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Article

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Article

The Challenge of the Energy Sector of Russia during the 2020 COVID-19 Pandemic through the Example of the Republic of Tatarstan: Discussion on the Change of Open Innovation in the Energy Sector

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Abstract: Today the world economy is handling an economic crisis caused by the pandemic of a new coronavirus infection (COVID-19), announced by the WHO, as well as by fluctuations in the international energy market and by the development of “green energy”. The crisis, named the “2020 crisis”, is notable for the divergence of the sectoral dynamics of development, with a declining development trend in some industries and the rapid growth of others. The crisis is etymologically relevant to the energy sector, a sector which is important for the survival and specialization of the Russian Federation. This research is aimed at describing the status and highlighting the socioeconomic effects, constraints (economic and social risks), and “growth points” of the energy sector in the modern realities of the 2020 crisis. **Methods.** The method of in-depth interview was used. The need for studying expert opinion is based on the fundamental principles of *implementation research*, according to which the success of state sectoral policy depends on its perception and support by stakeholders. Top managers of energy enterprises acted as the experts (N = 10). The interviews were conducted in April 2020. The method of incremental approximation and coding (open and axial) were used for a high-quality discourse analysis. **Results.** The conducted study revealed divergence of sectoral dynamics of energy consumption, which is a translation of the immanent features of the 2020 crisis into the energy sector. The detected constraints are reserved development prerequisites of “green energy” and reduced investments in development programs. The potential “growth points” include intensified digitalization of the energy sector and the need for institutional changes in taxation in the energy sector, recognized by experts.

Keywords: energy economy; state policy during the “2020 crisis”; anti-crisis actions of companies

1. Introduction

Today the world economy is handling an economic crisis caused by the pandemic of a new coronavirus infection (COVID-19), announced by the WHO, as well as by fluctuations in the international energy market and by the development of “green energy” [1]. The crisis has been named the “2020 crisis”.

The reduced economic activity of the population and economic agents in Russia and abroad, caused by the introduced “self-isolation” regime, has had an impact primarily on the energy sector. According to the official statistics, in the first 25 days of the self-isolation regime, the average reduction in the Unified Energy System (UES) of Russia amounted to 3% [2]. The reduced energy consumption is observed due to the biggest decrease in the growth rates of energy consumption in such industries as mechanical engineering (−23.5%), railway transportation (about −7.2%), and metallurgy (−4%). At the same time, the demand for energy on the part of industrial enterprises is falling while the demand on the part of the population is growing. In the spatial aspect, the negative growth rates of energy consumption are observed in the Unified Energy System (UES) of the mid-Volga Region. This results from the sectoral structure of production—there are many automobile production facilities in this region, which have had to be put on hold [3].

In Russia the 2020 crisis is following periods of permanent stagnation (years 2013–2014; 2017–2019) and recessions in economic development (years 2015–2016), diagnosed by the leading representatives of the national economic school. These were accompanied by the negative growth rates of investments in GDP and a record reduction by 12–15% regarding the 2008–2009 crisis of the main indicators of the population’s earnings and consumption, including real earnings, retail commodity turnover and ultimate consumption of households [4]. To be fair, the described period of stagnation and economic decline was accompanied by a positive growth in electric power generation in Russia ($T_{\text{gen}}^{2019/2013} = +4.07\%$) [5].

The Russian Federation (RF) specializes in the energy sector, which is an important industry supporting survival and affecting the development of the economy. According to the RF Ministry of Energy, the contribution of the Fuel and Energy Complex (FEC) in Russia’s economy is described by the following facts for the year 2019: the share of the FEC in the export receipts of the RF budget was 62.1%, the share of the FEC in the GDP of Russia was 24.3%, the share of oil and gas receipts in the RF budget was 39.3%, and the non-production output (the share of the employed in the FEC) was 2.5 million people [5].

As shown above, most evaluations of the status of the energy sector are based on providing quantitative data on the changing dynamics of energy consumption in the RF in the spatial and sectoral aspects during the crisis. Considering the main principles of implementation research, success in pursuing the state sectoral policy and facing various challenges and threats depends on the stakeholders’ perception, which entails the need for expert evaluations by the leaders—top managers—in the industry.

Will the energy sector be able to become a “growth point” of the Russian economy? What is the status of the energy sector during the 2020 crisis? What anti-crisis measures are taken by the enterprises operating in this sector? These are acute and controversial issues, which make the research relevant and precondition the goal set.

The presented research is aimed at describing the status and revealing the socioeconomic effects, constraints (economic and social risks), and “growth points” of the energy sector in the modern realities of the 2020 crisis. The used method was in-depth interview of the top-managers of the energy enterprises, who are decision-makers, opinion leaders and drivers of transformations in the energy sector.

It is well known that during a crisis, both turbulence and uncertainty grow, so evaluating the socioeconomic challenges of the 2020 crisis is important for the RF energy sector. The obtained results are significant and possess scientific novelty for proper and efficient responses during the development and implementation of the relevant measures aimed at minimizing the risks.

This paper is structured in the following way. Section 2 describes the methodological basis of the research. Referring to the conclusions of the literature review, the characteristics to be studied are highlighted. Then a detailed description of the conducted research stages is presented, and the main methodology tool is described. The next section contains the main research results. Finally, the obtained results are discussed in the context of other research studies (Section 4). Appendix A presents “Interview guide for the executives of energy sector enterprises”.

2. Materials and Methods

2.1. Brief Literature Review

Before the 2020 crisis the issues of energy development were considered by Russian economists from various perspectives: from a popular problem of spreading renewable sources of energy to the general questions of developing the energy complex, including on the territory of the Arctic zone [6–17].

The distinctive feature of the 2020 crisis, highlighted by the professional community of economists in the RF, is the divergence of the sectoral dynamics of development, described by a declining trend of a majority of the service industry and a simultaneous growth of other industries—pharmaceuticals, digital technologies, which are highlighted as “growth points” in the future [18–20].

The RF Minister of Energy A. Novak in a public discourse emphasized the positioning of the current turbulent stage of the Russian energy sector, caused by the 2020 crisis, as a “period when new opportunities for sectoral development are growing due to digital transformation, production rates of high limit products are scaling, partnership cooperation is developing on the international market” [3].

It should be noted that as early as in 2016 the world energy scenario “Modern Jazz” built by the World Energy Council (WEC) until 2060 implied an active impact of digital technologies on the world energy market. The trend of digitalization acceleration of the energy sector was noted by the leaders of the energy sector and other sectors of the economy in a series of in-depth interviews (N = 18), conducted in 2019 by the WEC [21].

In the RF the processes of industry digitalization were initiated long before the 2020 crisis. Thus in 2017 the RF President approved the national program “Digital Economy of the RF” with due regard to the priorities of which the RF Ministry of Energy launched the agency project “Digital Energy” aimed at transforming the FEC industries [22].

The representatives of the economics and state management school of Moscow State University view the crisis as a period when new areas and opportunities for prospective development are arising. In particular, according to the theory of cycles, the 2020 crisis is positioned as an evolutionary form leading to a change of the technology paradigm [23,24].

International researchers of the energy policy [25–28] identify the modern development stage of the industry as the “third technology revolution”, which envisages decarbonization of the energy system, i.e., transition from high-carbon raw materials as an energy source [29–35] to renewable sources of energy (RSE). This will help to address the problems both immanent to the energy sector (ageing infrastructure, emissions, etc.), and of external etymology (climate change, etc.) to achieve the goals of sustainable development of the UN established in the world consensus.

The study [36] shows that Germany, Denmark, Poland, the USA and even less developed communities of Africa and South Asia have been able to use RSE more extensively due to the change in the positioning of stakeholders (private persons, energy cooperatives, small companies, local communities) from “passive energy users” to investors in RSE, and, thus, “active energy producers and consumers”. These practices are forming a new type of energy policy called “energy democracy” [37–44].

In the Russian Federation, according to the results of analytical elaborations on evaluating the efficiency of the Russian electric power market, conducted by the Council of Energy Producers, the share of RSE in the structure of electric power generation amounts to 0.7%. The contribution made by energy companies in achieving the goals of sustainable development of the UN implies their voluntary acceptance and implementation in corporate social responsibility [45].

During the 2020 crisis the pandemic of a new coronavirus infection (COVID-19) has become a challenge, causing a “tragic dilemma” of the state policy in many countries between, on one hand, introducing the regime of “strict quarantine” to ease the burden on the health care system, reduce the death rate, and, on the other hand, maintaining the regime of “economic activity” to help the population survive. Some experts believe that introducing the regime of “strict quarantine” is “an inadequately strong reaction of the government—replacement of the undesirable agenda (problems

of social inequality and climate change)” and, simultaneously, bring to the front the polemic on forming the priorities of the state anti-crisis policy [18].

Considering the experience of foreign countries (France, Italy, the UK, the USA, China), the top priorities of the state anti-crisis policy include direct subsidizing of costs, tax incentives and loans from taxes paid in previous periods, concessional lending for entrepreneurial structures of large energy consumers; introducing targeted social support of the population [46]. It should be noted that despite the limited economic activity during the 2020 crisis, many entrepreneurial structures in the RF subjects bear social liabilities to their employees and keep on implementing corporate social responsibility to the society through developing cooperation with non-commercial organizations and providing help to target groups of the population in the area where their production facilities are located [47].

Based on the above-mentioned problems and the literature review, the following characteristics of the energy sector during the 2020 crisis are defined:

- The changes and challenges in the energy sector, the study of which is aimed at revealing the socioeconomic effects and constraints of the energy sector during the crisis.
- The anti-crisis state policy and anti-crisis actions taken at the micro level, forming the demands by the areas and measures of the state support provided to the industry during the 2020 crisis.
- The prospects of more active development of “green energy” and “energy digitalization” as an institutional environment of technological solutions—“growth points” of the mid-term and long-term development of the sector.

2.2. Methods

The object of research is the energy sector of the Republic of Tatarstan (RT), which was chosen with due consideration of its characteristics, spatial constraints and information availability. The case of the RT has analytical prospects as firstly, it is part of the Unified Power System (UPS) of the Mid-Volga Region, where, as noted above, the biggest decline in electric power consumption in the RF during the 2020 crisis is being observed. Secondly, the RT is characterized by the competitiveness and sustainable development of the energy sector. According to the RT Ministry of Industry and Trade, the regional energy system demonstrates the following time dynamics: an increasing growth of reliable and safe electrical power supplied to consumers; modernization of production facilities of the energy system and introduction of new capacities; development of alternative energy using RES, in particular, those based on wind energy [48].

The specification of the RT energy complex structure is presented in Table 1, where the following notations are used: TPP—thermal power plant, HPP- hydro power plant.

Table 1. Leading enterprises of the energy sector in the Republic of Tatarstan [48].

Name of Enterprise	Kind of Activity	Divisions
Tatenergo JSC	Energy generation	3 TPP, 1 regional power station, 1 HPP,—Kazan, Naberezhnye Chelny and Nizhnekamsk heating network
TGK-16 JSC	Energy generation as part of TAIF Group	Kazan TPP-3 and Nizhnekamsk TPP (PTK-1)
Nizhnekamsk TPP LLC	Energy generation	Subsidiary of PAO “Tatneft”
Grid company JSC	Power transmission and technological connection	-
Tatenergosbyt JSC	Power distribution	-
Tatarstan Regional Dispatching Office, the Branch of System Operator of the UPS JSC (RDO of Tatarstan)	Dispatching management of electrical power objects on the territory of the Republic of Tatarstan	-
The group of companies INVENT	Engineering activity	TATCABLE LLC, INVENT-Electro LLC Tatheatinsulation
Management Company “Integrated EnergoDevelopment—Holding” (IED—Holding)	Engineering activity	-

The research study was conducted by a method of in-depth interview to obtain expert evaluation of the issues described above and related to socioeconomic effects and constraints, as well as growth points of the energy sector during the 2020 crisis. This method was proven to be a qualitative research technique providing the opportunity to capture rich, descriptive data about how people think and behave [49–51].

At the first stage of the research, an interview guide (Appendix A) was developed to study the highlighted characteristics of the energy sector during the 2020 crisis: the changes occurring in the energy sector and the challenges it faces are measured in the first set of questions. Anti-crisis state policy and anti-crisis actions to be taken at the micro level are diagnosed in the second set of questions. The prospects of more active development of “green energy” and “energy digitalization” are included in the third set of questions. The n-stage sampling was chosen ($N = 10$). The informants were top-managers of generation, distribution and engineering enterprises belonging to the RT energy complex including heads of two metropolitan company divisions. The respondents are the opinion leaders that form the energy policy in the region and drive the transformations and changes in managing the activities of energy enterprises.

At the second stage all interviews were collected according to the specified sample ($N = 10$). All interviews from beginning to end were recorded with a digital voice recorder incorporated into a mobile phone without interrupting the recording.

At the third stage, the interviews were transcribed and printed out as texts. For a high-quality discourse analysis of texts, a method of incremental approximation was used: creating the structure of assumptions and concepts; their approbation, which allowed us to see to which extent these assumptions correspond to the evidence and reveal the characteristics of data. Open coding (selecting the topics, to which codes are assigned, creating a list of topics and analytical memos) and axial coding (organizing a set of primary concepts, reviewing and verifying primary codes, establishing the key concepts of the analysis) were carried out.

3. Results

The specification of the generalized data obtained as a result of the interviews presented according to the principle of relevance (low or high frequencies of mention) and the degree to which the opinions of the interviewed experts coincided are presented in Table 2.

Table 2. Analyzing experts’ opinions—generalized data of the in-depth interviews.

Statements that Are Mentioned Most Frequently in the Interviews and Are the Most Controversial	Statements that Are Mentioned Most Frequently in the Interviews and Are the Least Controversial
<ul style="list-style-type: none"> - Perceiving the 2020 crisis - Energy sector digitalization as a “growth point” in the 2020 crisis - Evaluating the current development level of the energy sector digitalization 	<ul style="list-style-type: none"> - Trends and changes in the energy sector during the pandemic - The challenges of the 2020 crisis in the energy sector - Socially oriented behavior of enterprises after the quarantine regime was claimed - Reducing development costs and adjusting investment programs with anti-crisis actions at the micro level - Selectiveness in the anti-crisis state policy, including change in taxation (tax incentives, grace for payment), subsidies, etc.
Statements that Are Mentioned Least Frequently in the Interviews and Are the Most Controversial	Statements that Are Mentioned Least Frequently in the Interviews and Are the Least Controversial
Answering this question as an executive officer, I do not believe I am entitled to evaluate the policy pursued by the state	“Green energy” is a subsidized area focused on prospective development of technology and ensuring high-quality technological leap with a change of technological paradigm.

Below are the detailed comments and explanations of the interviews, which emphasise the realities of the energy sector during the 2020 crisis. Surely, the accumulated opinion data can be expanded further and this interview can be repeated in the post-peak period of the pandemic as there is still a lot

of uncertainty about the extent of the economic impact of the pandemic. However, this study is focused on the pre-peak assessment of the energy sector. The interviewed experts perceive and render the 2020 crisis in a different manner: from philosophical interpretation of the crisis as “a challenge for the world to change”, through an instrumental position to the crisis as a way to diagnose the development level of the industry (“the 2020 crisis is a challenge for checking the level of advancement of the energy sector in the RF”) to restrictive views on the crisis like “any crisis is a demand for economy”. The experts are solidary in claiming that despite the 2020 crisis, the energy enterprises of the region are complying with all target indicators of the financial and economic activities.

During the quarantine regime, electric power consumption is falling, which has entailed a chain reaction resulting in reduced generation and a lower price of electricity. At the same time, electricity consumption demonstrates various trends in wholesale and consumer market segments. Thus, the general trend for industrial consumption is declining, with some industries slightly increasing their consumption: the divergence of sectoral dynamics of energy consumption is a translation of the immanent features of the 2020 crisis in the energy sector. During the self-isolation regime, the electricity consumption by the population is growing, but the reduced earnings of the citizens and social guarantees introduced by the RF Government (collecting fines and penalties in case of overdue payment or incomplete payment for municipal services is stopped, stopping municipal services to nonpayers is prohibited) will have an effect on growing accounts receivable of the population in short-term prospects. [52] At the same time, the conditions of the 2020 crisis have not influenced the consumption, generation and transfer of heat energy. The heat energy market downfall occurred primarily due to the climate conditions—the average outdoor temperature was anomalously high in the heating season of the year 2019 [2,53].

The introduced “quarantine regime” called for making urgent decisions concerning organizational matters and transforming the operational activity of all the energy enterprises in the region: the staff (engineering and technical employees) had to be transferred to a remote working regime, biologically safe conditions had to be created at workplaces (the staff had to be provided with individual protective gear, maximal social distancing had to be ensured, the day work schedule had to be changed, etc.).

The experts relate the challenges of the 2020 crisis that the energy enterprises face to the deficit of financial means caused by the “payment crisis” and growing accounts receivable; to the risks of constraining renovation programs; to sequestering the investment program; and to growing payments under contracts in foreign currency.

The challenges of the 2020 crisis can be considered as “a demand for economy” and the anti-crisis actions implemented by the enterprises include cutting of all types of development costs, including reconsideration of investment programs, reduction of the staff training programs (apart from mandatory ones), decreasing of non-operational costs. Along with that, anti-crisis measures cover the areas characterizing social responsibility of an energy enterprise in the region, such as: providing health care and ensuring a stable salary level of the employees, rendering high quality services to the consumers on time.

The experts, being top managers of the energy enterprises in the region, are very reserved about their opinions concerning the state policy during the 2020 crisis and evade giving definitive answers. At the same time, they express a solidary position concerning the need for selective state support of enterprises, including those in the energy sector. Within the scope of the anti-crisis state policy, demand has formed for: tax incentives (the costs of companies related to providing protection from the coronavirus infection—protective gear, ensuring social distancing at work—are included in the composition of those ones that are not subject to taxation), prolongation of excise duties on fuel oil for TPPs; subsidies for energy companies and developers to reimburse costs on the paid interest on loans and credits taken from Russian credit organizations to implement large investment projects, well-thought out support of counteragents’ liquidity, aimed at ensuring solvent discipline for energy resources provided, minimizing the possible corrupt practice on the part of some consumers.

In the summer of 2020, the conditions, first of all, on the international energy market are characterized by a falling global demand and plummeting prices on energy resources, and, secondly, by a reduction in development programs due to the 2020 crisis. That is why all the experts doubt the prospects of more active development of “green energy” in a mid-term period, although they emphasize it is urgent and important that the traditional sources of energy should be replaced with alternative renewable sources.

The issue concerning “energy sector digitalization” as a growth point during the 2020 crisis is approached differently, even though there are no doubts that digitalization is getting more and more important in the operations (organizing distance working of employees during the self-isolation regime, electronic document turnover, stronger digital control), while with the reduced development programs, the digitalization of production activities is “frozen” until better times. The level of digitalization in the energy sector is assessed differently from an “infant” to “good average level”, the same as prospects that vary from pessimistic projections *“I wouldn’t say that the 2020 crisis gave momentum for active development of digitalization since it is a goal-oriented and complex process”* to sharing the statements announced by the RF Minister of Energy and translated in the public discourse such as *“no doubt that digitalization in all areas will gain additional momentum for development”*.

4. Discussion: The Change of Open Innovation in the Energy Sector of the Republic of Tatarstan

The expert evaluations show a decisive attitude and readiness of the regional leaders of the energy sector to overcome the challenges of the 2020 crisis, which are considered to be less destructive than the climate conditions in the winter 2019. The energy enterprises of the considered region demonstrated that they can flexibly and promptly adapt all types of activities to the changing conditions of the external environment within a short time and stick to the principles of corporate social responsibility for the enterprises’ employees and consumers. Despite the translated social responsibility of the energy companies within the anti-crisis corporate actions, the closed position of the experts regarding their assessment of the state policy is inconsistent with the principles of transparency and accountability to the society that accompany corporate social responsibility. Our previous research studies highlighted the need for developing an external form of corporate social responsibility of the region’s energy companies in building more active interactions with the society [45] and using the open innovation approaches [54–59].

Among the socioeconomic effects and constraints of the 2020 crisis, mentioned by the experts as a challenge and, at the same time, an action of the anti-crisis policy pursued by enterprises, a destructive potential is demonstrated by the reduced funding of the investment development programs. Thus the results of the analytical study conducted by the Council of Energy Producers in April 2020 show that investing in the electric power industry results in a bigger growth in the GDP than reducing electricity prices for industrial enterprises. In particular, according to the projections within this research, which consider the conditions of the 2020 crisis, “investing in the electric power industry on the horizon of year 2030 would bring about a 2 point increment in the GDP rather than if all the money saved from reduced prices of electricity was used by the production industry for investments” [46]. Considering the above results of the research, reducing investments in the development programs by the energy enterprises as an anti-crisis action is a controversial issue and should be positioned not as an anti-crisis action, but rather as a constraint caused by the 2020 crisis. We believe that with due regard of the proven contribution that investments in the electric power industry make towards an increase in the GDP, keeping investing in the development programs of the region’s energy enterprises could be a growth point in the crisis conditions. This situation calls for drastic changes in the legislation as part of the actions taken within the anti-crisis state policy.

The expert evaluations on the development prospects of renewable sources of energy as part of “green energy” in the Russian Federation correspond to the research results on RSE conducted by the Council of Energy Producers [46]. Restricting the development of “green energy” in the RF, which is aggravating in the time of the 2020 crisis, is a limiting factor for the change of the technological

paradigm in the sector. It causes divergence between the development vectors of the Russian energy sector and the targets of the promising world development. The main factors limiting the development of RSE in the RF include high accessibility of cheap natural resources; priorities in the energy policy aimed at modernizing heat capacities; lack of environmental requirements to reduce CO₂ emissions; low competitiveness of RSE by the levelized cost of energy (LCOE).

It is obvious that the Russian Federation differs from the world community in terms of the practices applied for using RSE and the intensity of developed “green energy” [60–64]. In European countries, where it is scientifically and practically proven [1] that there is a direct dependence between the contribution of the consumed renewable sources of energy and the rising trends of economic growth, however, research also confirms that developing “green energy” is not enough to effectively reduce CO₂ emissions, and changes have to be introduced in the legislation aimed at decreasing the emissions. “Energy democracy” is an active driver of such changes in the legislation, which helps to develop the “green energy” in European countries. In Russia the key stakeholder promoting RSE is the state. There is lack of social activity and civil involvement in dealing with this issue, which is an indicator of the existing level of stability in the non-commercial sector and civil self-organization, studied in detail by one of the authors of this paper within a regional context [65].

5. Conclusions

Nowadays the world economy is facing an economic crisis caused by the pandemic, as well as by fluctuations in the international energy market and by the development of “green economy”, which has been called the 2020 crisis. The presented research is aimed at revealing the socioeconomic effects, constraints (economic and social risks), and growth points of the energy sector in the modern realities of the 2020 crisis. The chosen case was the energy sector of the Republic of Tatarstan (Russian Federation). The used method was in-depth interview of the top-managers of the energy enterprises, who are decision-makers, opinion leaders and drivers of transformations in the sector. The conducted study revealed divergence of sectoral dynamics of energy consumption, which is a translation of the immanent features of the 2020 crisis into the energy sector. The detected constraints are reserved development prerequisites of “green energy” and reduced investments in development programs. The potential “growth points” include intensified digitalization of the energy sector and the need for institutional changes in taxation in the energy sector, recognized by experts.

The presented study covers a broad number of issues raised in the energy sector during the 2020 crisis, but there is still a lot of uncertainty about the extent of the economic impact of the pandemic. A promising area for further research is a benchmark analysis of the results obtained for the object of the current study (the Republic of Tatarstan) and expert evaluations collected in other Russian Federation subjects, involved in the Unified Power System of the Mid-Volga, which can be an independent subject of further research.

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Appendix A. Interview Guide for the Executives of Energy Sector Enterprises

Today the world economy is facing an economic crisis caused by the pandemic, as well as by fluctuations in the international energy market and by the development of “green economy”, which has been called the 2020 crisis. The 2020 crisis is different in terms of sectoral dynamics from the crises in 1998, 2009, 2014, because now some industries are experiencing a decline in production volumes,

while some others are growing, for example, the information technology industry. The Department of Economics and Production Engineering of Kazan State Power Engineering University is carrying out an initiative investigation “The status of the energy sector during the 2020 crisis: challenges, anti-crisis actions, “growth point” as viewed by experts”. We would like to learn about your expert opinion on a number of questions.

Would you mind telling us about yourself? Have you been working in the energy sector for a long time (could you specify it)? How long have you been working as a manager? What kind of experience do you have as an executive? How long have you been working in your current position? Are you interested in working as an executive and do you feel job satisfaction?

Let us discuss what is going on in the industry as a whole today and in the enterprise that you manage.

- How is the general quarantine affecting energy consumption? What is happening to the market?
- What impact does the self-isolating regime have on the volumes consumed by the population? What differences are there today in heat and electric power consumption by the population?
- What is going on with industrial consumption? In your opinion, which industries are suffering from recession?
- What challenges (problems) has your enterprise been facing due to the 2020 crisis?
- What changes occurred in the organization and performance of your enterprise due to the quarantine regime?
- Do you find it necessary to maintain economic activity of economic agents in the time of pandemic or do you share the position of introducing a strict quarantine to reduce the death rate?
- Does the quarantine regime or economic activity regime suit the Republic of Tatarstan? What about the energy sector and your enterprise?
- There is an opinion that the state policy pursued during the 2020 crisis is an inadequately strong reaction of the government aimed at replacing the undesirable agenda (problems of social inequality and climate change/green economy): how do you appraise this position? Do you understand the ideology of the state decisions taken today? Do you find them appropriate?

Let us discuss the anti-crisis policy and actions taken in today's conditions.

- What anti-crisis policy should the government follow, including the priorities for the energy sector?
- There is a suggestion in the public discourse that loans should be granted to enterprises in declining industries from the taxes they paid in 2019. What is your attitude towards this suggestion? Is it necessary and what will it give the energy sector?
- What anti-crisis actions are being taken in your enterprise at the moment?

Let us discuss the “growth points” in order to overcome the 2020 crisis of the energy sector. In 2017 the RF President approved the national program “The Digital Economy of the RF”, according to the priorities of which the Ministry of Energy formed the agency project “Digital Energy” aimed at transforming, primarily, the sectors of the FEC.

- How do you appraise the current level of digitalization in the energy sector and in your enterprise and what growth points can you highlight?
- What prospects are offered with active development of digitalization initiated by the 2020 crisis for the energy sector as a whole and in your enterprise?
- Will the trend of active development of green energy continue in view of new economic realities?

References

1. Piłatowska, M.; Geise, A.; Włodarczyk, A. The Effect of Renewable and Nuclear Energy Consumption on Decoupling Economic Growth from CO₂ Emissions in Spain. *Energies* **2020**, *13*, 2124. [[CrossRef](#)]

2. Electricity Consumption in the UES of Russia in April 2020 Decreased by 2.9% Compared with April 2019. Press Release of the Unified Energy System (UES) of Russia. Available online: https://www.so-ups.ru/index.php?id=press_release_view&tx_ttnews%5Btt_news%5D=16053&cHash=1b09391b96 (accessed on 31 July 2020).
3. Russian Fuel and Energy Complex: The Anti-Virus Program. Available online: <https://energypolicy.ru/?p=3846> (accessed on 28 April 2020).
4. Aganbegyan, A.G. On immediate actions to reinvigorate social and economic growth. *Stud. Russ. Econ. Dev.* **2019**, *30*, 3–15. [CrossRef]
5. Statistics. Available online: <https://minenergo.gov.ru/activity/statistic> (accessed on 28 April 2020).
6. Konnikov, E.A.; Osipova, K.V.; Yudina, N.A.; Korsak, E.P. The prevalence of renewable energy in the Russian energy market. In *E3S Web of Conferences*; EDP Sciences: Les Ulis, France, 2019; Volume 124.
7. Khabachev, L.D.; Plotkina, U.I.; Bugaeva, T.M.; Yurkova, A.B. Assessment of systemic effects from integration of distributed generation facilities into regional energy systems. In *Proceedings of the 6th International Conference on Reliability, Infocom Technologies and Optimization: Trends and Future Directions, ICRITO*, Noida, India, 20–22 September 2017; pp. 188–193.
8. Zaychenko, I.; Gutman, S.; Kalinina, O. Adjustment of Energy Strategy of Russia to Specific Nature of Far North: Analytic Hierarchy Process. In *Energy Management of Municipal Transportation Facilities and Transport*; Springer: Cham, Switzerland, 2017; pp. 453–462.
9. Sushko, O.P.; Kaznin, A.A.; Babkin, A.V.; Bogdanov, D.A. Economic Evaluation of the Information Security Levels Achieved by Electric Energy Providers in North Arctic Region. Available online: <https://iopscience.iop.org/article/10.1088/1755-1315/90/1/012074/meta> (accessed on 31 July 2020).
10. Balashova, E.S.; Gromova, E.A. Arctic shelf development as a driver of the progress of the Russian energy system. In *MATEC Web of Conferences*; EDP Sciences: Les Ulis, France, 2017.
11. Balashova, E.S.; Gromova, E.A. Norwegian experience as a promising measure for the Russian energy system development. *Int. J. Energy Econ. Policy* **2017**, *7*, 31–35.
12. Bekbaev, A.B.; Shakenov, K.B.; Titkov, V.V. Analysis of the roof of an autonomous house for efficient use of wind energy. *EAI Endorsed Trans. Energy Web* **2019**. [CrossRef]
13. Potekhin, V.V.; Pantyukhov, D.N.; Mikheev, D.V. Intelligent control algorithms in power industry. *EAI Endorsed Trans. Energy Web* **2017**, *3*. [CrossRef]
14. Bugaeva, T.M.; Novikova, O.V. Modern Methods of Urban Energy System Planning. Available online: https://www.researchgate.net/publication/335066700_Modern_Methods_of_Urban_Energy_System_Planning (accessed on 31 July 2020).
15. Kichigin, O.E.; Nadezhina, O.S.; Degtereva, V.A.; Ovsyanko, D. The concept of participation of fuel-energy companies in development of regional socio-economic systems. In *Proceedings of the 32nd International Business Information Management Association Conference*, Seville, Spain, 15–16 November 2018; pp. 6837–6842.
16. Balashova, E.; Gromova, E. Russian Industrial Sector in the Conditions of the Fourth Industrial Revolution. Available online: <https://iopscience.iop.org/article/10.1088/1757-899X/404/1/012014> (accessed on 31 July 2020).
17. Gromova, E.A. Agile management in the context of Russian industrial sector. In *MATEC Web of Conferences*; EDP Sciences: Les Ulis, France, 2018; Volume 178, p. 08007. [CrossRef]
18. Auzan, A. The Economy during and after the Pandemic: Lecture. Available online: <https://www.econ.msu.ru/COVID-19/Auzan/> (accessed on 9 April 2020).
19. Auzan, A. Strategy-2035: Preliminary Hypotheses. *J. New Econ. Assoc.* **2017**, *3*, 185–191. [CrossRef]
20. Auzan, A. Path dependence problem and possibilities of its overcoming. *World Econ. Int. Relations* **2017**, *61*, 96–105. [CrossRef]
21. WEC_Nuclear_Scenarios_Report_2019_Ru. Available online: https://rosatom.ru/upload/docs/WEC_Nuclear_Scenarios_Report_2019_Ru.pdf (accessed on 28 April 2020).
22. Departmental Project “Digital Energy” of the Ministry of Energy of the Russian. Available online: <https://minenergo.gov.ru/node/14559> (accessed on 28 April 2020).
23. S. Glaziev about the World Economic Crisis. Available online: <https://glazev.ru/articles/165-interv-ju/78794-s-glaz-ev-o-mirovom-jekonomicheskom-krizise> (accessed on 23 April 2020).
24. Glaziev, S.Y. National economy structures in the global economic development. *Econ. Math. Methods* **2016**, *52*, 3–30.

25. Stirling, A. Transforming power: Social science and the politics of energy choices. *Energy Res. Soc. Sci.* **2014**, *1*, 83–95. [CrossRef]
26. Shum, R.Y. Where constructivism meets resource constraints: The politics of oil, renewables, and a US energy transition. *Environ. Politics* **2015**, *24*, 382–400. [CrossRef]
27. Glasnovic, Z.; Margeta, K.; Premec, K. Could Key Engine, as a new open-source for RES technology development, start the third industrial revolution? *Renew. Sustain. Energy Rev.* **2016**, *57*, 1194–1209. [CrossRef]
28. Moroni, S.; Tricarico, L. Distributed energy production in a polycentric scenario: Policy reforms and community management. *J. Environ. Plan. Manag.* **2017**, *61*, 1973–1993. [CrossRef]
29. Choi, E.; Heshmati, A.; Cho, Y. *An Empirical Study of the Relationships between CO2 Emissions, Economic Growth and Openness*; IZA Discussion Paper, 5304; Institute of Labor Economics (IZA): Bonn, Germany, 2010.
30. Jorgenson, A.K.; Clark, B. Are the Economy and the Environment Decoupling? A Comparative International Study, 1960–2005. *Am. J. Sociol.* **2012**, *118*, 1–44. [CrossRef]
31. Mikayilov, J.I.; Hasanov, F.J.; Galeotti, M. Decoupling of CO2 emissions and GDP: A time-varying cointegration approach. *Ecol. Indic.* **2018**, *95*, 615–628. [CrossRef]
32. Piłatowska, M.; Włodarczyk, A. Decoupling Economic Growth From Carbon Dioxide Emissions in the EU Countries. *Montenegrin J. Econ.* **1992**, *14*, 7–26. [CrossRef]
33. Richmond, A.; Kaufmann, R.K. Is there a turning point in the relationship between income and energy use and/or carbon emissions? *Ecol. Econ.* **2006**, *56*, 176–189. [CrossRef]
34. Tapio, P. Towards a theory of decoupling: Degrees of decoupling in the EU and the case of road traffic in Finland between 1970 and 2001. *Transp. Policy* **2005**, *12*, 137–151. [CrossRef]
35. Vavrek, R.; Chovanova, J. Decoupling of Greenhouse Gas Emissions from Economic Growth in V4 Countries. *Procedia Econ. Financ.* **2016**, *39*, 526–533. [CrossRef]
36. Szulecki, K. Conceptualizing energy democracy. *Environ. Politics* **2017**, *27*, 21–41. [CrossRef]
37. Antal, A. The impact of U.S.A. and E.U. on environmental and energy democracy in Hungary. *Online J. Model. New Eur.* **2015**, *17*, 13–27.
38. Kunze, C.; Becker, D. *Energy Democracy in Europe. A Survey and Outlook*; Rosa-Luxemburg-Stiftung: Brussels, Belgium, 2014.
39. Miller, C.A.; Richter, J.; O’Leary, J. Socio-energy systems design: A policy framework for energy transitions. *Energy Res. Soc. Sci.* **2015**, *6*, 29–40. [CrossRef]
40. Morris, C.; Jungjohann, A. *Energy Democracy. Germanys Energiewende to Renewables*; Palgrave Macmillan: Basingstoke, UK, 2016.
41. Sovacool, B.K.; Blyth, P.L. Energy and environmental attitudes in the green state of Denmark: Implications for energy democracy, low carbon transitions, and energy literacy. *Environ. Sci. Policy* **2015**, *54*, 304–315. [CrossRef]
42. Sweeney, S.; Benton-Connell, K.; Skinner, L. *Power to the People. Toward Democratic Control of Electricity Generation*; The Worker Institute, Cornell University and Rosa Luxemburg Foundation: Ithaca, NY, USA, 2015.
43. Szwed, D.; Maciejewska, B. *Demokracja Energetyczna*; Green Institute: Warsaw, Poland, 2014.
44. Szulecki, K.; Ancygier, A.; Szwed, D. Energy Democratization? Societal Aspects of De-Carbonization in the German and Polish Energy Sectors. *SSRN Electron. J.* **2015**. [CrossRef]
45. Akhmetova, I.G.; Kulkova, V.Y. The formation of the social sphere of large entrepreneurial structures in the energy sector of the Republic of Tatarstan. *Russ. J. Ind. Econ.* **2020**, *13*, 108–114. [CrossRef]
46. Council of Energy Producers. *Evaluation of the Performance of the Electricity Market*; CPP Publishing: Moscow, Russia, 2020.
47. Time to Mobilize: How Large Russian Business Helps Fight COVID-19. Available online: <https://russian.rt.com/russia/article/733977-koronavirus-pomosch-biznes> (accessed on 20 April 2020).
48. Leading Enterprises of the Energy Complex. Available online: <https://mpt.tatarstan.ru/rus/vedushchie-predpriyatiya-40401.htm> (accessed on 3 May 2020).
49. Yun, J.J.; Zhao, X.; Park, K.; Shi, L. Sustainability Condition of Open Innovation: Dynamic Growth of Alibaba from SME to Large Enterprise. *Sustainability* **2020**, *12*, 4379. [CrossRef]
50. Yun, J.J.; Zhao, X.; Wu, J.-X.; Yi, J.C.; Park, K.; Jung, W.Y. Business Model, Open Innovation, and Sustainability in Car Sharing Industry—Comparing Three Economies. *Sustainability* **2020**, *12*, 1883. [CrossRef]

51. Yun, J.J.; Park, K.; Del Gaudio, G.; Della Corte, V. Open innovation ecosystems of restaurants: Geographical economics of successful restaurants from three cities. *Eur. Plan. Stud.* **2020**, 1–20. [CrossRef]
52. Will Putin's Anti-Crisis Program Help the Russian Economy Survive. How Much Does Coronavirus Control and Business Support Cost? RBC. 25 March. Available online: <https://www.rbc.ru/economics/25/03/2020/5e7b74039a794702166bdda0> (accessed on 12 April 2020).
53. Roshydromet. A report on climate features on the territory of the Russian Federation in 2019. In *Russian Federal Service for Hydrometeorology and Environmental Monitoring (ROSHYDROMET)*; Roshydromet: Moscow, Russia, 2020; ISBN 978-5-906099-58-7.
54. Henkel, J.; Schöberl, S.; Alexy, O. The emergence of openness: How and why firms adopt selective revealing in open innovation. *Res. Policy* **2014**, *43*, 879–890. [CrossRef]
55. Yun, J.J.; Zhao, X.; Jung, K.; Yigitcanlar, T. The Culture for Open Innovation Dynamics. *Sustainability* **2020**, *12*, 5076. [CrossRef]
56. Yun, J.J.; Kim, D.-C.; Yan, M.-R. Open Innovation Engineering—Preliminary Study on New Entrance of Technology to Market. *Electronics* **2020**, *9*, 791. [CrossRef]
57. Yun, J.J.; Won, D.; Park, K. Entrepreneurial cyclical dynamics of open innovation. *J. Evol. Econ.* **2018**, *28*, 1151–1174. [CrossRef]
58. Yun, J.J.; Liu, Z. Micro- and Macro-Dynamics of Open Innovation with a Quadruple-Helix Model. *Sustainability* **2019**, *11*, 3301. [CrossRef]
59. Felin, T.; Zenger, T.R. Closed or open innovation? Problem solving and the governance choice. *Res. Policy* **2014**, *43*, 914–925. [CrossRef]
60. Lin, R.; Gui, Y.; Xie, Z.; Liu, L. Green Governance and International Business Strategies of Emerging Economies' Multinational Enterprises: A Multiple-Case Study of Chinese Firms in Pollution-Intensive Industries. *Sustainability* **2019**, *11*, 1013. [CrossRef]
61. Yun, J.J.; Zhao, X.; Yigitcanlar, T.; Lee, D.; Ahn, H. Architectural Design and Open Innovation Symbiosis: Insights from Research Campuses, Manufacturing Systems, and Innovation Districts. *Sustainability* **2018**, *10*, 4495. [CrossRef]
62. Li, W.; Xu, J.; Zheng, M. Green Governance: New Perspective from Open Innovation. *Sustainability* **2018**, *10*, 3845. [CrossRef]
63. Kim, H.; Ahn, S.-J.; Jung, W.-S. Horizon scanning in policy research database with a probabilistic topic model. *Technol. Forecast. Soc. Chang.* **2019**, *146*, 588–594. [CrossRef]
64. Jung, K.; Lee, S.-H.; Workman, J.E. Exploring Neglected Aspects of Innovation Function: Public Motivation and Non-pecuniary Values. *Sci. Technol. Soc.* **2016**, *21*, 435–464. [CrossRef]
65. Kulkova, V. *Transformation of the Sustainability of Socially-Oriented Non-Profit Organizations in the Russian Federation*; Print-Service XXI Century: Kazan, Russia, 2016.



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