

ECONOMICS ASPECTS OF IMPLEMENTING ALTERNATIVE ENERGY

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Humanity consumes a lot of energy. The greatest part of it is generated by burning the organic fuel such as coal and gas. However it is known that this process leads to releasing large amounts of carbon dioxide into the atmosphere.

This increased level of carbon dioxide is the main cause of the so called "Global Warming Effect". One answer to global warming is to replace current technologies with alternatives that have comparable or better performance but do not emit carbon dioxide. This kind of energy is called alternate energy.

By 2050, one-third of the world's energy will need to come from solar, wind and other renewable resources. Population growth, climate change and fossil fuel depletion mean that renewable energy sources will need to play a greater role in the future than they do today.

Alternative energy refers to energy sources that have no undesired consequences that gas, fossil fuels or coal have. Moreover, alternative energy sources are renewable and are thought to be "free". They all have lower carbon emissions compared to conventional energy sources. These include Solar Energy, Biomass Energy, Geothermal Energy, Wind Energy, Hydroelectric Energy, Tidal Energy and Space Energy.

Solar energy is energy from the sun in the form of radiated heat and light. The sun's radiant energy can be used to provide lighting and heat for buildings and to produce electricity. Solar energy can be harnessed only during the day and only if the sunlight is not blocked by clouds, buildings or other obstacles.

Surprisingly in the minds of some, Russia has a range of suitable locations for pushing the use of solar power, with large expanses of Siberia and the Russia Far East, as well as the region between the Black and Caspian seas. Russia's state owned nanotechnology corporation, Rusnano, has recently committed to supporting the development of polysilicons and monosilane in Irkutsk and the establishment of solar batteries in Novocheboksarsk.

Biomass fuel refers to anything that can either burn or decompose. Other terms are biomass energy or biofuel. Bioenergy technologies use renewable organic resources, called biomass, to produce many energy related products including electricity, liquid, solid and gaseous fuels, heat, chemicals and other materials.

A recent publication by the European Union highlighted the potential for waste-derived bioenergy to contribute to the reduction of global warming. The report concluded that 19 million tons of oil equivalent is available from biomass by 2020, 46% from bio-wastes: municipal solid waste (MSW), agricultural residues, farm waste and other biodegradable waste streams.

Nowadays Russia is becoming a leader among countries which produce wooden pellets. However pellet production is export aimed. Moreover using pellets instead of organic fuel presents with severe difficulties, technological mostly. Fortunately a certain progress is registered in Arhalsk region, Nizhni Novgorod region and Krasnodar Territory.

Moreover agricultural potential isn't being used, with experts estimating Russia's capacity to produce biofuels at 850 million litres. Russia has one complex in Omsk which produces a bioethanol blend with oil and plant based spirit from raw materials produced by Biokhim, a joint venture between Russia and Ukraine sourcing raw materials from both countries.

Hydroelectric energy is energy that has been generated by using the force of flowing water and is the most commonly used form of renewable energy. Hydroelectric plants are highly advantageous as a source of reliable clean energy. Hydroelectric plants are responsible for producing approximately 20% of the world's electricity. For example, 75% of the electricity produced in New Zealand and over 99% of the electricity produced in Norway come from hydropower.

Basically, a hydroelectric energy implies small hydroelectric power station (under 25 megawatts). At this moment there are about 200 minor hydroelectric power stations. Fortunately, the interest to Russian hydroelectric energy sector is increasing among foreign and Russian investors.

Tidal power, sometimes called tidal energy, is a form of hydropower that converts the energy of tides into electricity or other useful forms of power. Although not yet widely used, tidal power has potential for future electricity generation. Tides are more predictable than wind energy and solar power.

Due to scientific and technical achievements Russian tidal projects are worked out in the Murmansk region and in the Sea of Okhotsk, where rising tides run up to 8-10 metres.

Geothermal energy is the heat from the Earth. It's clean and sustainable. Resources of geothermal energy range from the shallow ground to hot water and hot rock found a few miles beneath the Earth's surface.

Russia currently has four major geothermal power stations in Kamchatka for which expansion proposals are being developed. There is currently 80 megawatts capacity from these plants with plans to expand this beyond 120 megawatts. Russia also has smaller geothermal plants in the Stavropol region and the Kurile islands.

Finally, Russia has wind power operations in Kaliningrad with a capacity of 5.1 megawatts, to go with a 2.5 megawatt capacity wind power station in remote Chukotka, and a further 2.2 megawatts of capacity in Bashkortostan. New wind power projects in the pipeline include those in the Leningrad and Krasnodar region, to go with plants scheduled for Dagestan, Primorski Krai, Karelia, Magadan and Altai, which are expected to add a further 276 megawatts to Russia's wind power generation capacity.

Nowadays both well-developed and developing countries such as the USA, Spain, Germany, China, and India are the leaders of using alternate energy. In spite of Russia is one of the richest countries in raw resources it is vital to develop alternative energy too.

Basically alternative energy will promote the diversity in Russian economy (particularly in fuel-energy complex), optimize energy balance structure; stimulate the development of advanced technology products. Besides economic aspects there are also social and ecological advantages. Russian citizens will benefit by having better job opportunities and higher living standards.

For instance, creation of a single workplace in wind power engineering is followed by creation of 4-5 workplaces in adjacent industries. In Russia this social aspect seems to take on special significance as constructing of power stations in remote areas supplies basis for developing local industries. Moreover, building boiler-houses using renewable energy sources gives additional guarantees of safe and reliable heat supply in winter.

However, renewable energy currently comprises just 1% of Russia's energy output, with the government planning to increase this to 4.5% by 2020, in the face of estimates suggesting that up to 30% of Russia's energy demand could come from renewable sources.

That compares poorly with many international counterparts. The European Union is expecting to get 13.5% of its energy from renewable sources in 2014, rising to 20% by 2020 and 30% by 2030. In Canada the figure varies between 3.5% and 15% depending on the province, with the US figure varying between 5% and 30% depending on the state. Even fellow BRICS, India, is getting an estimated 10% of its energy from renewable sources.

The largest factor in why Russia doesn't have a more sizeable renewable energy sector is its wealth of hydrocarbon based resources – copious amounts of oil, gas and coal. This coupled with a history which sees Russia dependent on energy exports for an estimated 80% of its foreign trade earnings has meant renewable sources have traditionally been viewed as minor players.

Apart from large amount of carbon oil and gas, Russia has no proper legislative basis. In 2009 the Program of alternative energy development was approved and it was expected that the foreign investment stream would grow up. However, neither Russian nor foreign investors did not show any interest. The creation and approval of the federal law on alternative energy might make all the aspects related to it clearer. Consequently investors would get the “game rules” and, therefore, be able to invest with less risk.

In my opinion, building the joint enterprises with foreign technologies can be an appropriate solution. What is more, I believe that the governmental support in building roads, electricity nets for such plants will help to make these projects more appealing to investors.

It is well-known that the great part of Russian energy sector is formed by raw materials companies. In order to optimize energy balance it is important to create a preferential fiscal regime (value-added tax and ecological payment free) for alternate energy producers and enterprises.

In order to encourage the processing industry to develop alternate energy, these kinds of legal and tax regimes should be practicable for all types of industries (for instance, fuel pellets can be produced of woodworking wastes; biogas may be produced in meat processing factories, etc.).

I believe that organizing joint factories with foreign investment and technologies could be the appropriate solution. Apart from, governmental support in building roads, electric mains will make these projects even more attractive for investors.

Nowadays there are plenty of places in Russia where renewable energy sources can be effectively used. Combination of the great renewable energy potential and hi-tech technologies could provide our country with certain advantages. Here are the most perspective ways of using renewable energy in Russia:

- 1) the areas with the absence of centralized energy supply (more than 70% of country's area);
- 2) the areas where centralized energy supply is not the reliable one;
- 3) individual centers of population, especially “green” recreation areas (to provide perfect ecological situations in them).

To conclude, Russia has a great potential of using different kinds of alternate energy. To my mind, it is vital to focus on developing legislative basis as well as creation of attractive business environment in the field as soon as possible.