

DIGITAL TECHNOLOGIES AS A DRIVER FOR THE INNOVATIVE DEVELOPMENT OF FEC. LEGAL REGULATION PROBLEMS AND PROSPECTS

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Digitalization of the society and high speed of the development and introduction of digital technologies in the modern life is currently a world tendency. The majority of countries of the world have moved to building of digital economy elements in different spheres of public administration, science, business and industry including the fuel and energy complex. This article reviews the main areas of the application of digital technologies in FEC, problems and prospects of digitalization of the energy industry, the system of regulatory acts governing the issues of the application of digital technologies in FEC.

Keywords: energy law, digital technologies, digital economy, energy security, artificial intelligence, blockchain.

The introduction of digital technologies in various spheres of public relations (digitalization) is currently a world trend.

Many countries of the world make different segments of their economy digital by large-scale deployment of information and communications technologies to improve public administration processes, raise workforce productivity, increase efficiency of business processes and reduce production costs.

According to the international experts' estimates, humanity is now on the verge of the Fourth Industrial Revolution (industry 4.0) that on the one hand will lead the human civilization to the whole new level of life and on the other hand will present a challenge

to the system of cultural and social values and links existing in the modern society, which can entail a change in the social paradigm.

Considering the situation in the world economy, the digital transformation of energy companies, raising of their performance and cost reduction become of crucial importance to preserve the position of national FEC companies on the world energy markets.

It seems obvious that it is impossible to be a leader in any industry of the economy at the domestic or international level without innovative, breakthrough technologies.

In this respect, the developers have introduced the term "breakthrough technologies"

in the updated Energy Strategy of Russia for the Period up to 2035 (the “Energy Strategy of Russia”) and named their main categories in the document.

In particular, the Energy Strategy of Russia determines renewable energy sources and energy accumulators, network technologies in the electrical energy industry including active-adaptive networks, distributed generation, informational and technological platforms for planning (forecasting) and management of the energy infrastructure and power receivers of electrical energy consumers able to ensure minimization of cost of consumed energy resources by optimization of modes of operation of consumers’ technological equipment and able to participate in the wholesale market, as technologies affecting organizational and technological changes in the management and functioning of electrical energy systems and facilitating the transition of the energy industry to the new technological basis (the so-called “energy transition”).

Almost all digital economy instruments (digital technologies) can currently be in demand in the FEC sphere: neurotechnologies and artificial intelligence, machine learning, quantum technologies, digital financial technologies, virtual and augmented reality, wireless communications technologies, technologies of the Industrial Internet of Things, Big Data, distributed register systems (blockchain), 3D printing, unmanned vehicles and drones, smart sensors, robotization of production, additive technologies, digital twins of FEC facilities.

Digital technologies in FEC is a valuable and an extremely relevant resource for the solution of issues of competition development, restraint of the growth of prices on electrical energy and other energy resources, raising of reliability and continuity of energy supply, reduction of accident rate at FEC facilities, problems of energy supply and raising of energy efficiency.

Deployment of digital technologies in order to raise the efficiency of production and

processing of energy resources, reduce the energy resource consumption level, reduce of the volume of burned mineral resources and harmful emissions to the atmosphere will make a positive impact on the environmental situation in the country.

Digital technologies are widely used in the electrical energy industry, pilot smart grid projects have been launched, automatic emergency response and relay protection system are actively used at facilities of the electrical energy industry, systems of remote control and telemechanics have been introduced (automated systems for commercial accounting of energy consumption, automated technological process control systems).

New technologies of distributed generation, microgeneration, managed electrical energy consumption make it possible to create new conditions for the functioning of competitive retail electrical energy markets.

Some measures facilitating the innovative development and digitalization of the electrical energy industry are performed within the framework of the implementation of the action plan (the “roadmap”) of the National Technological Initiative in the EnergyNet sphere. In particular, priority is given to intellectual technologies and means of monitoring and diagnostics of the state of equipment in energy systems, new technical means for the creation of intellectual energy systems including a digital substation, “virtual power station”, intellectual electrical energy (power) recording systems, means of intellectual management of end electrical energy consumption (“energy Internet”) and means of accumulation of large electrical energy volumes.

Challenging aspects and tasks of the legal support of the use of digital technologies in the energy industry is sufficiently detailed in the works by V.V. Romanova [1].

Let’s focus of the industrial tasks of digitalization in the fuel and energy complex.

In the end the changes will cover all aspects of functioning of the electrical energy

industry: from technological cooperation to financial and market relations [2].

Digital technologies are also actively applied in the nuclear industry. In particular, the Rosatom state corporation has deployed the project management system (the multi D digital platform) that allows management of a nuclear power station at all stages of its life cycle: from design and construction to decommissioning.

In order to develop nuclear technologies and ensure competitiveness of the nuclear energy system of Russia on the world market, there has been developed a project of a standard, optimized, informatized, double-unit nuclear power station under the PWR technology deployed in the modern information environment and compliant with the nuclear and radiation security requirements [3].

The use of digital technologies at pipeline transport allows raising security, optimizing logistics and reducing operational costs.

Digital technologies in the oil and gas industry will help monitor and optimize oil and gas assets and production facilities throughout the entire value chain, from a well to a gas filling station, more effectively and will enable to raise the aggregate volume of production and reduce exploration costs in the field production industry [4].

The oil and gas industry is actively using the “digital twin” technology that gives an opportunity to transfer an object in the digital space, model a change in the object condition under the influence of various factors and possible control actions, develop and perform optimal control actions to reach the target condition of the object [4].

Digital technologies entail a high-quality increase in the operational management level and ensuring reliability of energy supply due to the enhancement of observability and manageability as well as digitalization of risk-oriented operational management of FEC systems.

Digital technologies in the coal industry make it possible to optimize the production

chain from extraction to supply of coal to consumers and raise the industrial and environmental security level at facilities of the coal extracting industry.

An analysis of the national system of laws shows that a lot of regulatory acts of various levels have been adopted in the recent decade, some of such acts are aimed, inter alia, at the establishment of the digital environment in our country.

If we have a look at digitalization processes in the energy industry, M.M. Vildanova and L.V. Urmanov note that the level of the use of information technology in the exchange trade in oil and gas is quite representative. Thus, Law of the Russian Federation No. 2383-1 of February 20, 1992 On Commodity Exchanges and Exchange Trade has laid the legal grounds for stock exchange functioning, and the later adopted Federal Law No. 325-FZ of November 21, 2011 On On-Exchange Trading; Federal Law No. 7-FZ of February 7, 2011 On Clearing, Clearing Activities and Central Contractor; Federal Law No. 63-FZ of April 6, 2011 On Digital Signature; Federal Law No. 149-FZ of July 27, 2006 On Information, Information Technology and Information Protection and other regulations have allowed creation of an efficient electronic exchange trade system [5].

Today, the legal ground for the development and functioning of the digital economy of Russia is Federal Law No. 172-FZ of June 28, 2014 On Strategic Planning in the Russian Federation, Federal Law No. 259-FZ of August 2, 2019 On Attraction of Investments with the Use of Investment Platforms and on Amendments to Separate Legal Acts of the Russian Federation, Federal Law No. 258-FZ of July 31, 2020 On Experimental Regal Regimes in the Digital Innovation Sphere in the Russian Federation, Federal Law No. 259-FZ of July 31, 2020 On Digital Financial Assets, Digital Currency and on Amendments to Separate Legal Acts of the Russian Federation, other federal laws, strategic planning documents approved

by the President of the Russian Federation (the National Security Strategy of the Russian Federation, the Information Security Doctrine of the Russian Federation, the Energy Security Doctrine of the Russian Federation, etc.), other regulations of the Russian Federation that determine the areas of application of digital technologies in the country.

The President of Russia first touched upon the need for the digital transformation of the national economy in the Address to the Federal Assembly of the Russian Federation of December 1, 2016, and set the main focus on digitalization by Decree No. 203 of May 9, 2017, that approved the Strategy of the Development of the Information Society in the Russian Federation for 2017 to 2030 defining the goals, tasks and measures of the implementation of the internal and external policy of the Russian Federation in the application of information and communications technologies aimed at the information society development, establishment of the national digital economy, protection of national interests and implementation of strategic national priorities.

Decree of the President of the Russian Federation No. 204 of May 7, 2018 On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period up to 2024, in its turn, singled out transformation of the energy infrastructure by deployment of digital technologies and platform solutions as one of the priority tasks.

The Program The Digital Economy of the Russian Federation was approved by Resolution of the Government of the Russian Federation No. 1632-r of July 28, 2017, and Presidium of the Council for the Strategic Development and National Projects under the President of the Russian Federation approved the Passport of the National Project The National Program The Digital Economy of the Russian Federation (minutes No. 7 of June 4, 2019).

Decree of the President of the Russian Federation No. 474 of July 21, 2020 On National Goals of the Development of the

Russian Federation for the Period up to 2030 raised the achievement of “digital maturity” of the key branches of the economy and the social sphere and public administration to the rank of the national goal.

The adoption of the main document of strategic planning in the FEC functioning and development sphere, the Energy Strategy of the Russian Federation for the Period up to 2035 is of importance for digitalization of the energy industry; the strategy points out that the accelerated transition (modernization leap) to more efficient, flexible and stable energy industry is impossible without the digital transformation and intellectualization of FEC industries, that should result in the new quality of all processes in the energy industry and acquisition of new rights and opportunities by consumers of products and services of FEC industries.

The Energy Strategy of Russia stipulates two steps of the digital transformation of FEC.

Step one stipulates the creation of conditions for the elaboration and development of digital services and solutions in FEC industries and the implementation of a complex of measures that includes, inter alia, the establishment of the system of management, coordination and monitoring of the digital transformation, the development and amendment of laws of the Russian Federation, the regulatory framework and the technical standards base for the development and deployment of digital technologies in industries of the fuel and energy complex, selection and implementation of pilot projects aimed at the deployment thereof including those in the sphere of public administration and control and supervisory activities in the energy industry. Step two stipulates the adoption of measures of large-scale distribution of efficient digital technologies in FEC industries based on an analysis of pilot project results.

Resolution of the Government of the Russian Federation No. 1447-r of June 1, 2021, approved the Action Plan for the Implementation of the Energy Strategy

of the Russian Federation for the Period up to 2035 that details FEC digital transformation events.

It is important to note that the Ministry of Energy of Russia with the active involvement of FEC companies developed The Digital Energy Industry departmental project aimed at a transformation of the energy infrastructure of the Russian Federation by deployment of digital technologies and platform solutions to raise its efficiency and security.

The indicated project stipulates a number of events for the digital transformation of the energy industry until 2024; the events are divided into four areas, the three of which are digitalization of separate FEC industries: electrical energy industry, oil and gas complex and coal industry. The fourth area is common for all FEC industries and primarily stipulates the creation of platforms and services to ensure digitalization of public administration and control and supervisory activities in FEC.

Besides, in order to coordinate and monitor the transformation, the leading FEC companies with the involvement of the Ministry of Energy of Russia in 2019 created competence centers in the electrical energy industry, oil and gas industry and coal industry to determine directions of and priority technologies for FEC industries, implementation barriers and develop “roadmaps” of the digital development of FEC industries.

For example, several leading systemic companies in the electrical energy industry (Rosseti, PJSC, SO UES, JSC, etc.) established The Digital Energy Industry Association aimed at facilitation of the implementation of the Digital Transformation Strategy of the industry.

Thus, we can sum up that the current technical re-equipment and the digital transformation of FEC of Russia are in full swing corresponding to the plan set by strategic planning documents.

Today, the legislator continues comprehensive elaboration of the regulatory

framework for the development and functioning of the digital economy of Russia.

In particular, on September 9, 2021, the Government of the Russian Federation approved the second package of support measures for the national IT sphere (the “roadmap”) that stipulates additional incentives for the development of the IT industry in order to raise the demand for national IT solutions, ensure the accelerated digital transformation of branches of the economy and the social sphere, create comfortable conditions for the IT business in Russia and that determines, inter alia, the measures for the introduction of industrial digital standards defining the required level of digitalization of the respective processes and establishing the preemptive use of Russian software and hardware for such processes, lifting of legal restrictions and barriers for the use of modern digital solutions.

Some occasional amendments are also introduced in the energy laws to deploy digital technologies in various FEC industries. For example, there was adopted Federal Law No. 471-FZ of December 27, 2019 On Amendments to the Federal Law On the Electrical Energy Industry in the Development of Microgeneration.

A positive example of the adoption of an innovative regulation in the electrical energy industry in terms of the use of digital technologies is Resolution of the Government of the Russian Federation No. 320 of March 21, 2020 On Amendments to Some Acts of the Government of the Russian Federation on the Issues of Functioning of Active Energy Complexes that enshrined the legal framework for the implementation of pilot digital projects aimed at the creation of active energy complexes.

An active energy complex (microgrid) is an energy system attributable to a single balance sheet, that can include different energy equipment types (power receiving, generating, accumulating and other energy equipment) managed by a company

or an individual to carry out business activities; microgrid represents a new model of energy supply to industrial consumer groups based on distributed generation [6].

Problems of the legal regulation of FEC digitalization are quite numerous, many issues deserve increased attention, including in order to be a subject of complex legal research. It seems reasonable to single out just a couple of relevant problems in the indicated sphere as it is impossible to review all problems in detail within this study.

The first problem is intrinsic to the entire system of the legal regulation of the digital economy development in Russia.

Despite numerous strategic planning documents of various levels in the digitalization sphere, there are no doctrinal approaches towards the legal regulation of digital technologies developed by the scientific community.

Digital technologies radically change the way of living of the humanity, act as a destabilization factor for the stability of social and economic relations, facilitate transformation of political and social institutions, revision of sociocultural values.

It is logical that at the complex development of laws in the digital economy, the state should stipulate anti-crisis mechanisms, means of legal and social protection of citizens against negative effects of the digital transformation including income reduction and unemployment.

The current domestic laws lack the detailed development of the issues of the man's personal security in the use of digital technologies, protection of rights and legal interests, the mechanisms of compensation for the caused damage are not defined on the due level.

Moral and ethical issues of the use of biometric data, artificial intelligence and other digital technologies still remain unsolved.

It is still debatable who is going to make the key decision, for example, in the energy system management, a human or artificial intelligence [7]?

In some cases, the legislator "lags behind" the rapid development of digital technologies.

For example, the Federal Law On Digital Financial Assets, Digital Currency and on Amendments to Separate Legal Acts of the Russian Federation was adopted only in July 2020, and before that, parties to cryptocurrency transactions were acting at their own risk in the conditions of legal vacuum.

In this regard, the supported opinion is that the establishment of a new regulatory environment ensuring a favorable legal regime for the origination and development of modern technologies and the digital economy should primarily stipulate the creation of a continuous mechanism for management of changes and competencies in the regulation of the digital energy industry and the establishment of the comprehensive legal regulation of relations in this sphere including incentives for the use of modern information technology [8].

Speaking of the FEC digitalization, we need to finally move from the development and adoption of various program documents directly to the development and amendment of industry-specific laws of the Russian Federation, the regulatory framework and the technical standards base for the development and deployment of digital technologies in FEC.

It seems reasonable to develop a well-defined conceptual framework for FEC digitalization in the laws, enshrine well-defined goals and tasks, determine incentive mechanisms for innovations and the development of digital technologies, stipulate incentives for the use of domestic IT equipment in the digital electrical grid structure and the procedure for certification of domestic and foreign equipment.

The need for the introduction of digitalization promotion measures has been noted by N.G. Shulginov, Minister of Energy of the Russian Federation, who believed it to be reasonable to provide tax incentives or directly co-finance the efficient digitalization of FEC companies deploying domestic software that gives a significant increase in

workforce productivity and partly subsidize the interest rate on loans aimed at the deployment of domestic digital technologies in FEC companies. Besides, he has acknowledged the need to assist companies entering foreign markets to export digital products in the FEC sphere [9].

As noted by A.L. Teksler, First Deputy of the Minister of Energy, an important role of the state in the digital transformation of the electrical energy industry lies in the establishment of minimal requirements for digital solutions, ensuring flexibility of the regulatory policy and cybersecurity of deployed solutions [10].

In this case, the state regulator undoubtedly needs to stay within well-defined borders in the development of the technical standards base and objectively assess when the imposition of excess requirements for digital products will create administrative barriers on the way towards digitalization, and when softening of such requirements can give rise to an energy security threat.

Thus, the state policy should be aimed at the creation of “digital innovation ecosystems”, stimulation and promotion of non-profit-making organizations incorporated to facilitate the FEC digitalization process in the conditions of state support. ■

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