, the European Commission is due to consider the tightening of the Annex V minimum requirements for LCPs as part of the review of the IED.

Compliance with efficiency levels in EU Best Available Techniques (2006 BREF)
According to the 2006 BREF document, for lignite, >40 percent net thermal efficiency would be associated with BAT for Fluidised Bed Combustion, or 42-45 percent for pulverised lignite (Dry Bottom Boiler).

In the reference project distributed to potential investors, 40.82 percent efficiency was requested, however none of the preliminary offers reach this level. The highest offers for 220 MW plants are from Hubei Power China at 38.1 and Skoda at 39.4 percent. The other offers range between 34.9 and 37.91 percent. Thus none of the offers represent the Best Available Techniques.

Compliance with Chinese Emission standard of air pollutants for thermal power plants
On 1 January new standards came into force in China on pollution from thermal power plants.[10] From 2015 these also include a standard for mercury. The standards are not intended to apply to overseas plants but are examined here to ensure that what Chinese investors are doing abroad is at least the same as they would be allowed to do at home.

For the parameters contained in the table above, the standards that would need to be met by a new Circulating Fluidized Bed Combustion plant are as follows:

- Dust: 30 mg/m^3
- SO2: 100 mg/m^3 (200 in four specifically defined regions)
- NOx: 100 mg/m^3 (200 in four specifically defined regions)

However for some key regions the limits are stricter for dust (20 mg/m^3) and SO2 (50 mg/m3).

If we exclude the regional variations of the limits and compare the Pljevlja offers with the standard limits, the results are the following:

- All offers except IEG are in compliance with the dust emission levels.
- None of the offers are in compliance with the SO2 levels
- None of the offers are in compliance with the NOx levels.

In other words, all of the companies, including the European ones, are offering technologies which would not be allowed to be constructed in China today. The only exception would be the four regions where the emissions limits are set higher.

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9 http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP_D1_June2013_online.pdf

10 Emission standard of air pollutants for thermal power plants GB 13223-2011 replacing GB13223-2003 and putting into effect as of Jan.1, 2012, http://english.mep.gov.cn/standards_reports/standards/Air_Environment/Emission_standard1/201201/t20120106_222242.htm, unofficial English translation at: http://switchboard.nrdc.org/blogs/bfinamore/NRDC%20Unofficial%20English%20Summary.docx.