Policy brief: How many fossil power plants does Montenegro need? June 2016

This policy brief is based on work carried out under the IEE project BETTER.[1]

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Introduction

Montenegro currently produces its electricity from one thermal power plant (TPP) (Pljevlja I) and from large hydro, in addition in the last years several small hydro power plants were built and two wind parks are under construction. The gap between domestic electric production and electrcity consumption (currently more than 40%) is imported. Montenegro plans two additional TPPs in the next years, the first one the TPP Maoce, the second one the TPP Pljevlja II.

Electricity demand and renewable electricity expansion scenarios

The analysis below assumes stabilizing and after 2020 decreasing final electricity demand. Montenegro as EU accession country will have to adopt the EU energy and climate framework, and the corresponding EU energy saving legislation.

Two scenarios for the future impact assessment of West Balkans (Green-X BAU, Green-X SNPave) have been chosen from the national RES policy options pathway provided by the Green-X model.[2] The Green-X BAU scenario assumes that up to 2020 RES policies are applied as currently implemented and no adaptions are taking place. Thus, RES future deployment takes place under business as usual (BAU) conditions, resulting in a moderate RES development forecast. The Green-X SNPave scenario assumes a continuously improvement of RES policies until 2020, thus expecting an enhancement of policies regarding effectiveness and efficiency in future. SNPave means thereby "Strengthened National Policies-Average" that includes a reduction of non-economic barriers and a support level aligned with EU average support levels for specific technologies. More information about Green-X scenarios can be found under: http://www.green-x.at/RS-scenarios-overview.php

As Figure 1 shows in the business as usual (BAU) scenario in future will still import a large amount of electricity or will need additional TPPs to fill the demand gap. Figure 1 shows the BAU scenario including the planned TPPs: TPP Maoce and TPP Pljevlja II. It shows that under the electricity demand assumptions from onwards 2022 Montenegro has a surplus of electricity.[3]

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[1] www.better-project.net/content/results ;in particular the report "The Western Balkans Impact Assessment"

[2] BETTER Report:
The Western Balkans Impact Assessment http://better-project.net/content/western-balkans-impact-assessment-1

[3] www.green-x.at/RS-scenarios-overview.php

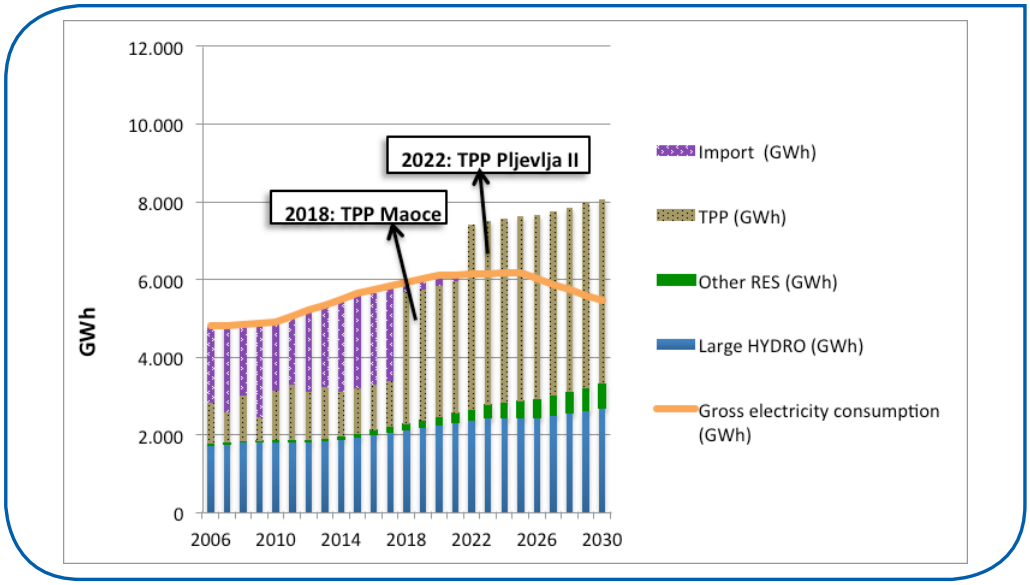

Figure 1: *Electricity production and gross consumption in 2006 – 2030 for the BAU scenario, including the planned power plants TPP Maoce and TPP Pljevlja II*

If under the SNPave scenario renewables are stronger expanded than under the BAU scenario, by 2027 Montenegro could produce its electricity only from renewable sources, in the meantime if no new TPP is built it has to remain importer (Figure 2).

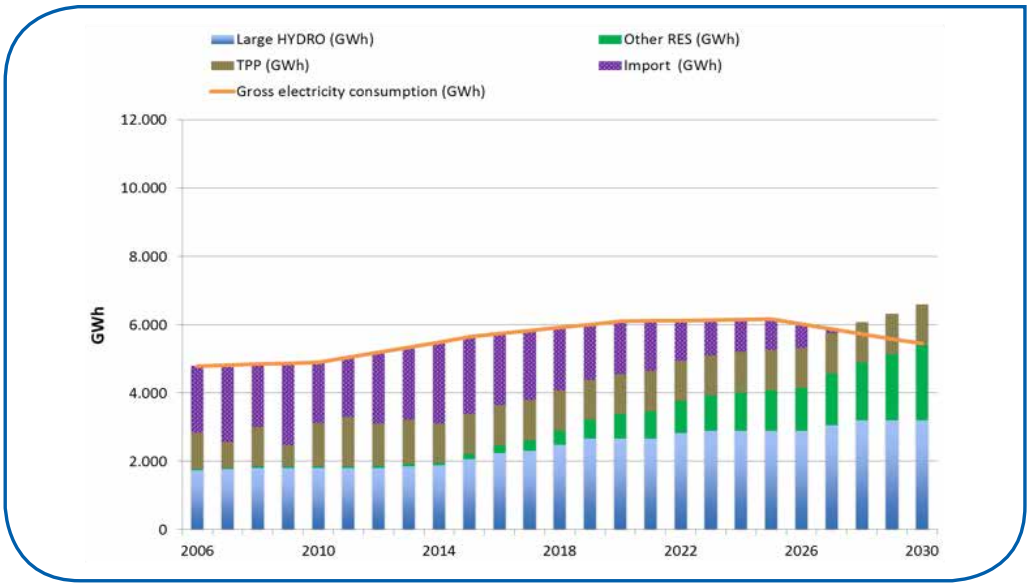

Figure 2: *Electricity production and gross consumption in 2006 – 2030 for the SNPave scenario (not including the new installation of TPPs)*

Reduction of air pollutants

Depending on the fuels and technologies used, TPPs have impact on greenhouse gas (GHG) emissions. This is in particular relevant for a country that will soon have to implement EU GHG-emissions and air pollution limits.

Figure 3 shows the saved greenhouse gas (GHG) emissions and air pollutants in case the TPP Maoce is not built and Figure 4 in case TPP Maoce and TPP Pljevlja II are not built.

The saved GHG-emissions (CO_2, CH_4 and N_2O) and air pollutants (NO_x, SO_2, particles) were calculated based on direct emissions from fuel burning. Emissions from construction of the power plant or from the provision of the fuel are not included in the assessment. Therefore in this assessment GHG emissions and air pollutants of electricity are determined by thermal power plants only. Saved emissions result from avoiding the emissions from the electricity generation by the lignite TPPs Maoce and Pljevlja II and were based on the amount of expected electricity generation by these power plants and emission factors for lignite fired power plants shown in Table 1.

Table 1: *Emission factors for lignite fired power plants Maoce and Pljevlja II*

Emissions	Power	Efficiency	SO_2	NO_x	Particle	CO_2	CH4	N_2O	CO_{2eq}
	[MW]	[%]	[g/kWh$_{electricity}$]						
New Plants									
TPP Maoce (starting 2018)	350	40%	5.66	1.92	0.13	978	0.0063	0.0144	983
TPP Pljevlja II (starting 2022)	225	40%	5.66	1.92	0.13	978	0.0063	0.0144	983

Data on power, efficiency, SO_2, NO_x, Particle, CO_2 according to GEMIS Version 4.9 (iinas, 2014 [1]), CH_4, N_2O calculated according to (South East Europe Consultants, 2011 [2])

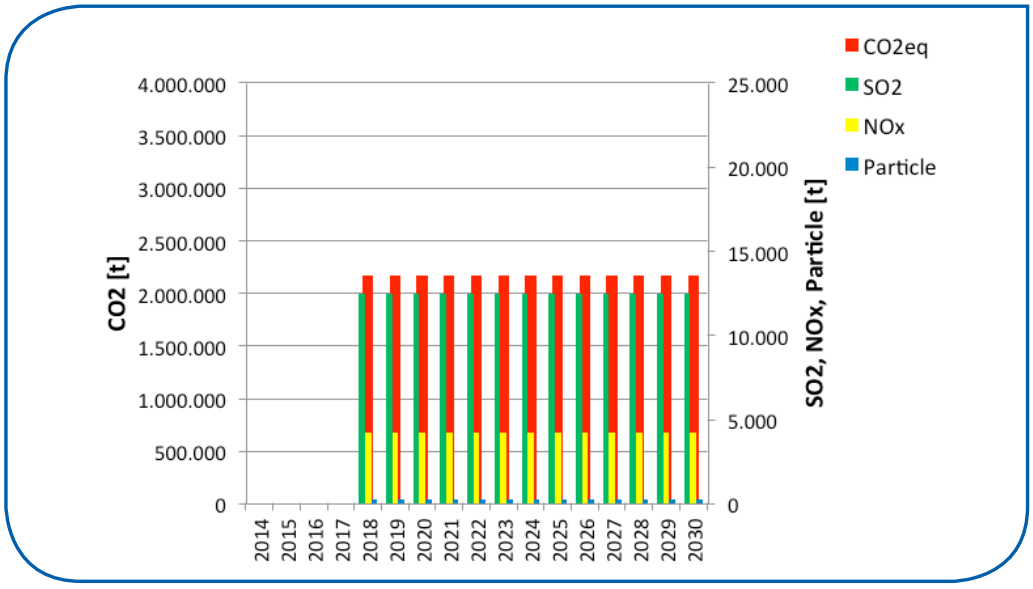

Figure 3: *Saved greenhouse gas emissions and air pollutants in case that TPPs Maoce is not built (includes emissions from fuel combustion only).*

[1] iinas (2014) GEMIS - Global Emission Model of Integrated Systems, Version 4.9, www.iinas.org/gemis-de.html

[2] South East Europe Consultants (2011) Study on the potential for Climate Change combating in Power Generation in the Energy Community - Annex 1: Review of System Input Data Base Regarding Fuel Characteristics and Emissions of power generation plants in the ENC SEE Parties. Ref No: EnC-11-001, report financed by the Energy Community. March 2011.

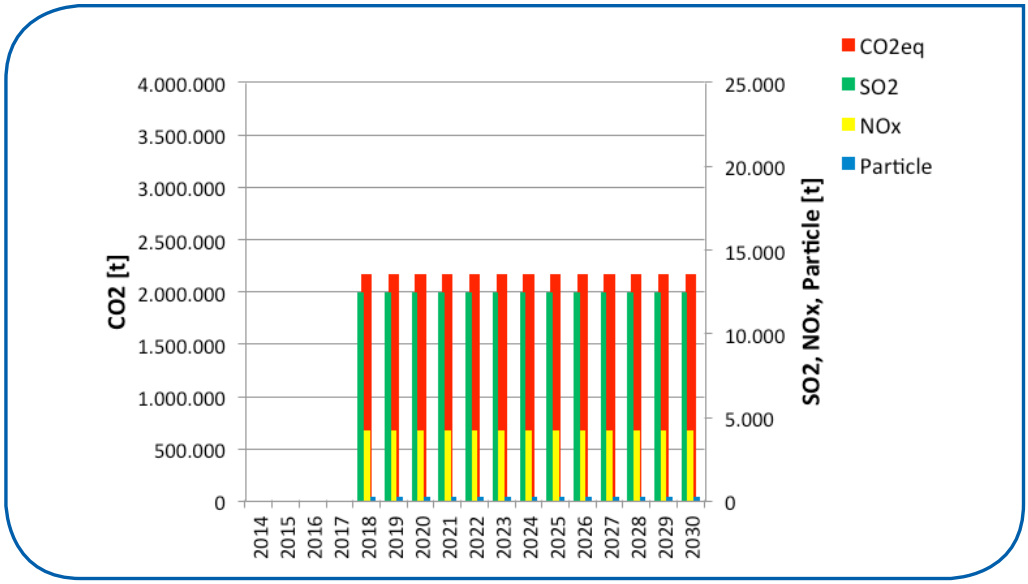

Figure 4: *Saved greenhouse gas emissions and air pollutants in case TPP Maoce and Pljevlja II are not built (includes emissions from fuel combustion only).*

Conclusions

As this policy brief showed Montenegro has an electricity production gap that can be filled with a higher expansion of renewables than currently planned only by 2027. If the policy preference is to be independent and to reduce imports, then Montenegro would need to build one TPP. A second is not needed assuming an electricity demand stabilization by 2025. If Montenegro wants to go a more sustainable pathway, with a stronger limit on greenhouse gas emissions and air pollutants it has to remain importer country for the next 10 years as long a stabilized electricity demand matches a stronger renewables expansion. For meeting long term greenhouse gas emission and air pollution targets this pathway would be the more advisable.