

The construction of wind generators in Serbia is interpreted as Serbia's obligation towards the EU - to achieve 27% of energy from renewable resources in its energy mix by 2020. The obligation that the EU has imposed on its members is to achieve only 20% of renewable energy by this time. It is unclear why Serbia has declared as its obligation a higher participation of renewable energy than the one that the European countries accepted for themselves.

Serbia entered the business of building wind generators unprepared, led by the pressures from the European Union and exposed to the pressures and deceptions of the wind generation lobby.

Although Serbia obtains more than 21 percent of energy from renewable resources, the electricity from our large hydro power plants has been excluded without grounds from the balance of the national renewable energy - so as to make room for the construction of expensive and inefficient wind generators and small hydro power plants.

Likewise, without grounds, the required percentage of renewable energy in Serbia by 2020 has been raised to a 27 percent participation in the energy mix - which is above 20 percent of renewable energy, the amount that the EU requires from its member states by this time. At the end of 2014, the construction of a total of 250 megawatts of capacity of wind generators was announced in Serbia, which should cost around 566 million dollars.

On the average, the production (cost) price of electricity from wind generators is two to three times higher than the electricity from coal-fired thermal power stations (which costs only 3.17 eurocents per kilowatt-hour in Germany today), and therefore, in the world, it is subsidized through the *feed-in-tariff*, i.e. through guaranteed higher purchase prices of electricity which cover its production costs, usually for the period of 15-20 years.

Serbian electricity consumers will pay the cost of construction and operation of wind generators through the increased price of electricity that they generate during a multi-year period - the same as in the case of small hydro power plants.

The domestic public is not familiar with the data on the production /cost price of electricity from wind generators in Serbia. In European countries (Britain, for example) it amounts to around 10 eurocents per kilowatt-hour, and, according to the data from 2009, the guaranteed production-purchase price of electricity from wind generators in Serbia should be 9.5 eurocents for a supplied kilowatt-hour.

Today, the price of electricity for households in Serbia amounts to around 6.3 eurocents per kilowatt-hour.

Serbia has winds from the IEC class III, and this only at the height of 100 meters above the ground, which is usable only for the low-wind generators (more than 6 m/sec to 7.5m/sec) - and which require wind turbine columns /towers with the height of 90-140 meters and the rotors of a larger diameter, whereas the generators should be of a lower capacity than the standard wind generators.

The operation of these wind generators (low-wind turbines) is profitable only in the case of a prolonged activity of such wind throughout the year.

The construction of wind generators in Serbia leads towards a rise in the electricity price for domestic consumers.

Serbia does not have the winds that are at the same time sufficiently fast, long-lasting and steady (without sudden interruptions and speed changes) - which could provide an economically profitable operation of wind generators. Unfortunately, the cost of construction of wind parks in Serbia is also higher than their cost in Europe.

With the costs of wind parks higher than those in Europe and with the wind generation capacity lower than the North-European, Serbia can hardly achieve success in this sphere. The data specified in Serbia in relation to the efficiency and profitability of wind generators, as well as the data on the energy potential of wind at critical speeds (5.5 - 6m/sec on the average) is exaggerated - so as to justify the construction of wind generators in our country. In Europe, the electricity from wind generators is subsidized with 10 billion euros annually; the guaranteed purchase price for the generated electricity (feed-in-tariff) from major wind generators in Britain is 10 eurocents per kWh, and, for the smaller than 500 kW, it amounts to 18 eurocents per kWh.

According to the data from 2009, the guaranteed purchase price of electricity from wind generators in Serbia should be around 9.5 eurocents per kWh.

The average achieved electricity production from wind generators on land, annually, with respect to their installed capacity (which is marked by the 'capacity factor') is only around 20% in Germany (it was only 17.5% in 2012) and around 25% in Britain - whereas the coal-fired thermal power plants have the capacity factor of more than 80 percent.

As Germany and Britain have significantly faster winds with a longer-term annual activity than those in Serbia, this capacity factor for domestic wind generators will be significantly lower.

The basic parameters for a profitable use of wind through wind generators, are the wind speed (over 6m/s for the low-wind turbines) and the significant duration of its activity throughout the year (measured in hours of annual activity for particular wind speeds), as well as its favorable wind-generation characteristics (it should not be intermittent and it should not change the speed suddenly, as well as that it should not exceed 90 km/h).

Košava, the wind that is mentioned as the most important wind generation source in Serbia, is a seasonal, pulsating and cascade wind which changes speed abruptly, blows in gusts of 2-3 to 3-7 days on the average, blowing for around 80 days a year on the average on favorable locations in the South-East Banat (Plandište, for example) that are stretched over the period autumn-winter-spring. Other winds from the southern quadrant blow over there for around 60 more days annually.

In Eastern Serbia, there are more locations with strong wind which, unfortunately, is not

sufficiently active throughout the entire year.

Wind turbines start operating at the wind speeds of 3.5 to 4.5 meters per second (but the electricity generation is very low at this); the standard type of wind turbine reaches its installed capacity at the wind speeds of 12-14 m/s; the installed capacity of low-speed wind turbines is adjusted to the wind of the IEC class III, of 7.5 m/s, also including the wind of more than 6m/s - but they are profitable only provided that such winds blow within an extended period during the year, when the cumulative annual wind energy at these lower speeds is higher than the total annual potential of fast wind (classes II and III) on the same location.

According to domestic research, the average wind speed of a little bit over 6m/s exists within the surroundings of Vršac, but only at the height of 100 meters above ground - whereas at the height of 50 meters above ground, the wind speed amounts to 5.5 m/s. The wind turbines with the capacity of 1.5 - 2.5 MW, similar to those planned in our country, are usually designed for the IEC class II of wind with the speed of 8.5 m/s and they have the tower height of (the column carrying the housing with the rotor) around 80 meters - which means that, in our country, they would reach the wind below the average speed of 6 m/s. Wind generators with higher towers certainly exist - but they also cost more.

On the average, the prices of wind farms on land are by 35-50 % higher than the prices of the wind generators themselves (because they also additionally include the construction of access roads and transformer substations) - but, in Serbia, wind farms cost almost two times more than the price of the wind generators themselves.

The price of wind generators in the EU is around 960.000 euros per MW of capacity (in China, by one third less), and the planned price of wind farms in Serbia should be around 1.866 million euros per MW of installed capacity.

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It is unclear why Serbia has declared as its obligation a higher participation of renewable energy than the one that the European countries accepted for themselves (Britain and Poland committed to an even smaller participation - only 15 percent of renewable energy by 2020).

The question is also why, in this sphere, Serbia has opted for small hydro power plants and wind generators which produce cheaper electricity than the large hydro power plants, for example, which are also among renewable energy resources - so, on this basis, their construction is financed even by the European Investment Bank. , transmits Serbia-energy.eu