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Orient in World Energy Progress

Analysis of the present situation of technological projects in the sphere of alternative energy sources prompts the conclusion that world energy will remain carbon based in the foreseeable future. A case in point is the successful technological breakthrough in developing hydrocarbon sources that were not extracted before. This breakthrough substantially increases the supply and hence brings down the price of fossil energy carriers. Fossil fuel will continue to dominate in primary energy production though with a tendency to decline in its share. By 2035 it will account for 82 per cent of the world consumption of primary energy against 87 per cent in 2010 [3, p.7]. The share of new sources of renewable energy (RE) will be growing until it amounts to 8 per cent in 2035. Nuclear and hydropower energy will retain its share of 5–6 per cent [6, p.74].

Demand for Primary Energy. The greatest increase in energy consumption is expected in developing Asian countries with extremely small or zero increment in North America and Western Europe. After 2020 energy consumption in developed countries will stop to grow. By 2050 almost 60 per cent of world energy consumption will fall on China, India and the Middle East [based on calculations: 6, p.81, pp. II. 45-II. 52]. This forecast is based on analysis of interdependence of GDP, its energy intensity and per capita energy consumption in different groups of countries. Energy intensity is on the decline both in developed and developing countries as the GDP grows faster than energy consumption. As for per capita energy consumption (as energy consumption divided by the population) it is increasing everywhere: in developed countries the rise is small (because of the greater energy efficiency) with a still smaller rise (or almost stagnation) of the population. It is unlikely developing countries will have a higher population growth with the growth of primary energy consumption being still greater. Consequently, per capita energy consumption in different groups of countries is limited within a narrow space and the growth rates of per capita energy consumption are approximately the same for all groups of countries which is caused by leading growth rates of energy efficiency in developed countries against higher growth rates of population in developing countries.

Orient as extremely heterogeneous region demonstrates a variety of forecast indicators of primary energy consumption. Yet perspective trends even in backward and stagnant countries are in the world mainstream. East Asia will

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account for 46 per cent of primary energy consumption increase by 2050, Middle East for 24 per cent, South Asia for 15 per cent, Central Asia and Trans Caucasus four per cent [calculation based on: 1, pp. II.28, II.45 – II.52].

Structure of Primary Energy Consumption. Regarding perspective changes in the structure of primary energy consumption in different oriental regions, especially Middle East and North Africa rich in hydrocarbon reserves and East Asia, Southeast Asia and South Asia lacking large reserves of fossil fuel, deviate from world trends. Coal will retain its leading part in energy balances in East Asia and South Asia while the average annual growth rates of coal consumption will reach here only 1,6 per cent (the growth rates of all energy sources will be 2,6 per cent). The percentage of coal in the region's primary energy consumption will go down from 45 per cent in 2010 to 40 per cent in 2050. In PRC annual growth rates of coal consumption will be as low as 1,4 per cent. However the country's share in world coal consumption will go up from 47 per cent in 2010 to 53 per cent in 2050 through the rapid dwindling of coal share in energy balances in developed countries (the rise in world coal consumption will be only 0,2 per cent per year) [calculations based on: 1, pp. II.30 – II.33]. The share of PRC in regional consumption will fall because of the high rates of consumption in India. Due to the limited opportunity of increasing gas imports soon the provision of energy for fast economic development of India is only possible through increasing consumption of local coal and imported coal (mostly Indonesian) which is cheaper than gas.

East Asia and Southeast Asia will guarantee the world's greatest absolute increases in gas consumption. PRC will account for 28 per cent of the world consumption growth [5, p. 6]. Middle East will demonstrate the world's second largest consumption growth. The region's share in the world gas consumption will rise from 13 per cent in 2010 to 20 per cent in 2035 [4, p. 5].

Asian countries will provide over 3/4 of the world demand in oil, a fuel the share of which in the world energy balance will be on the decline. By 2030 PRC will be the world's largest oil consumer. India will rank third (after U. S.) [3, p. 7].

Electric Power. Unlike the developed regions where 80 per cent of the electric power generation growth will be covered by RE, the Oriental developing countries will have generation growth covered by the same 80 per cent but by fossil fuel. In spite of the efforts of countries that lack fuel for leading development of non-carbon generation of electric power, the role of fossil sources of energy will remain intact there. In South Asia the share of coal in electricity generation will not change substantially (62 per cent in 2035 against 64 per cent in 2010), the share of gas will rise from 15 per cent to 17 per cent, the share of nuclear energy will not have considerable growth (2–6 per cent) and the share of hydropower generation will even go down from 16 to 14 per cent [2, p. 84]. In Southeast Asia contrary to the world tendency the share of coal in power generation will rise from 27 per cent in 2010 to 53 per cent by 2050. Yet again contrary to the world trend the share of gas will dwindle (from 49 per cent to 33 per cent)

because Indonesia has ceased to be world leader on the LNG market and has become a major exporter of coal [2, p. 84]. East Asia power sector will remain the world's greatest coal consumer though the share of coal in electricity generation will decrease from 73 per cent in 2010 to 53 per cent in 2050, the share of gas will more than double (from 5 per cent to 11 per cent), the share of hydro-power energy will be almost the same (14 to 15 per cent), the share of nuclear energy will double (from 5 per cent to 10 per cent) [calculations based on: 1, pp. II. 353 – II. 370, 2, pp. 84–86]. In Middle East and North African energy generation will still be mainly based on oil and gas (with the growing share of the latter) which is not surprising given its abundance. Central Asia and Trans Caucasus will have almost the same structure of power generation: the share of hydropower will have a small decrease (from 30 per cent in 2010 to 27 per cent in 2050), the share of gas will go up (from 34 per cent to 40 per cent), the share of coal won't change (21–22 per cent) [calculations based on; 2, p. 113].

Nuclear energy will develop in the East though its share in generation will decrease from 16 per cent in 2010 to 14 per cent in 2035 [3, p. 7]. Almost all reactors being currently built and designed are located in Asia: 24 in China, 6 in Republic of Korea, 4 in India, 2 in Iran, 1 in Viet Nam, 1 in Thailand, 1 in Pakistan. Asian countries do not waive building up power production using this non-carbonic method which does not have commercial prospects (Japan is an exception: it gave up construction of new reactors in 2014). In RK the use of nuclear fuel will remain the basis of power generation (32 per cent in 2010 and 34 per cent in 2035 [2, p. 181].

Electricity generation growth in hydropower plants has natural limitations in the Middle East and North Africa and is fraught with acute inter-state contradictions over the use of water and overpopulation in South Asia and Southeast Asia. Therefore, in the Oriental region as a whole this type of generation will have the lowest growth rates among all kinds of power generation with the declining share in the overall production. 72 per cent of generation increase will be provided by China where, according to forecasts, the generation will nearly double [5, p. 8]. Large power plants are planned in Myanmar and Lao (oriented to China's market) as well as in Bhutan and Nepal (with perspective electricity supplies to India. By 2030s these countries will rank among the world's biggest hydro- power energy exporters. For Tajikistan, Kyrgyzstan, Armenia, Georgia, Sri Lanka hydropower plants will continue to be the basis of power generation with a slow decreasing share in general power generation.

Demand and Supply Balance. An increase in primary energy consumption in South Asia and East Asia will outpace the growth of its production. The growing deficit will be covered by imports. Net imports of fossil fuel will double here in 2010–2050 [calculation based on: 2, p. 30].

Middle East and North Africa demonstrate the opposite situation: a rise in the primary energy production in 2010–2035 here will be 1,5 times higher than the

rise in its consumption [4, p. 4]. This part of the Orient will retain its role of the world's leading exporter of hydrocarbons.

By 2030 Southeast Asia will turn from a net exporter into a net importer of energy carriers. The role of the Caspian region and Central Asia will rise on markets of all energy carriers.

The global tendency (characteristic of the East too) is that the number of net exporters of primary energy is declining while the number of net importers is correspondingly growing. The East as a whole will remain a net exporter and will include both the biggest net traders and net buyers.

As the GDP growth rates are faster than growth rates of primary energy consumption the region is likely to "cope with" both investment rise in the growing production and financing of the increasing volumes of energy carrier imports. Its success is guaranteed by the recently emerging "stabilizer" and "restrictor" of oil price and oil-related prices of other energy carriers – the profitability of world shale oil projects. The growing dependence of volatile world markets of primary energy will not be a heavy burden for balances of payments in most countries of this most dynamic region of the world.

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