Russian Energy Week 2018

Energy of the Future: Three Drivers of Sustainable Development

KEY CONCLUSIONS

Digitalization is key to development as well as efficiency increase in the energy sector

"According to projections, technology and digitalization will lead to a significant increase in recoverable oil and gas reserves. Bloomberg's study says digitalization will support approximately 30% of increase in power generation capacity," Steven Griffiths, Member of the Global Energy Prize International Award Committee; Senior Vice President, Research and Development, Khalifa University of Science and Technology.

"The process of digital transition in the electric power industry, which will not only improve the efficiency of traditional energy systems, but also reduce maintenance costs and ensure more security of energy supply, is recognized as the key topic by world's most advanced countries. Development of high tech, such as artificial intelligence and machine learning systems, will open up new possibilities for providing holistic solutions that were previously impossible," Steven Griffiths, Member of the Global Energy Prize International Award Committee; Senior Vice President, Research and Development, Khalifa University of Science and Technology.

Renewables open a new era in energy industry

"The efficiency of organic fuel will increase in short-term perspective. <...> A further future holds renewable energy sources. But we must work on them today, otherwise we are going lag behind forever. This is where I see such important areas as solar energy and geothermal energy. But gradual transition to petrothermal energy is even more promising. It uses heat from dry rocks at depths of 3 to 10 kilometres. That is where temperature reaches 350 degrees Celsius, and it is estimated to be an inexhaustible source of heat. At the very least, it will be sufficient for the entire time of humanity's existence, taking into account the complete life cycle of developed civilizations. The idea of extracting deep heat was proposed by Tsiolkovsky in 1897. But it is only today that there is an opportunity to realize it," Sergey Alekseyenko, Academician, Member of

the Department of Energy, Mechanical Engineering, Mechanics, and Control Processes, Russian Academy of Sciences.

"Recent price calculations reflect a bigger role for solar energy in the future. In recent years, the industry has seen a tenfold reduction in the cost of energy supply to users. We are going to supply 1 terawatt of solar energy by the middle of the next decade," Martin Green, Professor, University of New South Wales (UNSW); Director, Australian Centre for Advanced Photovoltaics (ACAP).

"Renewable energy sources are very important for sustainable energy development, for rapid energy development. Oil and gas, especially gas, will remain important, but the share of renewables will increase: wind, solar, hydropower, nuclear power, biomass energy; and that is going to take up to a third of the total energy consumption structure. The future is in combining different types of energy," Sun Xiansheng, Secretary General, International Energy Forum (IEF).

PROBLEMS

Digitalization creates opportunities for cybercrime

"New projects related to the energy of the future are fraught with new dangers. Systems associated with 'smart grids' that are more automated and require less human supervision, can become the target of cyber-terrorism; therefore, security is becoming one of the most important problems of the energy industry. And that is where we can't act afterwards, we need to act in advance," Dominique Fache, Director, Sophia Antipolis Foundation; Chairman of the Board of Directors, Russian Technology Foundation (RTF); The Global Energy Prize Expert.

Low share of renewable energy in the Russian power industry

"The pessimistic outlook is that we will consume as much fuel in 2025 as we do today. Looking at the situation in Russia, both in oil and in natural gas, coal as well, you may notice that Russia has a very small share of renewable energy because there is a huge industry of nuclear energy and hydropower," Rodney John Allam, Nobel Peace Prize Laureate; Chairman of the International Award Committee, Global Energy Association.

Poverty in some of the world's regions

"Up to 2 billion people do not have access to clean energy and utilities. This is a rather serious problem for all of us," Sun Xiansheng, Secretary General, International Energy Forum (IEF).

"1.5 billion people do not have access to clean cooking, that is in China and India. They have electricity, but they do not have the opportunity to cook their own food. This is a serious health issue," Liu Hongpeng, Director, Energy Division, United Nations Economic and Social Commission for Asia and the Pacific (ESCAP); The Global Energy Prize Expert.

Energy industry depends on political factors

"Politics influence decisions on whether you invest in renewable energy or in energy efficiency," Klaus Riedle, Honorary Professor, Friedrich-Alexander University Erlangen-Nürnberg (FAU).

SOLUTIONS

International cooperation in cybersecurity

"Fighting cybercrime can be effective only if all countries get together and work on it," Sophie Shevardnadze, Journalist, Anchor.

"Controlling power supply networks is a key aspect of the global strategy. Today, Europe must find a new trend, including an agreement with Russia <...> Energy sector is where we can't act afterwards, we need to act in advance," Dominique Fache, Director, Sophia Antipolis Foundation; Chairman of the Board of Directors, Russian Technology Foundation (RTF); The Global Energy Prize Expert.

Developing new energy storage and transmission technologies

"Even though the efficiency of solar energy systems increased, it is necessary to ensure coherence and cooperation at the global level. If we try to solve our problems on our own, we need huge energy storage systems. But if we are connected through a global system, we can minimize our storage needs. Supernetwork and supergrid technologies are required for that," Chung Rae Kwon, Nobel Peace Prize Laureate; Member of the Global Energy Prize International Award Committee; Professor Emeritus, Incheon National University.

"Another important component that needs to be developed, and we are working on it as well, is energy storage, because all renewable sources, except

geothermal, are temporary. We are working in all of these areas, and we already have a few significant achievements," Sergey Alekseyenko, Academician, Member of the Department of Energy, Mechanical Engineering, Mechanics, and Control Processes, Russian Academy of Sciences.

Reducing the price of renewable energy

"Further energy development is associated with renewable sources. My colleagues and I have created technologies that can significantly reduce the cost of solar panels and drastically increase the efficiency of their work by improving silicon fuel cells," Martin Green, Professor, University of New South Wales (UNSW); Director, Australian Centre for Advanced Photovoltaics (ACAP).