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in building of electric power sources: Principi
donošenja odluka pri gradnji elektroenergetskih
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ELECTRIC POWER SOURCES – BASIC QUESTIONS

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Development of civilization is strongly related to existence of energy resources and degree of knowledge how to use them. Today in modern civilization, spectrum of sources of energy is greater than ever and technology of their usage reached very sophisticated level. Nevertheless demands for energy are higher than ever with visible tendency of its growth. Taking into account that current industrial technologies are predominantly based on electrical energy, demand for energy mean demands for electrical energy i.e. demands for building new electric power stations, converting other kinds of energy into electrical one.

Not underestimating other, emerging, technologies in this field, majority of existing and planned to be built, electric power stations are hydro, thermo or nuclear power stations, each of them with own benefits and own negative influence to people and local and global surroundings.



Fig.1. Total view of ITAIPU. Left part shows overflow (spillway).

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Carefully evaluated balance between benefits and disadvantages (if other influences can be excluded) defines politics of building new electric power sources.

Illustrative examples in this sense could be hydropower station ITAIPU (Brazil, Paraguay) and electric power stations in Japan.

ITAIPU – the biggest hydroelectric power plant on Earth, with capacity of 14,000 MW, was built on river Parana (border river between Brazil and Paraguay), Fig. 1. and owned by Brazil and Paraguay on equal parts (L1; L2).

ITAIPU generates 103 TWh of electrical energy per year. It covers 26% of electrical power consumption of Brazil and 78% of electric power consumption of Paraguay. Using significantly smaller part of "own" energy (less than 5%), Paraguay is selling the rest of "own" energy to Brazil, using electrical energy as good export product.

Although 1.350km² of soil (mainly forest) was covered by lake (about ten thousands families were dislodged and about 30.000 wild animals had to be saved during first filling-in of the lake), as great advantages of ITAIPU are referred facts that it has capacity of fourteen nuclear power stations and that it has not any harmful emission (equivalent coal power plant would emit 92.7 million tons of carbon dioxide per year).

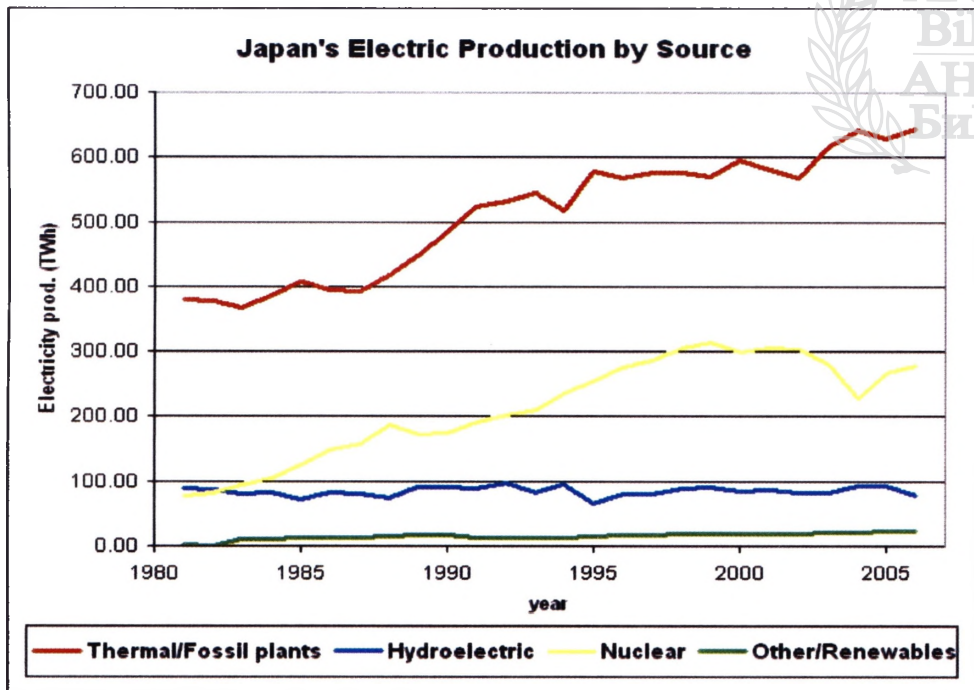


Fig.2. Production of electrical energy in Japan in the period 1980-2006

Quite opposite situation is on the opposite side of the planet Earth – in Japan. Highly industrialized country, Japan is spending over 1000TWh of electrical energy per year, Fig.2., 80% of which is based on imported fuel (L3).

Therefore since 1973 nuclear energy has been defined as national strategic priority. In 2005 there were 55 nuclear reactors in operation, located all around the country and generating about 30% of totally produced electrical energy in Japan.

Despite to the fact that Japan represents the area subjected to frequent earthquakes, despite 17 accidents in 9 nuclear power plants in the period since 1995 to 2004 (L4.) and despite widespread public opposition to nuclear power, building of new nuclear power plants in Japan is in progress with tendency to provide 41% of total electrical energy in Japan by 2012 and 60% by 2050.

In-between two mentioned border cases, Paraguay and Japan, it is possible to locate decision making problems in building of electrical power sources in any other country.

If taking care about own population and social progress, in decision making process each country is faced to the questions:

- How to find balance between benefit and unavoidable devastation of surroundings (dislocation of population, flooding of fertile soil, natural beauties, rare flora, air pollution and waste deposition, risk of soil and air poisoning);
- To build capacities to cover own needs for energy only (and so minimize negative impact to population and surroundings) or to cover own needs and for export also;
- To import fuel and to build electrical power sources or to import electrical energy (if possible) and not to build any electrical power sources (if country has not enough of own resources of energy);
- Which kind of fuel to import (if necessary)?

Other specific questions, not written here, also should be analyzed and answered.

Based on the fact that decision making in the field of electrical energy is sovereign right and responsibility of each independent country, presentation of experience of different countries and different aspects in this field is extremely useful. Also, because of strong mutual connections and global influence to surroundings, general decision making principles in building of electric power sources should be harmonized and respected.

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