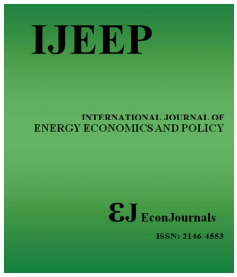

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Financial Stability of Electricity Companies in the Context of the Macroeconomic Instability and the COVID-19 Pandemic

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ABSTRACT

The electricity sector is an important part of any country's economy as it holds a cross-sectoral importance and produces a socially significant product for residents and industries. Economically, the sector is less vulnerable during world crises, receiving many variations of the state support. Both world electricity consumption and electricity generation have grown steadily over 2007-2019, with China, USA, India, Russia, Japan, Canada, South Korea, Germany, Brazil and France being world market leaders. This article analyzes the current state and the main trends of the development of the electricity industry as a whole and the financial stability of its companies. The United States and Russia, with similar functioning market models, were chosen to assess. The analysis of the financial stability of PJSC Inter RAO and Exelon Corp, two electricity giants in Russia and in the United States, has shown that they demonstrate stable results: Exelon Corp is more profitable while PJSC Inter RAO is less dependent on financing from creditors. Overall, electricity companies and the industry as a whole should not suffer much from the COVID-19 pandemic: many financial support measures have been developed in both countries, helping the sector to recover to 2019 levels by 2021.

Keywords: Energy Sector, Electricity Industry, Economic and Financial Crisis, Coronavirus Pandemic, Low-carbon Economy, Financial Stability
JEL Classifications: G30, L94, Q43, Q48

1. INTRODUCTION

The electricity market in the past 50 years has gone through significant changes: starting off as a completely regulated market with vertically integrated state-controlled electricity companies, for many countries it has transformed into one with many competitive aspects. In Russia, similar to the United States, the electricity market updated its legislative framework, which led to new regulative relationships and companies being divided into activity-specific businesses (Palamarchuk, 2016). This led to a significant increase in industry investments, resulting in positive economic outcomes for both countries.

It should be noted that the electricity sector is a branch of the Russian energy industry that provides the production, transmission, distribution and sale of electricity to consumers. At the same time the fuel and energy sector of Russia is one of the most potent in the world - it is the second in extraction of oil and gas, the third for total output of fuel and energy resources (Suslov et al., 2019). In addition, starting in 2014, we have seen the beginning of the digital transformation of the Russian energy sector (Chebotareva, 2021).

Previous research has shown that the electricity market – in terms of electricity consumption – has a positive effect on economic growth (Bass, 2018; Vasiliev, 2018). This fact highlights the importance for the state to support this market as one that is

closely tied with the commercial sector. What is more, it has been shown that along with a relationship with natural indicators, there is also significant correlation between important financial indicators of electric power companies and GDP growth (Kalugina et al., 2019). Keeping up a high level of financial stability of electricity companies should also be seen as a main priority on the government level as the electricity market is one with high market concentration (Kuzmin et al., 2019). A failure to do so could lead to market degradation in terms of competitiveness.

With industry forecasts predicting a growth of energy demand by 1.4% per year until 2035, it is also important for countries to consider expanding energy supply through developing renewable energy sources. This could further increase electricity consumption, which is beneficial for driving economic growth (Chi Hoang, 2021). On top of that, trends for developing renewable energy sources have been driven by numerous global, national and regional initiatives that set standards for corporate performance in terms of how they aim for a low-carbon economy.

Increased interest in analyzing how electricity companies function specifically in Russia and in the United States is due to the fact that Russia's tactic used to reform the market was borrowed from the experience of the United States (Suslov and Mel'tenisova, 2012). As a result, both countries have electricity firms that work in very similar mezzoeconomic conditions. However, it is important to note that the American electricity market is far more developed than in Russia, although Russia's electricity market is developing at a quicker pace. These factors can indicate and define differences in the financial stability of the country's electricity companies.

The world electricity market is expected to decrease in 2020 due to a sharp decrease in commercial consumption, which could lead to electricity companies worsening their financial results. During previous crises, decreases in energy output was mainly due to a decrease in investment in fixed assets, decline in economic activity of industrial production as a whole (Savchina et al., 2017). These factors can also be present for the year of 2020, as many power plants completely stopped working due to businesses shutting down.

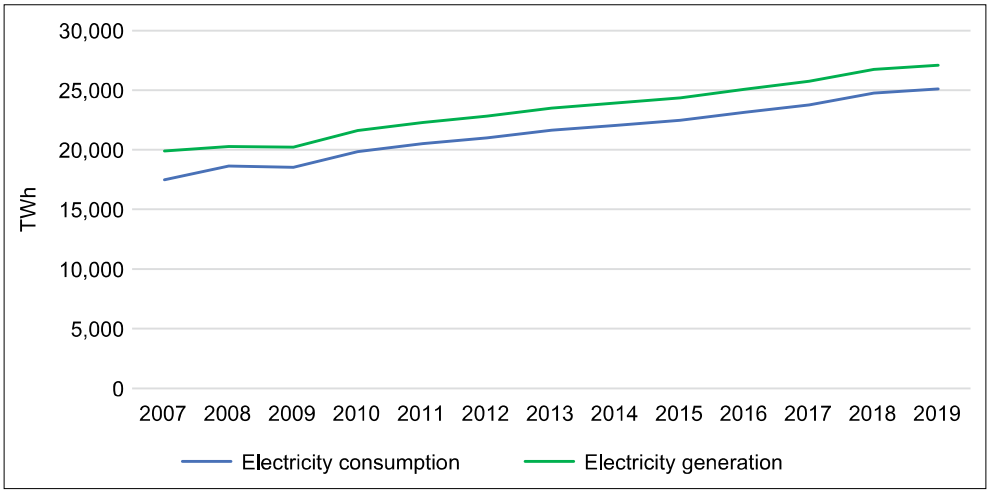
The COVID-19 pandemic poses serious challenges to the global economy due to the growing economic, financial and medical response to the pandemic. It is of particular interest to study the response of the energy sector to the COVID-19 outbreak (Kamran et al., 2020). Risk factors in the current conditions of the COVID-19 pandemic that can cause negative effects on electricity companies include falling electricity prices, a higher share of non-payments from both industries and households and difficulties of new investment projects. On top of that, the decrease of demand in industrial sectors has resulted in an inter-fuel struggle for leadership, where nonrenewable sources are inferior to renewables (Gimadi, 2020).

2. DYNAMICS OF THE WORLD ELECTRICITY MARKET IN 2007-2019

In 2007-2019, the compound annual growth rate (CAGR) of the world electricity consumption was higher than the CAGR of the world electricity generation by +0.4%: the CAGR of the world electricity consumption amounted to +2.8%, of the world electricity production – to +2.4% (Figure 1). Chain growth rates during this period were mostly positive, achieving a maximum of +6.6% for electricity consumption in 2008 and +6.9% for electricity production in 2010. In 2009, during the global financial crisis, chain growth rates for electricity consumption and generation were both negative: –0.6% and –0.3% accordingly. However, the fall in the electricity consumption and generation was much lower than the fall of the global GDP during the global financial crisis of 2008-2009: the chain growth rate for this economic indicator in 2009 was -1.7% (The World Bank, www). These kinds of tendencies can characterize the electricity market as one that is more stable during the global crisis: the main indicators of the market do not fall sharply and recover fast: by 2010, electricity consumption and generation were not only higher than 2009 levels by +7.2% and +6.9%, but also higher than 2008 and 2007 levels: by +6.7%, +13.7% and +6.5%, +8.7%, accordingly.

The Top-10 leaders in the electricity generation and consumption have not changed in 2019 in comparison to 2007: China, USA, India, Russia, Japan, Canada, Brazil, Germany, South Korea and

Figure 1: World electricity consumption and generation in 2007-2019, TWh



Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

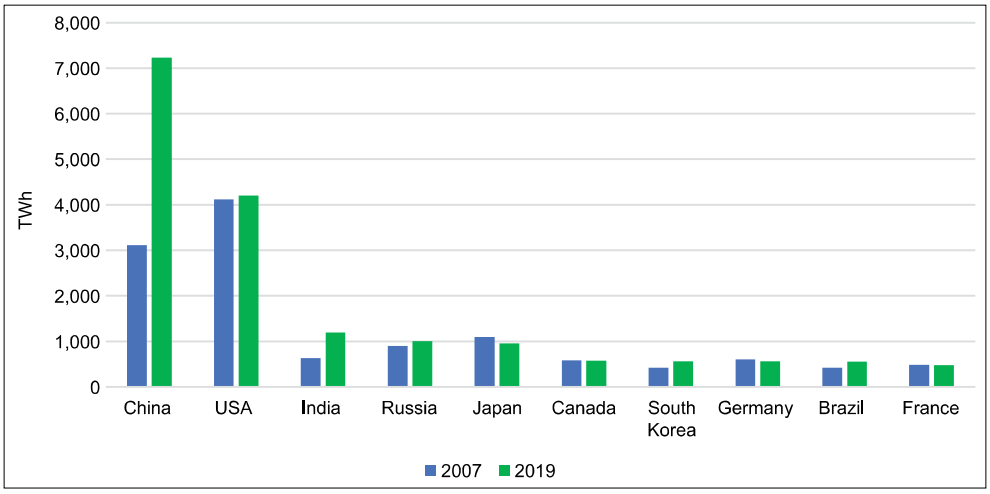
France make up this list (Figure 2). However, over 2007-2019 the positions of these countries have changed: when looking at the electricity consumption, four countries have improved their rankings: China held the second position in 2007 and by 2019 has become the leader in electricity consumption; South Korea increase its' position from the tenth spot to the seventh; Canada – from the seventh spot to the sixth; India – from the fifth position to the third. Two countries had no changes in positions over this period: Brazil holds the ninth position while Russia is stable at the fourth. The other four countries have lowered their positions on the world electricity consumption market: the ranking of France lowered by two spots from the eighth to the tenth; of Japan – from the third to the fifth; of Germany – from the sixth to the eighth and of the USA – from the first to the second.

The countries with the highest CAGRs of the electricity consumption were those classified as developing countries – China (+6.7%) and India (+5.0%). Other countries with positive CAGRSs of the electricity consumption are South Korea (+2.4%), Brazil (+2.3%), Russia (+0.8%) and the USA (+0.1%). Japan, Germany, France and Canada have all had a decrease in electricity consumption over 2007-2019, with negative CAGRs of –1.0%, –0.5%, –0.1% and –0.05%, accordingly.

As for the electricity generation, the only country that remained its' position amongst the Top-10 leaders was Russia at fourth place (Figure 3). As with electricity consumption, Germany, France, Japan and the USA worsened their rankings in the electricity generation: Germany now holds the eighth place instead of the sixth, France – the tenth instead of the eighth, Japan – the fifth instead of the third and the USA – the second instead of the first. Brazil, India, Canada, China and South Korea all bettered their positions: Brazil rose from the ninth place to the seventh, India – from the fifth to the third, Canada – from the seventh to the sixth, China – from the second to the first and South Korea – from the tenth to the ninth.

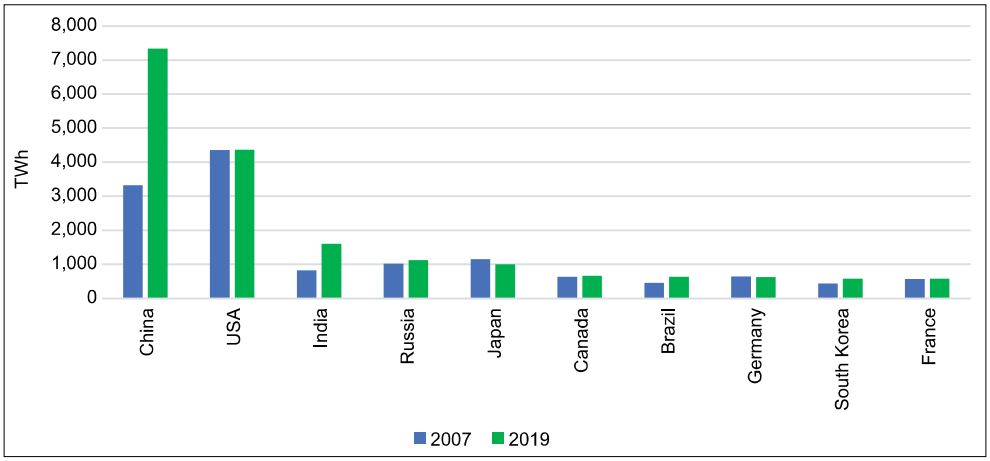
Like electricity consumption, the countries with the highest CAGRs of the electricity generation are developing countries – China (+6.3%) and India (+5.3%). Brazil, South Korea, Russia, the USA and France also had positive CAGRs - +2.7%, +2.4%, +0.7%, +0.03% and +0.01%, accordingly. Japan and Germany

Figure 2: Top-10 countries in electricity consumption in 2007 and 2019, TWh



Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

Figure 3: Top-10 countries in electricity generation in 2007 and 2019, TWh



Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

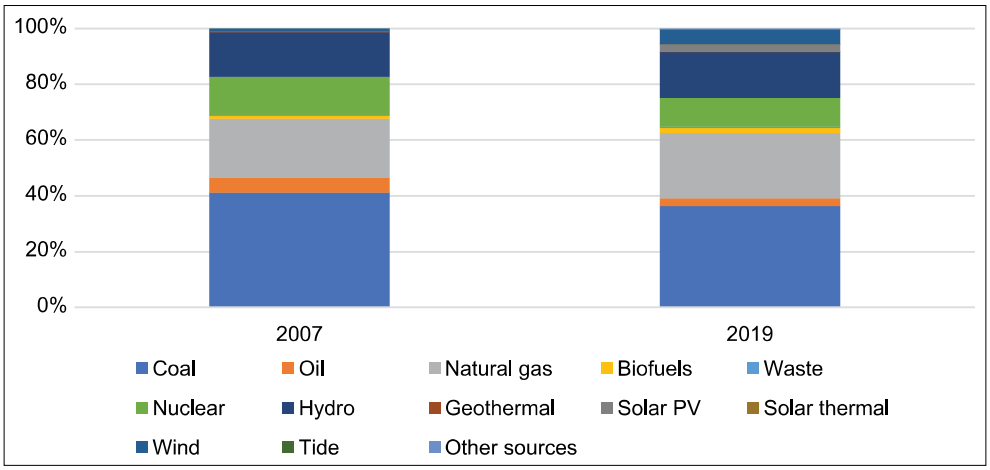
were faced with negative tendencies of the electricity generation – their CAGRs of this indicator in 2007-2019 were -1.0% and -0.3%, accordingly.

The structure of the energy generation by source over the past 13 years has considerably changed. This is due to multiple global, national and regional initiatives that set standards for corporate performance in the context of transitioning to a low-carbon economy. The Sustainable Development Goals (SDGs) were the main driving force into such a transition. Electricity generation by coal, oil and nuclear sources in 2019 has decreased by 5 percentage points (p.p.), 2 p.p. and 4 p.p., accordingly. The share of renewable "green" energy sources, such as biofuels, solar PV, wind and hydroelectricity has increased by 0.9 p.p., 2.5 p.p., 4.4 p.p. and 0.4 p.p., accordingly (Figure 4).

Most countries in the world depend on imports of electricity, which can be illustrated by the dynamics of the electricity imports and exports worldwide (Figure 5). On average, electricity imports were higher than electricity exports by 2%. Furthermore, EU countries are faced with certain policy concerns relating to the security of energy supplies (Eurostat, www), as they have a high dependency on energy imports. In 2018, more than half (58.2%) of the EU's gross available energy came from imported sources (Eurostat, www). In each year from 2008 to 2018 the EU's net imports of energy have been greater than its primary production, which results in a high dependency rate of more than 50%.

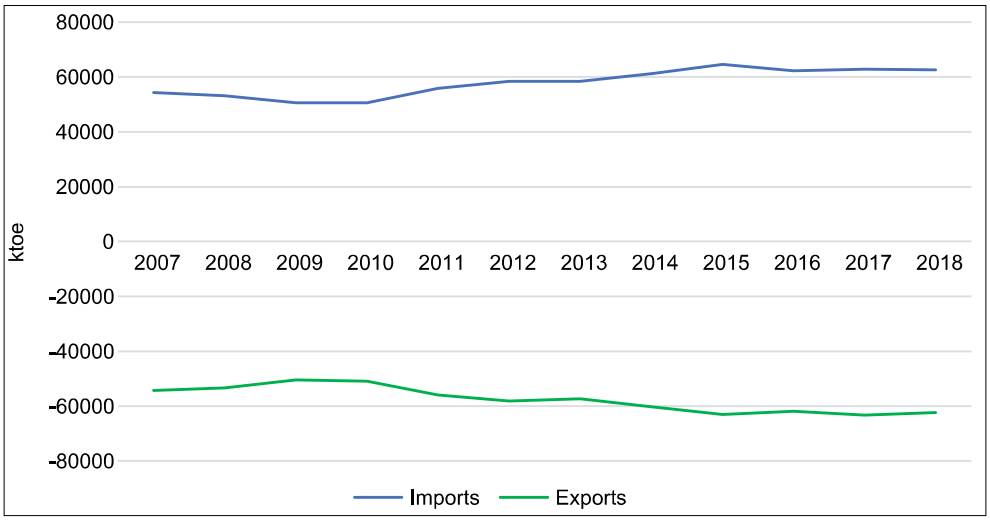
In conclusion, the world electricity market can be described by three main trends and characteristics: the first being is that it is less vulnerable to economic crises – generation and consumption levels did decrease, but not as much as the economy did overall. The second – due to global, national and regional initiatives implementing environmental factors aimed towards a low-carbon economy, the structure of electricity generation has changed over the past 13 years. With the appearance of more "green" trends in the global economy, it is expected that this structure will change even more. The last trend is the problem of energy dependency, especially in the EU countries, with more than half of their energy needs being met only thanks to imports.

Figure 4: Structure of electricity generation by source in 2007 and 2019, %



Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

Figure 5: World electricity exports and imports in 2007-2018, ktoe



Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

3. ANALYSIS OF THE ELECTRICITY MARKETS OF RUSSIA AND THE USA IN 2007-2019

To identify the financial stability of electricity companies, the authors have chosen organizations of two countries – Russia and the USA. Both of these countries are not only leaders of the world electricity market (the USA holds the second place by electricity generation and consumption, while Russia holds the fourth place by these indicators), but also because both countries have similar market models, being predominately competitive markets. In the last 20 years, the electricity industry has significantly changed towards deregulation and competition with the goal of improving economic efficiency (Ventosa et al., 2005). The competitive model of the electricity market means that the state carries out centralized control over the functioning of the industry's assets, however the generation and sale segments of electricity are completely deregulated.

In the USA the electricity market model is a mix of competitive and regulated models, as states decide themselves whether or not to deregulate their electricity market or keep it unreformed and regulated. In 2018, 27 states have regulated electricity markets, while the other 24 have formed a competitive model. Today, there are over 3200 electricity companies in the United States, with the Top-20 of them making up 14% of the overall electricity generation (Reuters, www).

By the end of 2010, Russia was still quite behind other countries in implementing competitive market principals to its electricity sector. During that time, the Russian electricity market had the IPP model (independent power producer), as only the generation segment of this market was made competitive, while transmission and distribution sectors, traditionally also made competitive as a result of market reform, were still under the control of the state. Further development of the electricity market was defined by the General layout scheme of power facilities until 2020 (Ministry of Energy of Russia, www). To achieve the goals defined in this document, capacity to contracts were implemented, with investors guaranteeing their execution. Earning control over electricity generating companies, investors had to fulfill obligations that had to do with building a certain amount of generating capacity in a set time. Increased consumer payments guaranteed investors a good level of ROI (return on investment), however if investors were to violate the terms of commissioning, they were faced with penalties.

As a result, about 43 GW of new electricity capacities were commissioned. In 2019 the Russian government approved a new strategic document on capacity contracts. The main aim of this document is to modernize the available thermal power plants, which will lead to a further increase of the electricity capacity equal to 41 GW by 2031 (Ministry of Energy of Russia, www). The result of these reforms formed the Russian electricity market as a market with a competitive model. However, like the USA, the liberalization of this market is not present across the whole country. In remote regions with isolate power supply systems and weak network connections with a single power system, a noncompetitive market model is still functioning (such as the Russian Far East, Komi Republic, Arkhangelsk Oblast and Kaliningrad Oblast). However, there are still many problems facing the electricity market in Russia, with the most evident one being that of cross subsidization, when higher prices are charged to one type of consumers to artificially lower prices for another group. The Federal Antimonopoly Service of the Russian Federation has estimated that by 2018, the cross subsidization losses have amounted to 220 billion rubles (FAS, www).

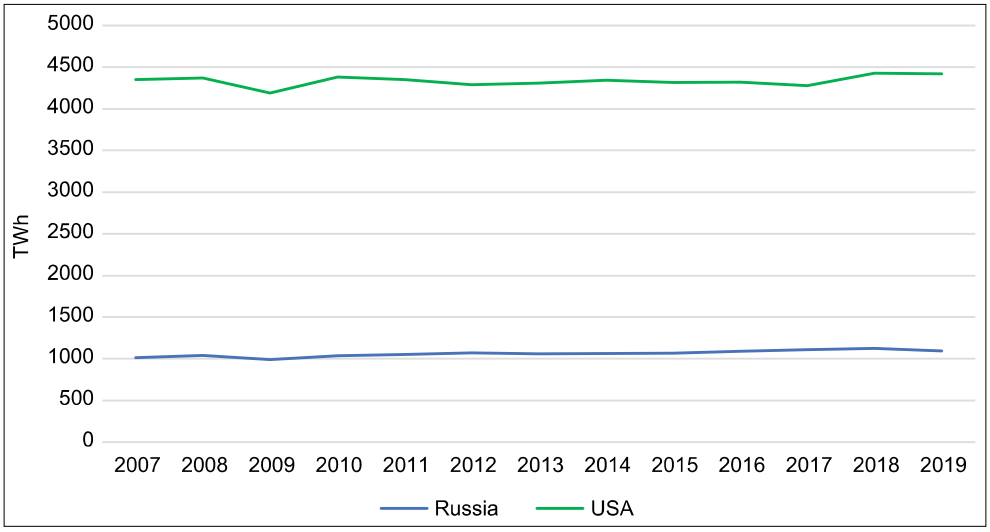
Looking at the electricity generation in Russia, negative trends were only present 3 times – in 2009, 2013 and 2019, where chained growth rates equated to –4.6%, –1.1% and 2.8%, accordingly. The CAGR for 2007-2019 amounted to 0.6%. In the USA, electricity generation was more fluctuant: negative trends were present 6 times: in 2009, 2011-2012, 2015, 2017 and 2019. The sharpest decrease was during the global financial crisis of 2008-2009: in 2009 electricity generation saw a 4.6% drop. The CAGR of the electricity generation in the United States was much lower than in Russia - 0.1% (Figure 6).

The structure of the electricity generation in the United States over the past 13 years has drastically changed: electricity generated by coal has seen a 24.5 p.p decrease, oil – a 1.0 p.p. decrease (Figure 7). The decrease in these two sources is a result of a sharp increase in electricity generated by natural gas – by 16.4 p.p. and an increase in electricity generated by renewable sources – such as Wind, Solar PV and Hydro – by 6.2 p.p., 2.1 p.p. and 0.5 p.p, accordingly. The rise in the share of renewable sources in electricity generation is due to the state support of such sources – in 2016, over 45% of federal subsidies to the electricity sector were related to renewable energy sources (U.S. Energy Information Administration, www).

In Russia, the structure of the electricity generation has not yet made the switch to implementing renewable sources – the decrease in coal, oil and natural gas by 0.9 p.p., 0.6 p.p. and 1.5 p.p. was mostly compensated by 2.9 p.p. increase in the electricity generated by nuclear sources. The only renewable sources that had a slightly significant increase were Solar PV – by 0.1 p.p. (Figure 8). Even though there are also many forms of the state support for the development of the renewable energy segments, investors are still not to keen in helping to finance such projects and initiatives.

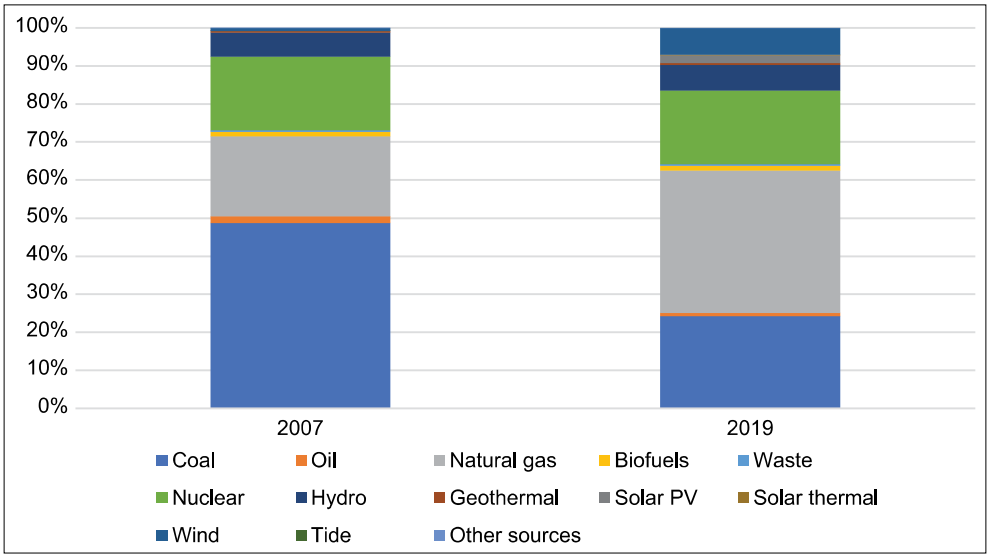
As for the electricity consumption, compound growth rates were higher in Russia than the United States by 0.7 p.p. (0.8% for Russia and 0.1% for the US). Electricity consumption in Russia mostly had positive trends, decreasing only 3 times: in 2009, 2013 and 2019 – by 4.7%, 1.0% and 0.3%, accordingly. In the United States, the electricity consumption had negative tendencies twice as much – a total of 6 times in 2009, 2011-2012, 2015, 2017 and 2017 – by 4.7%, 0.4%, 1.4%, 0.2%, 0.9% and 2.2%, accordingly (Figure 9).

Figure 6: Electricity generation in Russia and the United States in 2007-2019, TWh



Source: Compiled by the authors according to the Global Energy Statistical Yearbook, www.yearbook.enerdata.net

Figure 7: Structure of electricity generation in The United States by source in 2007 and 2019, %



Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

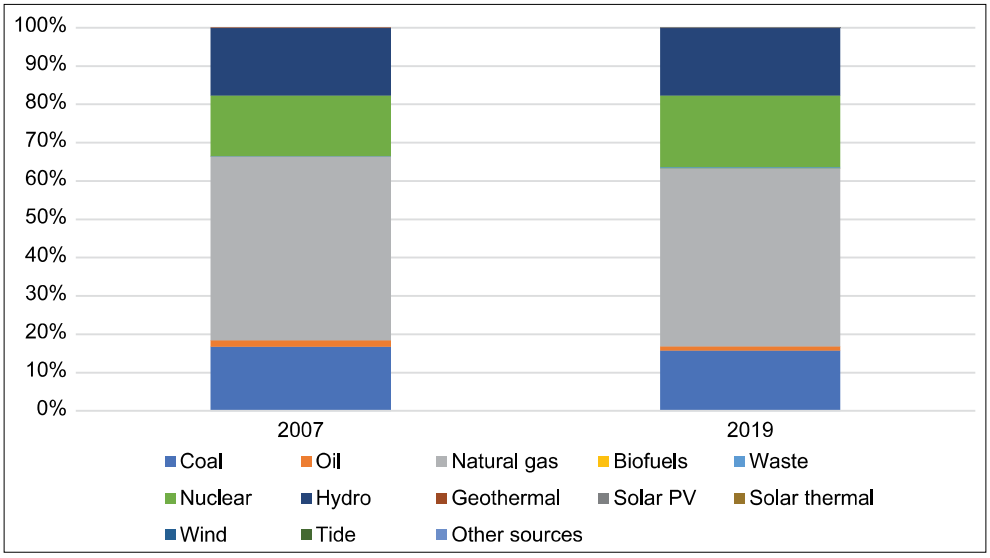
Exports and imports of the electricity of these two countries show that the United States is a clear net electricity importer, contrasting Russia as a net exporter (Figures 10 and 11). Russia's role as one of the main electricity exporters on the global market is evident: for example, in the EU energy imports as a share of the total imports to the EU from Russia have only increased in the last few years by 3.2 p.p. – 61.4% in 2016 versus 64.6% in 2020 (EU imports of energy products – recent developments, www).

To sum up, the electricity markets of Russia and the United States have gone through several reforms that have led them to adapt principles of a competitive model market, with Russia adapting such a market structure much later. On top of that, these two countries are similar in that some states in the United States and some regions in Russia still have a fully government regulated electricity market.

The dynamics of the United States electricity market can be classified by three main trends: decreases in consumption and generation, a share rise of electricity generate by renewable energy sources and a sharp decline in imports since 2015, reducing the risks that come with energy dependency. The Russian electricity market can be defined as one with stable growth in the electricity consumption and generation, a stagnating electricity consumption structure, with renewables still not playing an important enough role and saving the status of being one of the worlds' top electricity exporters.

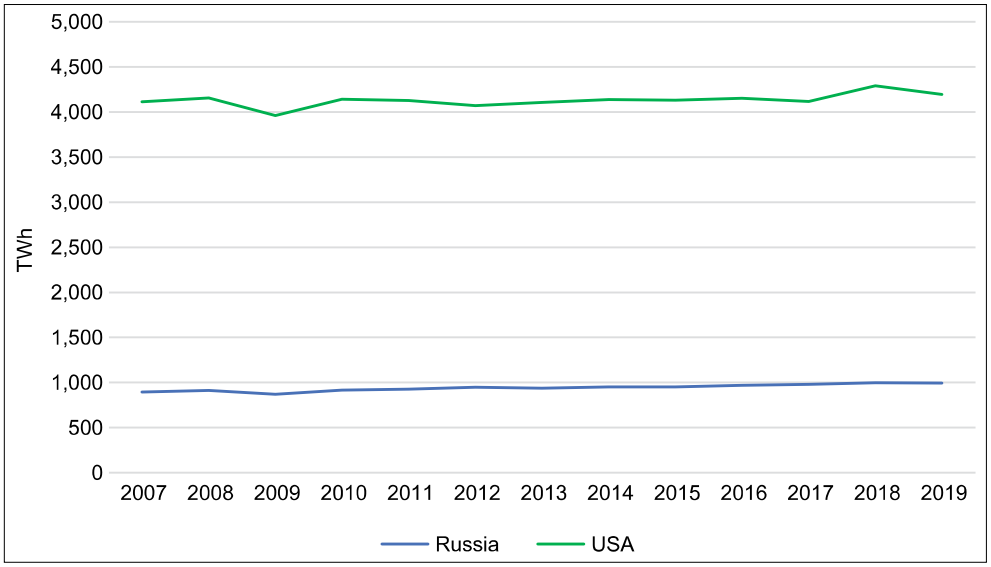
Analyzing the state of the industry that companies work in is a necessary step that helps further understand the main tendencies and changes in their financial stability. Trends on the mezzo, industry level should directly reflect what goes on in the micro-level, which will further be assessed.

Figure 8: Structure of the electricity generation in Russia by source in 2007 and 2019, %



Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

Figure 9: Electricity consumption in Russia and the United States in 2007-2019, TWh



Source: Compiled by the authors according to the International Energy Agency (IEA)

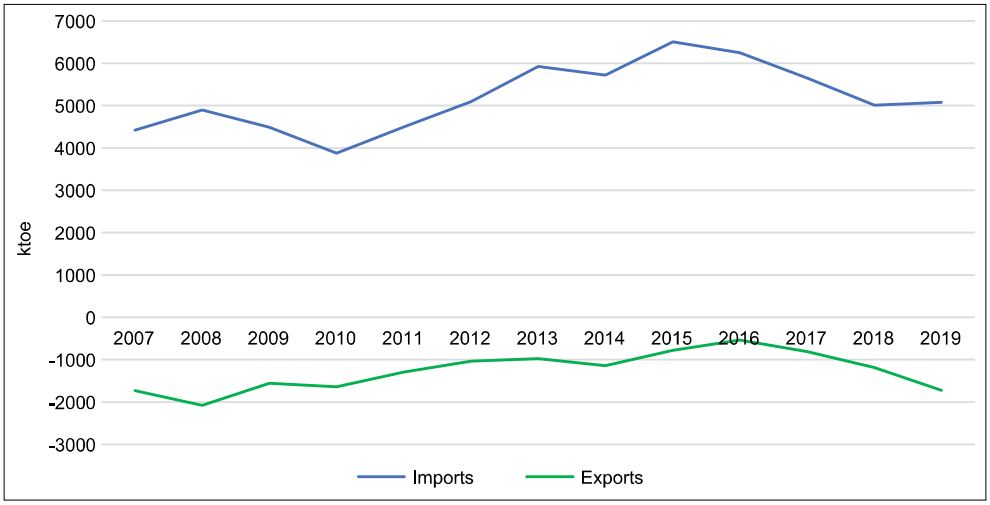
4. METHOLODGICAL APPROACH OF THE ASSESSING OF THE FINANCIAL STABILITY OF COMPANIES' ACTIVITY

There are many methods that can be implied to assess the financial stability of a company. A tool that is frequently used for doing so is by calculating groups of financial indicators (ratios). Financial ratios are used for internal and external comparisons. The first type of comparison is used to compare a present ratio with past and expected future ratios for the same company. This is used to determine whether a company has improved their financial condition or, on the contrary, failed to do so. So, it is important to calculate these financial indicators over a certain period – only then is it possible to rate financial stability of a companies' activity. External comparisons are done to give an insight of the relative financial condition and performance of an organization. In this article, an external assessment of the financial stability of two companies will be done – of the one electricity giant in Russia and one in the United States.

The method that will be used to perform such an assessment will be that of James C. Van Horne and John M. Wachowicz, Jr. (Van Horne and Wachoeicz, Jr., 2008). This method includes calculating the main groups of financial ratios using a company's balance sheet and income statement. The groups of financial ratios that will be assessed are as following:

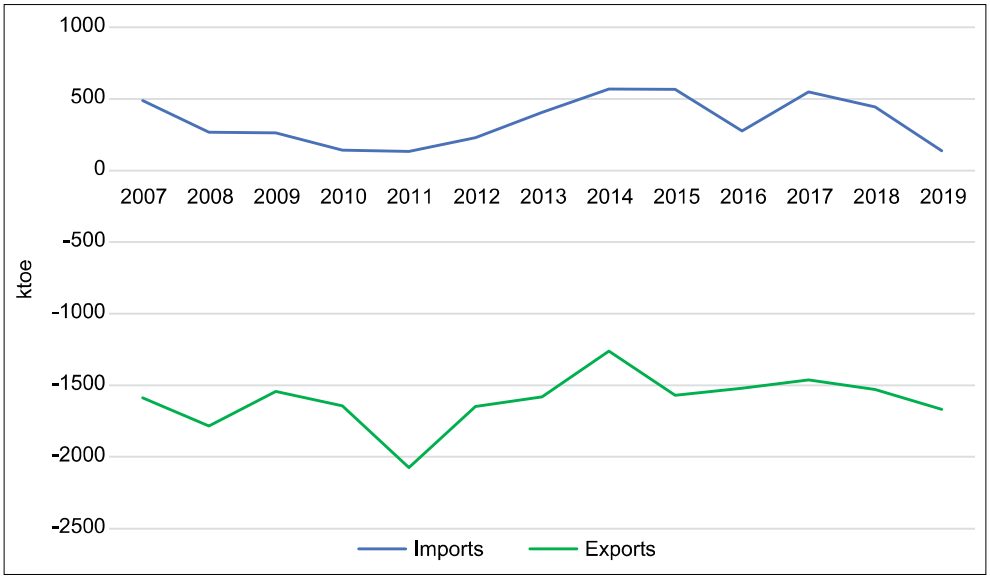
- Liquidity ratios: current ratio and acid-test (quick ratio)
- Financial leverage (debt) ratios: debt-to-equity ratio and debt-to-total-assets ratio
- Coverage ratios: interest coverage ratio
- Activity ratios: receivables activity, receivable turnover in days, payables activity, payable turnover in days, inventory

Figure 10: Electricity exports and imports in the United States, ktoe



Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

Figure 11: Electricity exports and imports in Russia, ktoe



Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

activity, inventory activity in days, operating cycle, cash cycle and total asset turnover

- Profitability ratios: gross profit margin, net profit margin, return on investment, return on equity.

So, a total of 18 financial ratios over the course of 10 years will be analyzed for electricity companies in Russia and in the United States, allowing an external comparison to be performed and financial stability to be defined.

5. ASSESSMENT OF THE FINANCIAL STABILITY OF THE RUSSIAN AND AMERICAN ELECTRICITY COMPANIES IN 2010-2019

The choice of the electricity companies to assess the financial condition of them was based on the 2020 S and P Global Platts Top 250 Energy Company Rankings (Table 1). Both Exelon Corp (Reuters, www) and PJSC Inter RAO UES make up significant market shares of their country's electricity markets – 4% and 12% in 2019, accordingly. In terms the cost of assets, revenue and profit numbers, Exelon Corp is significantly ahead of PJSC Inter RAO UES, with these indicators being 1039%, 128% and 146% higher, accordingly. However, PJSC Inter RAO UES is a faster growing company with good return on invested capital and CGR revenue growth – 9 p.p. and 2.7 p.p. higher than Exelon Corp. Overall, PJSC Inter RAO UES ranks at 75 in the S and P Global Top 250 Energy Company Rankings, while Exelon Corp ranks at 30.

The time chosen to analyze the financial stability of these two companies is shorter than the time that was used to analyze the state of the Russian and American (Exelon Corp., www) electricity markets as a whole – this is due to a shortage of available financial data (balance sheets, financial statements) that correspond with the IFRS (International Financial Reporting Standards). So, a total of

10 years will be assessed – from 2010 to 2019. This will show how these two companies managed to recover after the world financial crisis of 2008-2009, and how much PJSC Inter RAO suffered from economic sanctions that were put into place in 2014-2015, which caused a new economic crisis, specific for Russia.

Table 1: 2020 S&P Global Platts Top 250 Energy Company Rankings: Set indicators for Exelon Corp and PJSC Inter RAO UES

Indicator\Company	Exelon Corp	PJSC Inter RAO UES
Assets	124 977	10 977
Revenues	34 438	15 086
Profits	2 936	1 193
Return on Invested Capital (ROIC)	4.0%	13.0%
3 year CGR % Revenues	3.2%	5.9%

Source: Compiled by the authors according to The Platts Top 250 Global Energy Company Rankings www.spglobal.com

The first group of financial ratios that will be assessed is liquidity ratios, which are used to measure a company's ability to cover short-term obligations (Tables 2 and 3). These ratios give an insight into the present cash solvency of the analyzed companies and how they remain solvent in the event of adversity. It is important to note that this group of financial ratios is standardized. For PJSC Inter RAO, the current ratio almost always lied within the normal limits (which is from 1 to 2), the only exception was 2013, when the current ratio was even higher than the norm – however, this is not always good, as it is important to see what type of current assets are predominate, as, for example, inventories are not as liquid as cash or nonoverdue receivables. For Exelon Corp, this ratio was always in the normal limits, except for 2016 and 2019 when it was a bit below 1 – 0.92 and 0.85, accordingly. This was due to a sharp decrease in cash – by 90.2% in 2016 and 56.5% in 2019.

Table 2: Key financial ratios of PJSC Inter RAO for 2010-2019, in dollars, days and %, where applicable

Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Current ratio	1.64	1.83	1.43	3.11	1.61	1.47	1.50	1.61	1.75	2.07
Acid-test ratio (Quick asset ratio)	1.52	1.64	1.34	2.96	1.49	1.35	1.40	1.50	1.64	1.95
Debt-to-equity ratio	0.79	0.36	0.50	0.53	0.57	0.55	0.36	0.38	0.50	0.36
Debt-to-total-assets ratio	0.44	0.27	0.33	0.35	0.34	0.36	0.27	0.28	0.33	0.26
Interest coverage ratio	0.96	4.59	–1.05	–0.71	2.38	3.44	3.82	13.41	14.58	0.00
Receivable turnover	2.94	12.38	10.34	9.34	9.76	9.92	9.13	8.16	8.88	9.61
Receivable turnover in days	124	29	35	39	37	37	40	45	41	38
Payable turnover	4.19	9.46	8.18	7.40	7.45	8.37	8.16	7.34	6.61	7.49
Payable turnover in days	87	39	45	49	49	44	45	50	55	49
Inventory turnover	13.85	68.59	51.82	52.56	51.80	52.88	55.30	52.97	47.63	47.80
Inventory turnover in days	26	5	7	7	7	7	7	7	8	8
Operating cycle	150	35	42	46	44	44	47	52	49	46
Cash cyle	63	–4	–2	–3	–5	0	2	2	–7	–3
Total asset turnover	0.34	1.37	1.05	1.20	1.35	1.44	1.52	1.44	1.41	1.36
Gross profit margin	5.6%	–2.3%	–6.7%	–10.5%	1.7%	2.0%	4.4%	5.5%	8.0%	6.3%
Net profit margin	4.0%	–0.8%	–4.0%	–3.9%	1.3%	2.9%	7.1%	6.3%	7.4%	8.1%
Return on investment	1.4%	–1.1%	–4.2%	–4.6%	1.8%	4.1%	10.8%	9.0%	10.5%	11.1%
Return on equity	2.6%	–1.7%	–6.0%	–7.0%	2.9%	6.7%	15.6%	12.4%	15.2%	15.8%

Source: Calculated and compiled by the authors according to IFRS balance sheets and income statements of PJSC Inter RAO for fiscal years 2010-2019 https://www.interrao.ru/investors/financial-information/financial-reporting/#451

Table 3: Key financial ratios of Exelon Corp for 2010-2019 in dollars, days and %, where applicable

Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Current ratio	1.51	1.11	1.30	1.31	1.35	1.68	0.92	1.10	1.17	0.85
Acid-test ratio (Quick asset ratio)	1.32	0.94	1.17	1.17	1.17	1.51	0.80	0.95	1.02	0.72
Debt-to-equity ratio	2.85	2.82	2.62	2.49	2.79	2.67	3.45	2.91	2.89	2.88
Debt-to-total-assets ratio	0.74	0.74	0.72	0.71	0.74	0.73	0.78	0.74	0.74	0.74
Interest coverage ratio	6.78	7.17	3.56	3.70	3.91	5.27	3.09	3.81	3.50	3.71
Receivable turnover	5.96	6.64	6.87	5.94	6.19	6.69	6.63	6.14	6.19	5.55
Receivable turnover in days	61	55	53	61	59	55	55	59	59	66
Payable turnover	10.14	10.35	10.49	8.39	8.80	8.44	8.90	8.37	8.75	8.17
Payable turnover in days	36	35	35	44	41	43	41	44	42	45
Inventory turnover	17.27	17.47	22.48	20.04	17.97	15.80	17.57	17.74	19.24	17.41
Inventory turnover in days	21	21	16	18	20	23	21	21	19	21
Operating cycle	82	76	70	80	79	78	76	80	78	87
Cash cyle	46	41	35	36	38	34	35	36	36	42
Total asset turnover	0.36	0.36	0.35	0.31	0.33	0.32	0.30	0.29	0.30	0.28
Gross profit margin	25.3%	23.5%	10.1%	14.7%	11.3%	15.0%	10.2%	13.1%	10.8%	12.7%
Net profit margin	13.7%	13.1%	4.9%	6.9%	5.9%	7.7%	3.6%	11.3%	5.6%	8.5%
Return on investment	4.9%	4.7%	1.7%	2.2%	2.0%	2.5%	1.1%	3.3%	1.7%	2.4%
Return on equity	18.9%	17.9%	6.4%	7.7%	7.1%	9.3%	4.3%	13.6%	6.6%	9.3%

Source: Calculated and compiled by the authors according to IFRS balance sheets and income statements of Exelon Corp for fiscal years 2010-2019 https://investors.exeloncorp.com/financials-performance/income-statement

The next ratio in the group of liquidity ratios is the acid-test ratio (quick asset ratio), which considers the liquidity of the individual components of the current assets (Tables 2 and 3). This ratio allows us to assess the more liquid current assets – cash, securities, and receivables. PJSC Inter RAO over 2010-2019 had a very high acid-test ratio – which indicates that the company has a higher share of more liquid current assets than it does inventories. The same could be said for Exelon Corp – if not higher than the norm, the company demonstrated values that are in the norm from 0.8 to 1. In conclusion, we can say that both companies do not have problems meeting their current obligations and have high levels of liquidity.

The next group of financial indicators that will be assessed are financial leverage (debt) ratios, which show the extent to which a company is using borrowed money instead of its' own. The first ratio is the debt-to-equity ratio – for PJSC Inter RAO, an average of 49 cents were provided by creditors for each $1 being provided by shareholders, while for Exelon Corp this number was significantly higher - $2.84 from creditors for each $1 by shareholders. This means that PJSC Inter RAO primarily finances itself, while Exelon Corp is much more dependent on creditors.

To further assess the importance of debt financing to these two companies we can calculate the debt-to-total-assets ratio, which shows the percentage of a firm's assets that is financed by creditors. For PJSC Inter RAO, this ratio is quite low – the average over 2010-2019 equaled to 0.32, which means only 32 % of assets are financed with debt. For Exelon Corp, it is much higher – 0.74, which is 42 p.p. higher than PJSC Inter RAO. We can conclude that PJSC Inter RAO has a low dependency on creditors, while Exelon Corp is highly dependent on them.

Moving on to coverage ratios, which show a company's ability to cover its' financial charges, we can assess the interest coverage ratio, which can be calculated by dividing earnings before interest and taxes (EBIT) and interest expenses (Tables 2 and 3). It can indicate a firm's ability to cover its interest payments and avoid bankruptcy. For PJSC Inter RAO, the company had problems with covering its' financial charges only twice – in 2012 and 2013, when it was faced with losses. On average, it had the ability to cover annual interest 4.6 times with operating income. Exelon Corp was never met with losses so could always cover its' financial interest, however the average over 2010-2019 was a bit lower – 4.45.

To measure the efficiency of how electricity companies are using their assets, we have calculated turnover ratios (Tables 2 and 3). The first financial ratio that will be assessed is the receivable turnover, which allows us to analyze the quality of a company's receivables and how fast it can collect them. For PJSC Inter RAO, receivables turned over at an average of 9.05 times during 2010-2019, which is 44% higher than for Exelon Corp with a receivable turnover average of 6.28. This means that Exelon Corp's receivables turn over considerably slower than PJSC Inter RAO's. The average collection period for PJSC Inter RAO 47 days, for Exelon Corp – 58 days, which are both quite high.

To assess how the level of promptness of payment to suppliers of a company, we can calculate the payable turnover ratio (Tables 2 and 3). For PJSC Inter RAO, this indicator average to 7.47 over 2010-2019, while Exelon Corp's ratio was 21.6% higher and amounted to 9.08. In days, the payable turnover for these two companies average to 51 and 41 days, accordingly. This means that Exelon Corp covers its' payables quicker and more often in a year than PJSC Inter RAO does.

The efficiency of inventory management can be calculated using the inventory turnover ratio. This ratio shows how often inventory is turned into receivables through sales during a fiscal year. For PJSC Inter RAO, the average value of this ratio during 2010-2019 amounted to 49.52, which is almost 3 times higher than for Exelon Corp, with a value of 18.3. For both companies, this indicator is quite high, which could indicate high efficiency management. However, sometimes high inventory turnover can lead to frequent stockouts. In days, the inventory turnover for PJSC Inter RAO on average equated to 9, for Exelon Corp – to 20.

Using inventory, receivable and payable turnover in days, we can calculate the operating and cash cycle for these two companies (Tables 2 and 3). The operating cycle shows us the time between purchasing raw materials and receiving cash after the finish goods have been sold. For PJSC Inter RAO, this indicator had an average value of 55 days, for Exelon Corp receiving money for its' goods sold was much slower – 79 days on average during 2010-2019. If we subtract the payable turnover in days from the operating cycle, we can calculate the cash cycle for these two firms. During 2010-2019, the cash cycle for PJSC Inter RAO was more often negative than positive, which means the company took longer to pay back loans that to receive them. For Exelon Corp, the company gave back money more often than it received money, as its' cash cycle for 2010-2019 averaged to 38 days. This could be the result of Exelon Corp having more obligations to creditors than PJSC Inter RAO has.

To finish off the group of turnover ratios, we have calculated the total asset (or capital) turnover. The average values for 2010-2019 for PJSC Inter RAO and Exelon Corp equated to 1.25 and 0.32, accordingly (Tables 2 and 3). We can conclude that PJSC Inter RAO generates more sales revenue per dollar of asset investment than Exelon Corp does. This means that PJSC Inter RAO has a higher efficiency of utilizing its total assets to generate sales than Exelon Corp. Overall, PJSC Inter RAO has a higher level of asset management efficiency that Exelon Corp does over the period of 2010-2019.

The final group of financial ratios is profitability ratios. They can be divided into two subgroups – those that show profitability in relation to sales and those that show profitability in relation to investments. Over 2010-2019, Exelon Corp was always profitable, while PJSC Inter RAO was not profitable in 2011-2013. This was a result of an increase in operating expenses due to impairment of the fixed assets. On average, almost all profitability ratios of Exelon Corp were higher than those of PJSC Inter RAO, except for return on investment. Gross profit margin, net profit margin and return on equity were 13.3 p.p., 5.3 p.p. and 4.5 p.p. higher for Exelon Corp than PJSC Inter RAO, while return on investment for PJSC Inter RAO was 1.3 p.p. higher than for Exelon Corp. In

conclusion, we can say that Exelon Corp manages to have a much higher profitability rate than PJSC Inter RAO does.

The assessment of the financial condition of two electricity giants in Russia and in the United States – PJSC Inter RAO and Exelon Corp – has shown that in dynamics, both companies show stable results. However, they are met with issues of their own – for Exelon Corp, these problems are highlighted by a high dependency on financing from creditors and a slower asset turnover rate. For PJSC Inter RAO, problems lie within low profitability rates, with the company occasionally having net losses over some fiscal years. However, both companies can be characterized as companies with relatively high liquidity ratios. Overall, we can conclude that Exelon Corp has a more profitable business, while PJSC Inter RAO has a high level of asset management and aims to be less financially dependent on loans than Exelon Corp does.

6. DEVELOPMENT PROSPECTS OF THE ELECTRICITY INDUSTRY IN THE CONTEXT OF THE MACROECONOMIC INSTABILITY AND THE COVID-19 PANDEMIC

In the first 10 months of 2020, electricity generation in the United States has decreased by 3.3%. Negative trends were observed even before the COVID-19 pandemic hit in January of this year, electricity generation decreased by 5.5% in comparison to January 2019. This was a continuation of the negative dynamics of 2019 for the country. The sharpest decrease was evidenced in May, when electricity generation dropped by 7.7% due to COVID-19 restrictions. However, soon after some of them were lifted and business activity started to recover, electricity generation had positive trends in June and July of 2020: it increased by 0.4% and 0.3%, accordingly (Figure 12).

Electricity consumption in the United States faced similar to electricity generation trends. May 2020 recorded the sharpest decrease – 7.6%. Positive chain growth rates for electricity consumption, however, were only present in July 2020, when this indicator increased by 0.2%. Overall, in the first 10 months of 2020 the electricity consumption fell by 3.2%, which is 0.1 p.p. lower than the electricity generation (Figure 13).

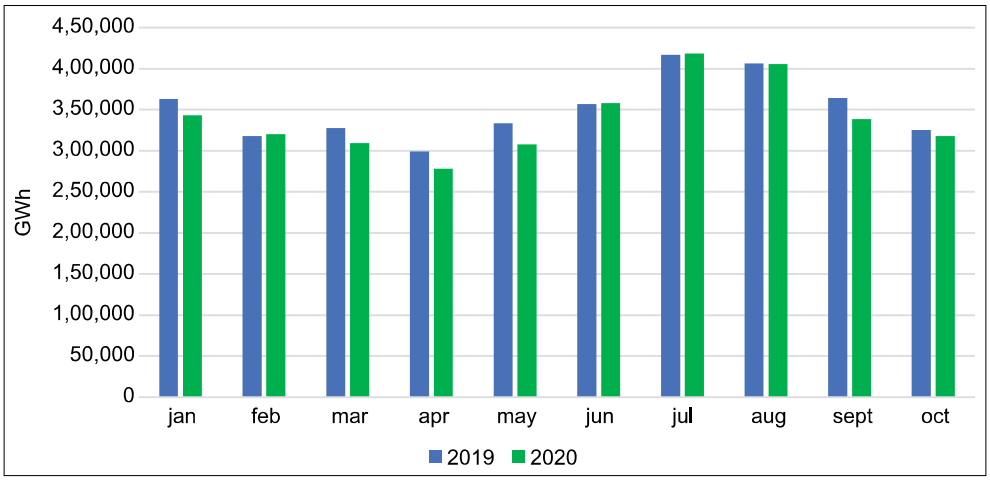
In Russia, the overall growth rates were quite similar to those of the United States: the electricity generation for the first 10 months of 2020 decreased by 3.6% (0.3 p.p. more than the United States), while electricity consumption fell by 2.9% (0.3 p.p. less than the United States). For all the months during the COVID-19 pandemic, chained growth rates year-to-year were all negative. Positive trends were only observed in pre-COVID-19 February, when the electricity generation and consumption grew by 0.5% and 1.4%, accordingly (Figures 14 and 15).

Overall, the electricity markets of the United States and Russia have suffered from the COVID-19, but not to the extent that other markets have – especially those to do with the tertiary sector of the economy. However, for the electricity industry in order to overcome the current COVID-19 crisis and return to the growth there is a set of the state support measures implemented by both countries.

It has been noted that for Russia, the current coronavirus crisis has not affected the security and reliability of the energy system, as the industry's companies have demonstrated stable results (Grabchak, 2020). The Ministry of Energy of the Russian Federation has developed three scenarios of the development under the conditions of a decrease in electricity consumption: optimistic, pessimistic and shock-scenario. For now, the electricity industry is heading towards the optimistic scenario, with it recently being corrected towards better-expected results. This means that serious financial support from the state will not be necessary, electricity generation and consumption should be back to 2019 levels by 2021. However, a certain level of support has been developed.

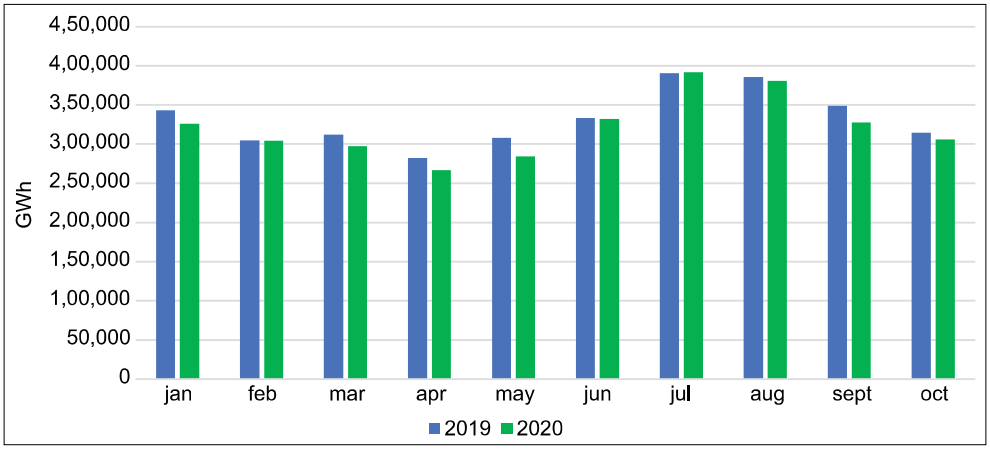
Weekly monitoring of the financial state of the Russian electricity companies done by the Ministry of Energy of the Russian Federation (Analytical Center of the Government Administration of Moscow, www) shows that they have worsened their overall financial stability due to a decrease in revenues from sales. To

Figure 12: Electricity generation in the United States in the first 10 months of 2019-2020, GWh



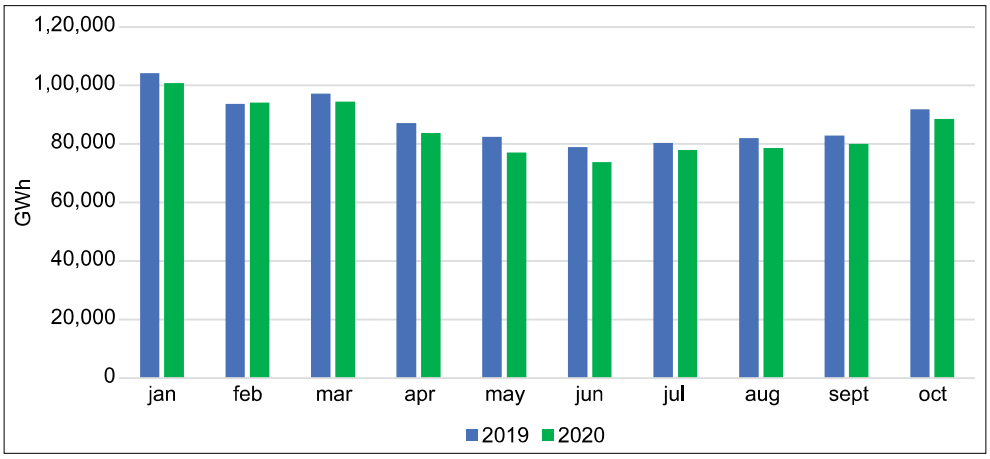
Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

Figure 13: Electricity consumption in the United States in the first 10 months of 2019-2020, GWh



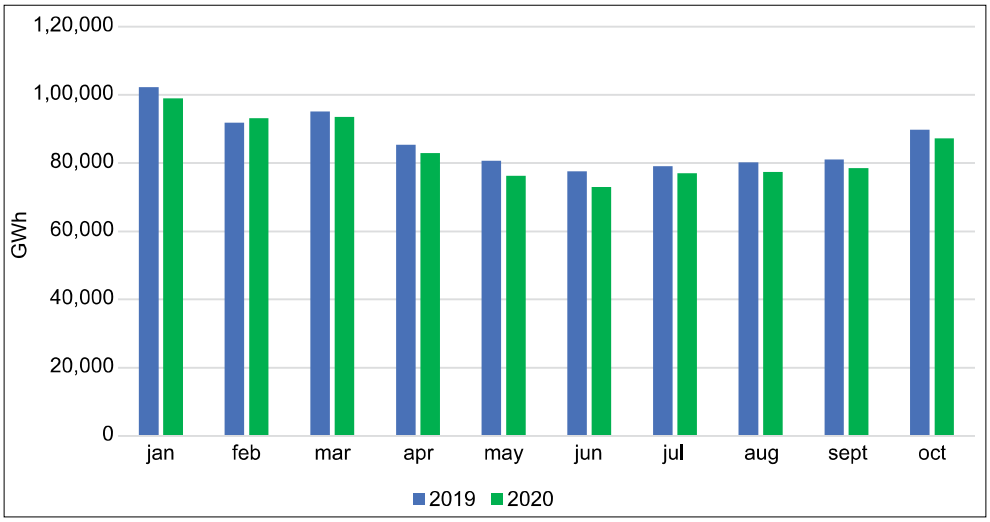
Source: Compiled by the authors according to the International Energy Agency (IEA) www.iea.org

Figure 14: Electricity generation in Russia in the first 10 months of 2019-2020, GWh



Source: Compiled by the authors according to the Federal Grid Company of Russia (FGC UES) https://so-ups.ru

Figure 15: Electricity consumption in Russia in the first 10 months of 2019-2020, GWh



Source: Compiled by the authors according to the Federal Grid Company of Russia (FGC UES) https://so-ups.ru

preserve social and financial stability of electricity companies in Russia, the state has developed a set of regulatory measures that are aimed at providing targeted support to companies who have suffered. These support measures include:

- Subsidies to reimburse the costs of production and provision of services
- Deferrals for tax payments and advanced payments for taxes
- Government guarantees for loans and bonded loans for main production activities and capital investments
- Repayment of loans given for production or capital investment support
- Loans with preferential interest rates set by the Central Bank of Russia.

In the United States there are similar trends: although there is a decline in the electricity consumption, especially in the commercial sector, it is compensated by a rise in consumption in the residential sector. However, many electricity companies are faced with a fine amount of losses. An insight from the Congressional Research Service (Congressional Research Service, www) highlights four main trends of COVID-19's potential impacts on the electric power sector:

- Reduced electricity demand led to lower electricity prices: prices in most wholesale electricity markets declined between 22% and 37% between mid-February and mid-April. This results in even more power plants becoming unprofitable, a trend that was present even pre-COVID-19 (Inside Climate News, www). Some states have come up with financial mechanisms to allow utilities to close their plants with minimal financial losses. One instrument that is being used is subsidizing the plants that remain open (Financial Times, www)
- Increased reliability risks due to workforce disruptions, potential supply chain disruptions and increased cybersecurity risks
- An increase of electricity customers unable to pay their electricity bills due to a loss in income. This has led most states suspend shutoffs as part of their COVID-19 response. However, Congress has yet to address problems that can occur with suspending shutoffs (such as utility revenue loss). It is assumed that the Coronavirus Aid, Relief and Economic Security Act may reduce cases of utility bill nonpayment (U.S. Department of the Treasury – CARES act, www)
- Extension of the tax credit eligibility deadlines for wind, solar and carbon capture projects – this measure is used to further support the transition to renewable energy sources and to support industry investment activity (U.S. Energy Information Administration, www).

In conclusion, the electricity sector in Russia, the United States and the world has been met with negative chained growth rates, which is a common trend under the current macroeconomic conditions due to the spread of COVID-19. Although these negative trends will have an effect on the US and the Russian electricity markets, forecasts show that with minimal, yet necessary, state support, they will gradually recover to pre-COVID-19 levels by 2021.

7. CONCLUSION

The Russian and U.S. electricity markets both hold top positions in the world, with the United States being the second in the electricity production and consumption, and Russia being the fourth. Both of these electricity markets have similar market structures: the United States has regulated and deregulated states, and Russia has regulated and deregulated regions. During 2007-2019, the United States electricity generation by source has been gradually making the change in favor of renewable sources. The start of this change is not yet present in Russia. Overall, the Russian electricity market is growing at a faster pace than the U.S. electricity market, which is the result of these countries having different levels of overall development and Russia starting its electricity market reform later than the United States.

The assessment of the financial stability of top electricity companies in Russia and in the United States has shown that both PJSC Inter RAO and Exelon Corp in 2010-2019 demonstrated high financial results and stability, though through different indicators. Exelon Corp had higher levels of profitability than PJSC Inter RAO; however, PJSC Inter RAO is less dependent on external financial resources, making it less prone to risk. Both companies demonstrate stable and healthy levels of liquidity.

The analysis of how the COVID-19 pandemic and crisis have affected the electricity sector has shown that both electricity generation and consumption in Russia and in the United States has decreased, but not by much. It is expected that the industry will fully recover by 2021. And government support measures in the form of subsidies, deferrals, government guarantees for loans, repayment of loans, loans with preferential interest rates, suspending electricity shutoffs and extensions of tax credit eligibility, will help the sector in doing so.

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