

Serbia: Nuclear power plants, real need as reality

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The high price and insecure supply of fuel and the environmental issues concerning the combustion of fossil fuels (coal, oil and gas) have caused a new interest in nuclear energy which was long neglected.

The Moratorium on the Development of Nuclear Plants in Serbia expires in 2015, and energy experts believe that, in the distant future, we will not be able to satisfy domestic needs without this electricity source but we will have to import electricity.

When the construction dynamics of new power capacities is compared to the consumption, the construction of nuclear power plants should not begin before 2020 or even 2030. In our country, the construction of nuclear power plants has always been perceived wrongly, in black and white. The fear is groundless, because there are already many such plants in our neighborhood, e.g. in Bulgaria and Hungary.

Within the diameter of 100 kilometers around Serbia, there are ten nuclear power plants, and there are 20 more within the diameter of 400 kilometers. A possible accident in any of them would be detrimental to Serbia, as if it happened in the middle of Šumadija. Should the "voice of the people" (a referendum) decide upon the construction of a nuclear plant? The government and experts must decide upon this.

Serbia will face a power shortage already in 2020. Realistically, Serbia has neither money nor personnel for building a nuclear power plant, but this is no reason not to begin expert assessments and negotiations.

From the moment when the Law on the moratorium on building nuclear power plants, having been adopted after the Chernobyl accident, ceases to be effective, 15 more years are necessary for such plant to start operating. Two billion dollars are required for building a small plant, like the one in Krško. We cannot pay this, but we have to think several decades in advance. If we decide to obtain a portion of electricity from a nuclear reactor, in addition to technology, by all appearances, we will also have to import knowledge. Because, one year after the Ukraine disaster, the department of nuclear physics of the Faculty of Electrical Engineering in Belgrade was closed down. Today, none of the faculties in our country provides education for experts in this field.

After more than half a century of using nuclear power, experience has confirmed that it is safe and economically advantageous. The economics of use of nuclear energy is the same or better than the fossil fuels energy. Considering that that the process utilization of installed capacity in the exploitation of nuclear power plants amounts to 90 percent or more and that the price per generated kilowatt-hour is not subject to changes affecting the energy generated from fossil fuels, nuclear power can be a significant stabilizing component of a power system. Nuclear fuel is renewed within the periods of 18 or more months, and this

practically eliminates the effects of short-term distortions on the energy market. The supply and price of fossil fuels are subject to global political changes, whereas climate disturbances affect the water levels of rivers and, consequently, they affect the capacity of hydro power plants. The share of the nuclear fuel price in the price of generated kilowatt-hours is very small, so that even a greater change in the nuclear fuel price has a small impact on the price of generated power.

The stated characteristics of nuclear energy are applicable to Serbia. Serbian energy sources are limited to coal and hydro energy, whereas gas and oil derivatives are imported. The plan of the European Union to reduce the emission of carbon-dioxide (Kyoto Protocol) can negatively affect the current Serbian energy basis, which relies on coal, when Serbia becomes the member of the Union. Considering ecology, nuclear power plants are the optimal solution.

There are 439 active nuclear power plants worldwide and the number is growing. The new technology of reactors that are on the market practically eliminates the issue of plant safety and security. The implementation of standardized power plant projects will significantly contribute to the reduction of costs and duration of constructing new nuclear power plants, and it will also reduce operating costs.

The price of construction of a nuclear power plant is high compared to the prices of fossil fuel power plants. The estimated prices of equipment and construction range from 2.000 and more dollars per kilowatt of installed capacity, excluding the financing cost. Depending on the financing cost, the final price of a nuclear power plant is estimated at 4.000 to 6.000 dollars per one installed kilowatt. The country in which the power plant is built is an important factor here. The construction of a nuclear power plant is very intensive in terms of labor force. This favors the countries in which the labor cost is low. Considering that a large part of construction is related to concrete structures, the experience with this type of construction that exists in Serbia represents an important advantage.

An important benefit of nuclear power plants is the service life amounting to around 60 years with the potential to be extended.

The generation price of a kilowatt hour of a nuclear power plant is approximate to the price of coal-based generation. If the cost of compensating for the negative environmental impact, such as the generation of carbon-dioxide, is added to this, than nuclear energy is more favorable. The price of nuclear fuel is the smallest component affecting the price of a kilowatt-hour. Operating costs, maintenance and operation also have a small share in the price per one kilowatt-hour. In nuclear power plants, the largest component of the price per one kilowatt-hour is the price of investment: the purchase of equipment, construction and financing. There are many estimates about the final price of generated power, which differ depending on the local, i.e. national conditions. For the European Union market, the generation price of one kilowatt-hour from new power plants is estimated at 0.054 to 0.074 dollars.

High generator powers are an important factor for choosing the location for integrating a nuclear power plant into the power grid and it is based on the power features of the grid as

well as on the infrastructure. With respect to the Serbian power grid, the ideal location for a power plant would be between the HPP Đerdap and the TPP Kolubara. The location on the Danube would also be suitable as a source of cooling water, and the cheap transport of equipment and fuel is an important contribution.

The issue of financing a nuclear power plant is the most important considering the high price of equipment and construction. One of the ways to build a nuclear power plant is through cooperation with international corporations with full or partial ownership. The international ownership of power systems has been very widespread lately. In such case, the power plant would be owned by a private corporation, and Serbia would be the electricity buyer. At the same time, such model would solve many issues related to fuel supply, the issue of storing the consumed fuel and of monitoring and implementing modern international regulations. The internationalization of power plants ownership is a normal transaction today. Of the several corporations specialized in nuclear power plants today, Areva in France and Exelon and Entergy in the USA are the most active.

The construction of a nuclear power plant is very intensive in terms of employing qualified workers for concrete construction, welders, electrical installers, plumbers and security staff. During the construction of a nuclear power plant, which lasts for four to six years, the number of employed staff can exceed 4.000. Maintenance and operations require significant qualified personnel of 400 to 600 people. And the construction and exploitation of a nuclear power plant can be a significant contribution to the local economy.

Serbia Energy supports the idea of NPP and initiated a public discussion campaign.