

Mustafa MUSIĆ*, Sead SPAHIĆ*, Ajla LUKAČ*

LONG-TERM DEVELOPMENT PLAN OF JP ELEKTROPRIVREDA BIH D. D. – SARAJEVO UNTIL YEAR 2025

Abstract: Three public utilities act on the territory of Bosnia and Herzegovina (BiH), among which JP Elektroprivreda BiH d. d. – Sarajevo (JP EP BiH) is the major with 47,6% share in total electricity generation in B&H for year 2009 and over 688.500 consumers. JP EP BiH is engaged in the production and distribution of electricity, electricity supply, trading, export and import of electricity. Major generation facilities of JP EP BiH are thermal power plant (TPP) Tuzla, TPP Kakanj and hydro power plants (HPP) on the Neretva river.

The Long-Term Development Plan (Master plan) until year 2025 is based on the following settings for the strategic development: long-term and safe supply of electricity to local customers; long-term supply of heat energy; retain the leading role in the region in exportation of electricity; provide replacement facilities and build new ones; special emphasis in intensifying the construction of generating facilities based on renewable energy sources; energy efficiency increase of thermal units; reduction in emissions of pollutants; establishment of a more flexible generating portfolio.

According to the Master Plan, JP EP BiH plans to construct 1.339 MW in new generation facilities until year 2025, out of which 850 MW will be new replacement units in TPP, cca 280 MW in HPP, cca 88 MW in sHPP and at least 120 MW in wind power plants (WPP).

After year 2025 it will be necessary to install new generation facilities in order to reach the stated goals. In this sense, JP EP BiH will continue to generate electricity based on new technologies in burning coal, natural gas, but will also leave the possibility of participation in regional nuclear power plant construction projects.

1. POWER SYSTEM OF JP ELEKTROPRIVREDA BIH D. D. – SARAJEVO

JP Elektroprivreda BiH d. d. – Sarajevo (JP EP BiH) is the major among three public utilities that act on the territory of Bosnia and Herzegovina (BiH). It reached the value of 47,6% share in total electricity generation in BiH for year 2009 and over

* JP Elektroprivreda BiH d. d. – Sarajevo, Bosnia & Herzegovina

688.500 consumers. It is a 90% state owned company with 10% share by stockholders. In year 2009 the company has taken the form of a concern to which seven coalmines have been added to, so that the Concern now counts over 16.000 employees.

JP EP BiH is engaged in the production and distribution of electricity, electricity supply, trading, export and import of electricity. Major generation facilities of JP EP BiH are thermal power plant (TPP) Tuzla, TPP Kakanj both working on coal and three hydro power plants (HPP) on the Neretva river. Total capacity in TPP is 1.165 MW or 69,3% of total installed power. Capacity of HPP is 517 MW or 30,7% of total installed power, of which there are 13 MW installed in small HPP (sHPP). In year 2009 the TPP have generated approximately 75,6% and HPP together with the sHPP approximately 24,4% of total electricity generation. This amount was enough to satisfy local consumer needs and export cca. 2.000 GWh of electricity in year 2009.

Table 1 gives an overview of the reconstruction dynamics and planned shutdown year for the existing thermal units. Their unit capacities are in the range of 100 MW to 230 MW and are based on old technologies. All of them will be out of operation by year 2028.

Table 1. Reconstruction dynamics and shutdown of existing thermal units

Thermal power plant	Unit	Year of commissioning	Year of reconstruction	Planned shutdown year
TPP Kakanj	Unit 5	1969.	2033.	2018.
	Unit 6	1977.	2011.	2026.
	Unit 7	1988.	2005.	2025.
TPP Tuzla	Unit 3	1966.	-----	2013.
	Unit 4	1971.	2003.	2019.
	Unit 5	1974.	2007.	2023.
	Unit 6	1978.	2012.	2028.

2. LONG-TERM DEVELOPMENT PLAN UNTIL YEAR 2025

2.1. Demand forecast until year 2025

In order to define the dynamics of expansion of the generating part of the power system of JP EP BiH, the forecast of electricity and power supply of the local consumption was done. This forecast includes a realistic growth of local consumption by 3,1% per year. To these values the supposed amount of electricity planned for exportation was added. The yearly amount of electricity planned for exportation is 2.000 GWh, at least.

2.2. Basic settings for the strategic development – The Goal function

The Long-Term Development Plan (Master plan) of JP EP BiH until year 2025 is based on the following settings for the strategic development:

- long-term and safe supply of electricity to local customers, according to the demand forecast
 - long-term supply of heat energy to local customers
 - retain the leading role in the region in exportation of electricity (at least 2.000 GWh/year)
 - provide replacement facilities for outgoing thermal units and build new ones, based on best available technologies (BAT)
 - special emphasis in intensifying the construction of generating facilities based on renewable energy sources
 - energy efficiency increase of thermal units
 - reduction in emissions of pollutants
 - establishment of a more flexible generating portfolio in order to back up the power output variations of planned amounts in renewable energy sources.
- All the above defines the adopted Goal function which needs to be achieved through consistent performance of the Master plan.

2.3. Master plan

The Master plan has been created by employees from JP EP BiH using software tools developed by the International Atomic Energy Agency (IAEA). The used software packages were MAED and WASP IV.

According to the Master Plan, JP EP BiH plans to construct cca. 1.339 MW in new generation facilities until year 2025. From this amount 850 MW will be in new TPP, out of which 750 MW in replacement thermal units based on coal and cca. 100 MW in a CCGT plant, based on gas. 280

MW is planned to come from new HPP, cca 88 MW to be in sHPP and at least 120 MW in wind power plants (WPP), as it is shown in Figure 1.

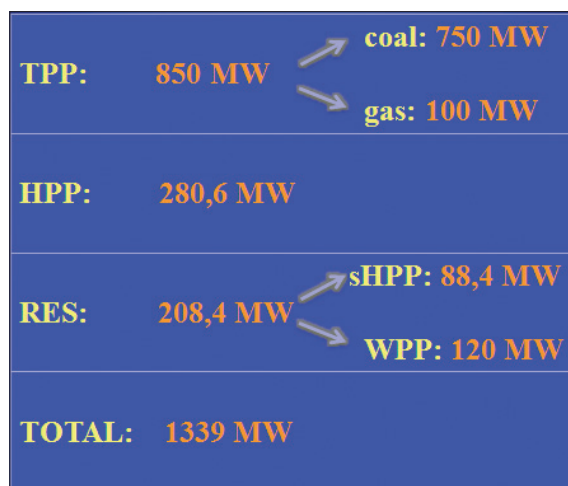


Fig. 1. Overview of planned capacities to be installed until 2025

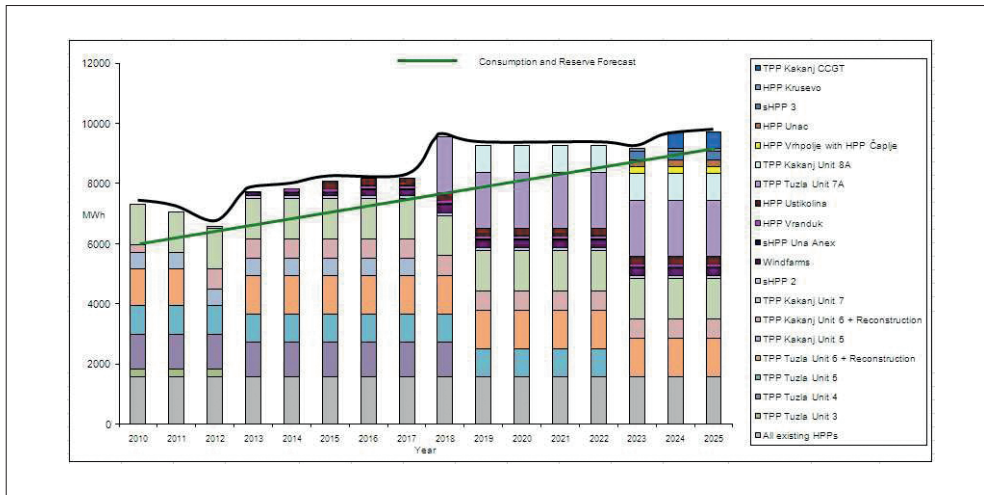


Fig. 2. Dynamic plan of commissioning new generating facilities

It is important to state that the usage of the existing hydro potential is very low in BiH, so that the construction of new generating facilities based on renewable energy sources will mostly be focused on the hydro potential together with the existing wind potential. The construction of the first WPP of installed capacity 32 MW to 48 MW is planned to start in year 2011. At the same time, JP EP BiH is performing measurements on wind potential at eleven different sites across the territory of BiH. According to very good results so far and after performing detailed analysis of the collected data, the construction of further WPP can be expected to start in the near future.

Figure 2 presents the results of the Master plan. In this diagram the consumption and reserves forecast, together with the planned amount of electricity for exportation is shown. Also the reconstruction and shutdown dynamics of existing thermal units is given together with the dynamic plan of commissioning new generating facilities. It can be seen that in case no new generation facility is put into operation according to the Master plan, already in year 2017–2018 it will not be possible to reach the Goal function and satisfy the local consumer needs. Also, it can be noted that if the Master plan is to be fulfilled, in some years the amount of electricity that can be exported will be much greater than the minimal planned amount of 2.000 GWh per year which is already included in the green line presented on the diagram.

After year 2025 it will be necessary to install new generation facilities in order to continue reaching stated goals. In this sense, JP EP BiH will continue to generate electricity based on new and best available technologies in burning coal, natural gas and use of renewable energy sources, but will also leave the possibility of participation in regional nuclear power plant construction projects. In that case, it is nec-

essary to start training staff in cooperation with neighbouring countries, where already training centres exist. Until now, at the University of Sarajevo there is a Department of Atomic Physics, where a very small number of students is being educated in this field. It is also necessary to do some research and start planning activities in that field, in order to put into operation and include a part of the production of the new nuclear power plant into the generating portfolio of JP EP BiH on time.

CONCLUSION

JP EP BiH has based its long-term development plan mostly on long-term and safe supply of electricity to local customers and continuous export of electricity in the region. After the end of the planning period, JP EP BiH will further intensify construction of generating facilities based on renewable energy sources, especially based on wind, solar and hydro energy. JP EP BiH will also undertake efforts to develop the gas transportation network in BiH, mostly to intensify the construction of new thermal units based on natural gas. JP EP BiH will continue to implement new and best available technologies for exploitation and coal burning in order to improve the construction of new thermal units based on coal, but will also seriously consider and open the opportunity to participate in a regional project for a nuclear power plant construction.