

Serbia should build gas power plants

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Gas is recognized as a transitional energy source in the green transition. We live in a new reality, which implies the need to build gas power plants during the transitional period of the energy transition and pay for CO2 emissions, it was said from the panel Using gas in the production of electricity instead of coal, which was organized as part of the JIE 2023 Gas Forum by Energy of the Balkans in cooperation with EPS -om Ad. It would suit EPS to build one or two gas power plants, which have their own advantages, said Dejan Popović, president of the AERS Council, while Zoran Šušnjević, director of energy production at the Pannonian TE-TO, pointed out that the EPS study is in the final phase. -a in which potential locations for the construction of a gas-steam block are analyzed, the power of which would be between 250 and 400 megawatts.

We live in a new reality, which implies the need to build gas power plants during the transitional period of the energy transition and pay for CO2 emissions, these are the conclusions of the panel on the use of gas in the production of electricity, which was held on the second day of the Gas Forum of Southeast Europe 2023.

In cooperation with Elektroprivreda Srbije AD Energija Balkana organized an international expert panel *on the use of gas in the production of electricity instead of coal*.

Gas is recognized as a transitional energy source in the green transition. However, although it has significantly less emissions compared to coal, its use for electricity generation is burdened with additional costs. In Europe, a CO2 tax is paid for the production of electricity from gas, explained Dejan Popović, President of the Council of the Energy Agency of the Republic of Serbia (AERS), at the fourth panel dedicated to the use of gas in the production of electricity.

"When it comes to gas power plants, we already have two owned by Elektroprivreda Srbije. Their installed power is 210 megawatts. They are used only in the winter months, as a cogeneration system that produces thermal energy for district heating systems and electricity. That's how TE-TO heats Novi Sad and supplies electricity. The production price ranges from 90 to 95 euros per megawatt-hour, which is twice as expensive as the production of electricity from coal. During 2022, TE-TO delivered a total of 685 GWh of electricity, for which 230 million cubic meters of gas were consumed. An average of 296,000 cubic meters of natural gas was consumed per gigawatt-hour, which means that 1 terawatt-hour requires almost 300 million cubic meters of gas. By the way, Serbia consumed 2.8 billion cubic meters of gas - Popović explained at the forum organized by Energija Balkana on November 2 and 3 at the Falkensteiner Hotel in Belgrade.

The President of the AERS Council pointed out that no data is yet available regarding the new gas power plant owned by Gazprom Energoholding and NIS, which recently started operating. TE TO Pančevo is expected to submit data to the Energy Agency.

Instead of coal-fired thermal power plants, EPS should build gas thermal power plants

"It would suit EPS to build one or two gas power plants, which have their own advantages. Investments in these power plants are not large. I would like to remind you that the Directive on large combustion plants provides for the closure of thermal power plants *Morava* and *Kolubara A*, where investments are not paid due to compliance with

environmental protection requirements. A gas plant could be built at the locations of these power plants. The level of investments would be further reduced, because we have transmission infrastructure, substations, which would facilitate the whole process", said Popović.

The comparative advantage of these power plants is that they contribute to energy security and can be used for balancing. Gas-fired power plants can be quickly synchronized to the grid but also easily shut down. Popović presented the information that the production price of electricity produced in gas power plants in the 27 member states of the European Union ranges from 97 to 107 euros per MWh. However, he assessed that for the complete replacement of coal, natural gas is not an alternative, but that replacement is only possible in one part.

"I hope that the gas situation will calm down and that we will get gas at more favorable prices. In addition, we need to have gas all the time. Consequently, long-term supply must be ensured. It is necessary to make an analysis with the new gas transmission company, Transportgas, as well as Srbijagas, about the possibilities of gas supply," concluded Popović.

Pannonian TE-TO underutilized

Pannonian thermal power plants consist of three thermal power plants located in Novi Sad, Zrenjanin and Sremska Mitrovica, said Zoran Šušnjević, director of energy production at Pannonian thermal power plants.

They were built as cogeneration plants near large industrial consumers, who needed technological steam for their industrial processes. In addition, TE-TO deliver thermal energy to consumers. Thanks to the cogeneration mode, a lower price of electricity is achieved in these plants.

"However, during the last 10 years there has been a sharp decrease in industrial production. So in Sremska Mitrovica, for example, factories that were big consumers were closed down, and that's how we got into a situation where we don't have anyone to supply technological steam to. As a large number of consumers shut down and passed into private ownership, only the city heating plant remained as a possible consumer of thermal energy. When it comes to TE-TO Zrenjanin, heat consumption did not follow the development of the city, so that thermal energy could be used optimally, while the situation is somewhat better in Novi Sad. TE-TO Novi Sad was designed for the delivery of electricity but also technological steam to the Oil Refinery. However, this technological vapor has practically not been delivered since 2008. TE-TO Novi Sad has a large heat consumption and with the operation of one unit, good cogeneration can be achieved. "When working according to the thermal diagram, more than 75 percent of the efficiency of the electricity production plant can be achieved," said Šušnjević.

With 250 cubic meters of gas, 1 MWh of electricity can be produced, and when operating in condensation mode, the consumption is 350 cubic meters. This means that gas consumption is 30 percent higher when only condensation is used.

Heat accumulators for greater efficiency

Šušnjević stated that a study was prepared at TE-TO Novi Sad in which the possibility of building a heat accumulator was analyzed, which would try to increase the level of usefulness by two to three percent in the winter months. The principle of operation of this accumulator would be as follows: when thermal energy is not needed by the heating plant in Novi Sad, it is stored, which increases the efficiency of the plant.

"In the last two to three years, we have recorded an increase in electricity production at TE-TO Novi Sad, from some 100 GWh in 2016 to 600 to 680 GWh, with a stable production of 350 to 400 GWh of thermal energy, which was delivered to the Novi Sad heating plant. . This

leads to gas consumption of 250 million cubic meters in the last two years. At the same time, the price of gas was really favorable," said Šušnjević.

He explained that in the conditions of the energy crisis, TE-TO Novi Sad *stepped in* whenever it could and whenever it was necessary. He added that TE-TO Zrenjanin was launched and that it worked for several months last year, after 10 years of downtime. The employees kept the plant *in good condition*, which enabled TE-TO to deliver the necessary electricity to EPS and the state.

EPS is also analyzing potential locations for the construction of a gas-steam block, the power of which would be between 250 and 400 megawatts. This study is in its final stages. Šušnjević estimated that the most convenient location would be the one that would enable the delivery of technological or thermal energy, which would increase the efficiency of electricity production and thus reduce the price of electricity.

Increased efficiency of gas turbines

Professor Milan Petrović presented the role of gas turbines in the future electricity market. He estimated that in the energy sector, a reduction in emissions is expected, as well as a reduction in the use of coal until its complete withdrawal, with reliance on renewable energy sources, mass accumulation of energy, and the application of *back up* and reserve plants.

"Gas turbines (GTs) have developed significantly over the last 30 years. The degree of their efficiency increased from 30 to 44 percent, while this percentage for combined plants is above 64 percent. The downsides of gas turbines are the high and unpredictable price of fuel and the uncertain supply. Measures that can reduce these impacts are diversification, storage and long-term planning. Gas turbines emit carbon dioxide, but the emissions are lower than when it comes to coal," said Professor Petrović.

On the other hand, the good sides of the GT are a high level of utility, a wide range of power, fast construction, low investment costs, high drive reliability, high availability, high degree of automation, cheap maintenance, fast and reliable start, easy load change and low emission of harmful gases. .

The possible application of GT in the future includes the role of a *back up* plant, i.e. for energy accumulation. Professor Petrović estimated that Serbia will definitely have to build gas turbines or combined plants, due to the inability to use renewable energy sources to quickly replace coal-fired power plants. When RES plants are built, gas turbines will serve as support. He reminded that EPS should close more than 1,000 megawatts of coal capacity.

Possible solutions

"The question arises as to how the energy deficit can be compensated. When it comes to imports, the question is at what price and from where electricity is imported. Gas turbines or combined plants can be built quickly, but the condition is to ensure a stable supply of gas. The construction of such a plant in New Belgrade would reduce the inevitable deficit and preserve the coal-fired capacity of the Nikola Tesla thermal power plants in Obrenovac, bearing in mind the planned project for heating Belgrade. However, not a single study on locations considers the construction of GT in New Belgrade", said this professor of the Faculty of Mechanical Engineering.

As he said, the development of GT depends on the future development of energy technologies, energy storage technologies, deposits, quantities and prices of gas, as well as climate and ecology. In the medium term, gas turbines will play one of the key roles.

Production of electricity from biogas is cheaper than production by burning coal

Duško Bošković, director of WABIO investment holding, assessed that gas turbines have great characteristics, but that the price of gas is a limiting factor, which is why this technology is not used to a significant extent in Serbia.

"Wabio has a technical solution to produce 1,000 cubic meters of methane from crop residues and biomass at a price of 270 euros. This means that we can get green energy at a price that is 10 percent lower than coal," said Bošković.

While the production cost of one kilowatt-hour of electricity from coal is about 4.5 euro cents, Wabio technology enables the production of the same amount of energy for four euro cents. The advantage of this technology is decentralized production, which means that no energy transport is needed. Bošković added that Wabio signed contracts for 500 megawatts of thermal power in the previous year.

EPCG is considering the use of gas for electricity generation

From the perspective of the energy transition, the Electric Power Company of Montenegro decided two years ago to consider the use of gas, said Bojan Đordan, representative of the Crono Gore electric power company.

"Gas bypassed us, but a study was done analyzing the possibility of gas delivery to Gora Gora and the positioning of gas power plants, which are conditioned by the possibility of obtaining gas," said Đordan.

When it comes to possibilities for gas supply, Đordan estimates that there are several alternatives.

"In the first place is the gas that they would find in their seabed, where the state intends to conduct new tests after the first attempt was unsuccessful. Another way is to connect to the Adriatic-Ionian gas pipeline, where the question arises as to whether there is space for connection. The first analyzes show that consumption would be limited. The third option is the delivery of gas from the north of Montenegro in the form of an extension of the gas pipeline that goes from Bulgaria through Serbia. The fourth option is the construction of a floating LNG terminal in the Port of Bar, but we do not have a clear government position on this issue. The construction of gas power plants in Bar, with a potential power of 50 MW, with the possibility of expansion, along with the improvement of the energy infrastructure, was analyzed. Podgorica and Pljevlja are also potential locations," said Đordan.

Pointing out that a key question is being raised here - whether domestic coal should be fossilized or whether hundreds of millions of euros should be invested in gas that must be imported, Đordan stated that it is also an important question whether there is a plan for the development of an economy that could be a consumer of gas, because in that case they would have combined production.

"We will have 180 megawatts from wind, solar power plants are being built, where we expect several hundred megawatts to come online in the coming years, which means we will need balancing capacity. We have investors who are interested in investing in LNG, mostly American companies. We are just waiting for the state to make a strategic decision on whether it wants gas infrastructure. Of course, the issue of the price of gas, the CO2 tax is important here, and it should be borne in mind that Montenegro does not have a single meter of infrastructure when it comes to gas", stated Đordan.