



THE FUTURE OF THE GLOBAL ENERGY PARADIGM – RUSSIA

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Throughout history, global society has witnessed fundamental economic and technological transformations in many of its industries. One can say with certainty that even today we find ourselves on the verge of such changes. These advancements have the opportunity to leave previous “technological revolutions” in the dust.

The Organization of the Petroleum Exporting Countries (OPEC) has been at the forefront of international energy dialogue since the early 1990s, when Member Countries, alongside other producers, as well as consumers, joined forces to initiate a very important platform for a producer-consumer dialogue and exchange through the establishment of the International Energy Forum (IEF).

As representatives of the global energy industry we all understand how momentous are the changes in the modern world and realise that we are witnessing not just short-term phenomena, but something that stimulates fundamental changes in the world of energy that will transform the entire international economic system and landscape.

No one could predict the current world energy outlook ten or fifteen years ago. Something that prevailed in the global oil society fifteen years ago was the “peak oil” theory, according to this concept mankind would reach an insurmountable rate of oil production for the foreseeable future. So, what is the current state of affairs? We are discussing “peak oil” again – but in another context – when the maximum rate of oil demand is reached, whereas oil supply is no longer an issue of concern.

We have witnessed a technological revolution. The past few years have seen a revolution in oil production technologies. New faster and less expensive ways of shale oil and gas extraction have emerged. This source has become another balancing factor in the market capable of reacting to changing market conditions within 3-9 months compared to 3-5 years as it was in the past.

The production cost has also decreased significantly. This has led to increasing volatility while the market is looking for a way to rebalance and stabilise.

For the moment, we can observe the explosive growth of renewables as well. The current annual investment into new solar and wind generation capacities amount to more than \$250 billion. More funds are invested in renewables than in conventional generation. It was

hard to predict that in many countries, solar and wind power plant generation costs would be competitive with conventional energy sources. It is obvious that the trend will continue – renewables will grow at high rates compared with other energy sources.

What are the key factors and challenges of the global energy transformation these days?

- New technologies will continue to change the market landscape, both in production and energy generation, as well as in the field of consumption.
- Moreover it is expected that fossil fuels will supply a great majority of the world’s fuel consumption over the long-term.
- The globalisation of all key processes will continue to be a factor.
- Competition between energy sources will intensify, which will result in a reduction in resource rents.
- It is important to note that non-economic restrictions, destructive to the foundations of global energy security, are gaining momentum worldwide.

Technology development has led to an increase in oil production in many oil-importing countries and to the reduction of its cost. Perhaps one of the most striking examples is the rapid growth of light tight oil production in the US. I believe that the struggle for efficiency will enhance the competitiveness of more expensive methods of oil production in the future.

Another essential factor is the quick pace at which renewable energy is deployed. Could anyone back in 2000 imagine that the new installed renewables would top the capacity added from all conventional technologies and that investments in renewables would exceed those in conventional energy sources?

Nowadays the levelled costs of electricity (LCOE) for renewable energy technologies are continuing to decline (over the past decade LCOE declined by an estimated 70 per cent for solar photovoltaic (PV) and by 25 per cent for wind energy technologies), therefore renewable energy is becoming more and more competitive on a cost per kilowatt-hour basis compared to fossil fuel power.

Economic growth has finally become decoupled from energy consumption: robust investments in energy efficiency have begun to yield positive results. According to forecasts, the size of the global economy will double by 2040, at the same time global energy consumption will rise by no more than

30 per cent. Meanwhile global electricity demand is expected to increase rapidly, particularly given rapid industrialization in emerging economies, population growth, a rising middle class, expanding urbanization, and the widespread electrification of society.

Another factor is the acceleration of globalisation and increased interconnection of different energy markets (both between energy sources and different regions). Since the beginning of the 21st century the number of major oil producers (countries with a production level of over 4 mln barrels a day) has doubled, at the same time the number of major gas producers (over 100 bcm) has tripled. A striking example is the LNG industry, which is transforming natural gas markets from regional systems, to more globalised and interdependent markets, which consequently leads to the formation of a truly global natural gas market.

The globalisation of markets also leads to the globalisation of risks - changes on one side of the globe can seriously affect the other. Competition between different producers and various types of energy resources has grown even stronger. All this is happening not within centralised integrated frameworks or large government programs, but rather, within uncontrolled consumer collaborative processes, which are difficult to forecast. Renewables will allow consumers to choose whether to connect to a centralised utility or to organise energy supply in their own households through decentralised renewable energy solutions such as rooftop mounted solar panels or micro-cogeneration units in cellars.

Comprehensive digitalisation of all processes in the energy sector promises the most revolutionary changes which will enable the reshaping of the entire global energy landscape. Power consumption management which includes digitalisation, robotisation, artificial intelligence and the development of smart city innovative technologies is now one of the key directions of modern energy development.

Nowadays many experts state that the era of fossil fuels is coming to an end. We do not share such extreme views, which are based on the claim that there won't be a place in the new world for conventional energy sources and that they will somehow play a secondary role to renewables.

First of all, traditional energy is important since it provides physical stability and security. For instance a

well-developed pipeline system in Europe will ensure fully digitalised and decentralised electricity flows.

Secondly, conventional energy has great potential for efficiency growth through digitalisation, flexible adjustment to the needs of consumers and decentralised management. An ideal digital model is built up in a way that as soon as a consumer presses the lever of a fueling nozzle, analysts based in an operational centre of an oil company will immediately receive information concerning the gasoline standard being pumped into the fuel-tank as well as the amount of crude oil to be produced, transported and then refined in order to meet the demand of a particular region.

In fact, global society has made a choice today in favour of sustainable development and the achievement of our common climate goals, which are simply unachievable without such an environmentally-friendly and abundant fuel as natural gas. It should be taken into account that the average greenhouse gas emissions intensity of a gas power plant are 40 per cent lower than that of a coal power plant, and 20 per cent than of an oil power plant. In practice, the CO₂ emissions intensity of natural gas is lowered even further thanks to highly efficient gas power plants. As a result, gas power plants emit about two times less carbon dioxide than coal-fired power plants.

The share of fossil fuels in the global energy mix will definitely fall in the next 20-25 years – from 85 per cent to 70-75 per cent – however, taking into account population growth, vehicle fleet and energy demand growth rates, the total consumption will accrue. If we want to ensure a sustainable global energy supply, we will have to find a rational balance between conventional and new energy sources.

It should be said that while the spotlight has been focused on digitalisation, innovative technologies and smart grids, slightly less than half of the global population still does not enjoy access to energy. At the same time, experts commonly believe that the UN will not deliver on Sustainable Development Goal 7, which aims to ensure access to affordable and sustainable energy for all by 2030.

We, as many of our partners, count on the significant role of technological progress in the acceleration of SDG7's implementation rates. Clean fossil fuel technologies have great potential in ensuring the achievement of that goal. ■