Center for Energy Efficiency – XXI

Russian climate policies and activities

Q3, 2023

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Russian climate policy review

Q3, 2023

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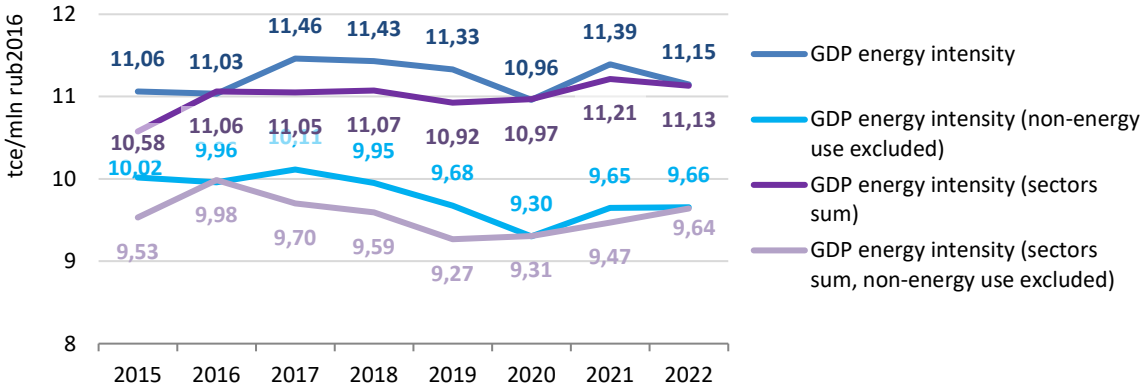
1 Evolution of energy use and energy related emissions in Russia: transition from a strong coupling in 2020-2022 to a 'reverse decoupling' in 2022

1.1. Drivers behind energy demand and energy efficiency evolution in Russia: 2015-2022

The energy efficiency and energy related GHG emissions accounting system (EE-EGHG-AS), developed by CENEf-XXI, was used to assess the progress in energy efficiency improvement and decarbonization in Russia in 2022.[1] This system was designed to account for the energy efficiency decarbonization progress as observed in 12 multi-activity sectors and 4 single-activity sectors incorporating 80 economic activities and identifies the impacts of 7 factors driving energy use and 9 factors driving energy related GHG emissions with a focus on the contribution from the technological factor.

In 2015-2022, all modifications of the energy intensity indicator of Russia's GDP were fluctuating around relatively stable levels without showing a clear trend towards either growth or decline (Figure 1). This is a result of the substantial post-2014 roll-back on the government support measures for energy efficiency improvement. Energy intensity of the Russian GDP, when estimated for all primary energy, was 2.2% down in 2022, but still remained above the 2015 level. The decline was driven by a decrease in non-energy use, as determined by the sanctions on chemicals exports. When non-energy use is deducted in two metrics (top-down energy use assessed as the result of production corrected for external trade and stock changes and bottom-up energy use assessed as the sum of energy use by sectors), energy intensity of GDP shows no decline in 2022 and very slow progress compared to the 2015 level: from -0.5% for top-down energy use to no progress (+0.16% per year) for GDP energy intensity assessed using bottom-up energy use. The gap is determined by statistical differences.

Figure 1. Evolution of Russian GDP energy intensity in 2015-2021



Source: Calculated by the authors based on Rosstat data.

Primary energy consumption in 2022 amounted to 1,027.9 million tce (718.8 Mtoe), which is 4% less than in 2021. In 2022, the main reason for the 43.2 Mtce (30.2 Mtoe) decrease in primary energy consumption was the decline in the non-energy consumption by 26.8 Mtce (18.7 Mtoe).

In 2015-2022, the key drivers behind growing energy consumption were the growth in economic activity (+65 million tce) and the growing share of energy-intensive sectors (+37 million toe). The contribution from the technological factor (-24 million tce) allowed it to restrain consumption growth (Table 2). Structural shifts in subsectors (-3.5 million tce) and production capacity load

[1] Bashmakov I., A. Myshak, V.A. Bashmakov, V.I. Bashmakov, K. Borisov, M. Dzedzichek, A. Lunin, O. Lebedev, and T. Shishkina (2023). Russian energy balance, energy efficiency, and energy-related GHG emission accounting system. Energy Efficiency. 16:67. https://doi.org/10.1007/s12053-023-10132-6

(-2.7 million tce) were working in the same direction. Changes in HDD (+2.2 million tce) and an increase in the level of amenities (+ 0.8 million tce) stimulated an increase in energy consumption.

In 2022, the technological factor worked to increase energy consumption to nearly 10 million tce. This happened for the second time during the entire post-2015 period. This factor also determined the 0.9% increase in GDP energy intensity in 2022. The uncertainty range is between -7 million tce and +10 million tce. The uncertainty in assessing the contribution from the technological factor in 2022 is largely determined by the accuracy of estimates of liquid fuel consumption in road transport and fuel consumption in trade. The above estimate (+10 million tce) is obtained using Rosstat's data for 2022. When assessing fuel consumption by road transport based on the evolution of the vehicle fleet, it turns out that the technological factor worked to slow down the growth in total energy consumption by 7 million tce.

Table 1. –Evaluation of contributions from individual factors to primary energy demand increments in 2015-2021 (1000 tce)

Year	Total	Economic activity	Inter-sector structure	Intra-sector structure	Technology	Climate	Capacity load	Saturation
2016/2015	40 182	1 615	15 392	-1 199	16 944	7 813	-505	122
2017/2016	-8 880	15 384	6 260	1 678	-27 015	-3 483	-1 249	-454
2018/2017	13 814	23 606	-1 135	-3 485	-8 258	3 979	-764	-130
2019/2018	-10 659	18 574	-3 389	826	-13 684	-12 723	-482	217
2020/2019	-19 137	-22 567	1 427	8 594	-5 647	-1 623	521	157
2021/2020	61 919	46 999	-350	-1 909	4 024	14 742	-1 258	-329
2022/2021	**-2 769**	**-18 608**	**18 609**	**-8 008**	**9 485**	**-6 493**	**1 043**	**1 203**
2022/2015	***74 469***	***65 004***	***36 813***	***-3 503***	***-24 150***	***2 214***	***-2 694***	***785***

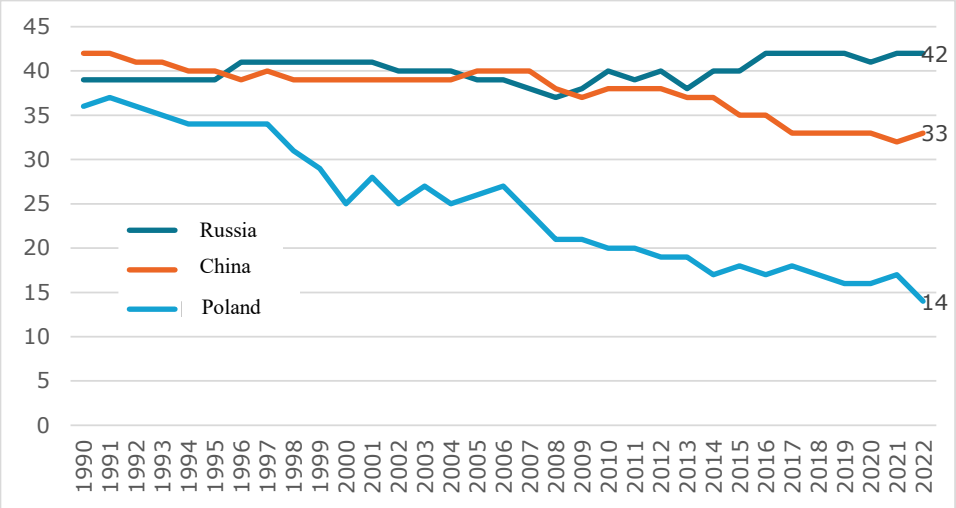
Source: Calculated by the authors based on MoTFC-16-80-GHG model

Total car park was only 0.67% up in 2022, and the number of privately owned passenger cars was only 0.35% up. Road transport freight turnover increased by 5.7% in 2022. No data are available regarding the change in mileage for personal vehicles, but there is also no reason to believe that it was significantly higher, than in 2021. Therefore, there is no rational explanation for the substantial increase in 2022 fuel consumption by road transport. One possible reason is that in 2022 the official statistics began to better capture fuel consumption by road transport. In 2022, the number of organizations that reported gasoline and diesel fuel consumption or supply by road transport grew up from 107.5 to 114.1 thousand and from 64.7 to 66.8 thousand respectively, showing the total of plus 8.7 thousand. This conclusion is supported by the results of an alternative assessment of liquid fuel consumption by road transport based on the dynamics of the vehicle fleet.

Russia has lost the race to improve energy efficiency. The past 30 years, which could have been used to bridge the gap in GDP energy intensity, was simply lost. Russia remains one of the most energy-intensive countries in the world.[2] In 2021, Russia ranked 186th out of 193 countries in terms of energy productivity (the inverse of energy intensity). It is followed only by North Korea, Iran, Kuwait, Bhutan, Bahrain, Venezuela and Turkmenistan.[3] In 2022, energy intensity of Russia's GDP was the highest among the G20 countries. Russia ranked 42nd in terms of energy efficiency among the 43 largest energy consuming countries in the world.[4] In contrast to Russia is China, which rose from the 42nd place in 1990 to the 33rd place in 2022, and especially Poland, which progressed from the 36th place in 1990 to the 14th place in 2022 (Figure 2).

[2] Bashmakov I.A. 2022. Energy Intensity of Russia's GDP in 2015-2020. Part 2. International comparisons // Energosberezhenie [Energy Conservation], No. 3, 2022, pp. 16-19. (In Russian).
[3] EIA (2023). International - U.S. Energy Information Administration (EIA).
[4] Enerdata. 2023. World Energy & Climate Statistics – Yearbook 2023.

Figure 2 – Russia, China, and Poland in energy productivity rankings in 1990-2022 (using GDP at PPP) among 43 countries – major energy consumers

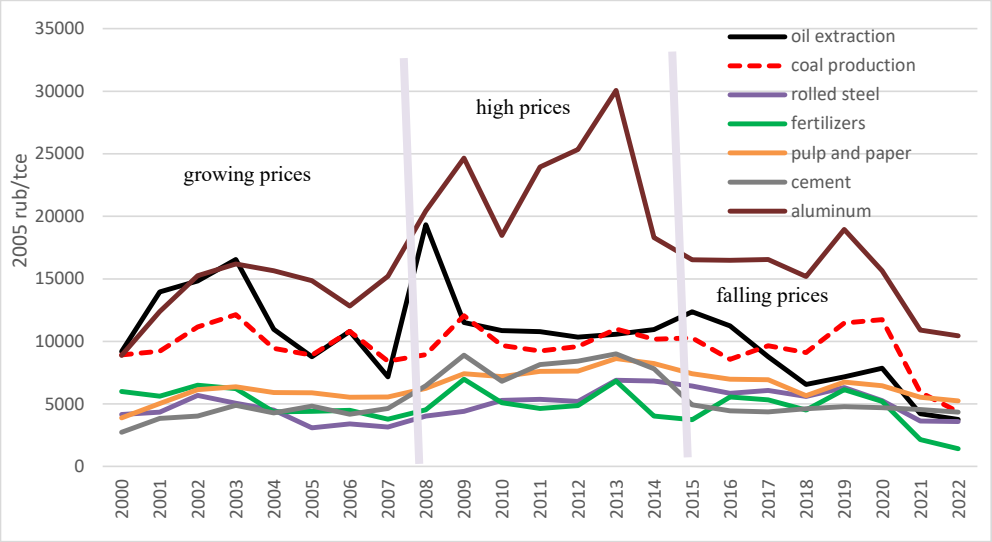


Source: Calculated by the authors based on Enerdata. 2023. World Energy & Climate Statistics – Yearbook 2023

Revenge of the ignored priority of Russia's energy policy: in 2022, even when calculated using purchasing power parity (PPP), the gaps in GDP energy intensity not only remained significant, but even increased: up to 1.3 times compared to Canada, 1.5 times compared to China, almost up to 2 times compared to the world as a whole, 2.1 times with the USA, 2.9 times with Japan and up to 3.2 times with the EU. The intensification of energy efficiency policies in 2009-2014 allowed it to practically keep pace with the international community in terms of reducing GDP energy intensity and keeping the gaps at a stable level. However, the post-2014 roll-back on energy efficiency programs in Russia led to a rapid recovery of gaps that exceeded not only the values of the Soviet era (1990), but also the values recorded for the lowest levels of economic activity in the 1990s.

Gaps in the levels of energy intensity are mainly determined by the lack of policies, lower level of development of the Russian economy, as well as by low and decreasing real (inflation-adjusted) energy prices; all these factors work to maintain the primitive structure of the economy and the low technological and skill level against the background of approximately equal levels of energy affordability compared to external competitors. The latter offset their high energy prices with high energy efficiency. Slow technological modernization, not stimulated by energy prices, inhibits the use of high-quality energy resources (electricity) and so does not allow it to improve the productivity of all production factors. Countries with lower energy prices do not have a competitive advantage because they have a higher energy intensity of GDP.

Figure 3 – Dynamics and levels of relative energy prices in the production of certain industrial products



Source: Calculated by the authors based on Rosstat data

Russia's high and not declining energy intensity (compared to other countries) is a natural outcome of the extremely low priority given to energy efficiency improvements in Russia's post-2014 energy and economic policies. The International Energy Efficiency Comparison System ranks countries based on both active energy efficiency policies and their success. It evaluates 25 largest energy consuming countries across 36 different policy and energy efficiency indicators to produce a comprehensive assessment. In the ACEEE rating system for energy efficiency activity for 2022,[5] Russia ranked 22nd out of 25 countries, scoring only 28 points in total versus 74.5 points for France (1st place) or 57.5 points for China (9th place). Only Saudi Arabia, South Africa, and the UAE were behind Russia.

1.2. Energy related GHG emission: from a strong coupling in 2020-2022 to a 'reverse decoupling' in 2022

The MoTFC-16-80-GHG model was also used to estimate 2022 energy related GHG emissions (only CO_2, CH_4 and N_2O) and to attribute the evolution of energy-related GHG emissions to different factors and to identify the role of the technological factor. The model operates in six modes and allows it to estimate direct CO_2 and GHG emissions from either fuel combustion alone or including fugitive emissions; and to take account of either direct or both direct and indirect emissions while allocating emissions from power and heat generation by end-use sectors. In 2015-2021, practically no progress was achieved towards reducing the carbon intensity of Russia's GDP. After an increase in 2016, carbon intensity was declining in 2017-2020. However, in 2021, it grew up again and nearly returned to the initial 2015 level.

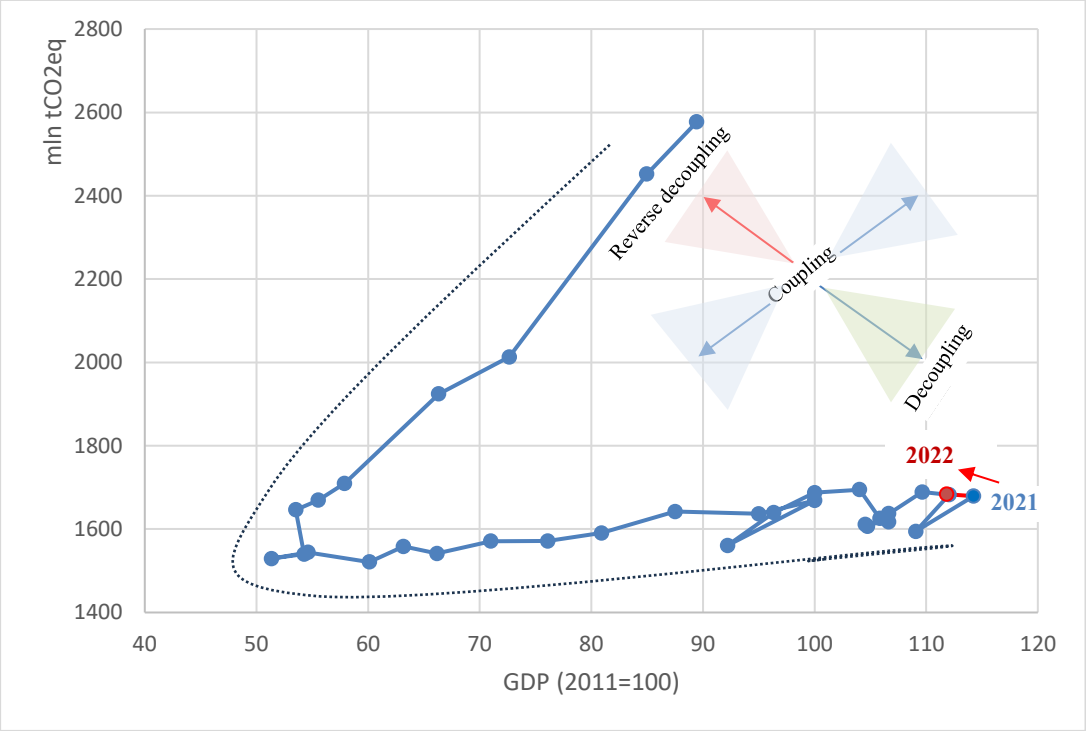
In Russia, supercoupling (an almost complete coincidence of changes in GHG emissions with changes in GDP in 2020-2021) was replaced by 'reverse decoupling' in 2022 (an increase in GHG emissions with a decrease in GDP) (Figure 4). Energy related GHG emissions are estimated to have increased by 1% in 2022 despite a 2.1% decline in GDP. In Russia, for the first time since 1990, a decline in GDP was accompanied by an increase (rather than a decline) in energy-related GHG emissions.

In 2015-2022, as a result of a balance between the impacts of a variety of factors, GHG emissions were growing faster than GDP. The factor of economic activity played a major role

[5] Subramanian, S., H. Bastian, A. Hoffmeister, B. Jennings, C. Tolentino, S. Vaidyanathan, and S. Nadel. 2022. 2022 International Energy Efficiency Scorecard. Washington, D.C.: American Council for an Energy-Efficient Economy. www.aceee.org/research-report/i2201.

both in bringing down GHG emissions in 2022 (by 30-35 million tCO2eq.) and in bringing them up in 2015-2022 by 122 million tCO2eq. (Table 2). Due to the carbon intensity of the energy used, GHG emissions were 19 million tCO2eq. up. This factor determined the 'reverse decoupling' phenomenon in 2022. In 2022, the structural shifts favoured both more carbon-intense sectors (+35 million tCO2eq.) and less carbon-intense economic activities within these sectors (-9 million tCO2eq.). In 2022, the climate factor (when calculated with an account of indirect GHG emissions) restrained the emissions growth by 12 million tCO2eq. In 2022, the factors of capacity load and the growth of amenities increased the emissions by less than 2 million tCO2eq. each. In 2022, the technological factor accelerated the growth of GHG emissions (when calculated using indirect GHG emissions) by 18 million tCO2eq.

Figure 4 – Energy related GHG emissions and GDP in 1991-2022



Source: Calculated by the authors based on Rosstat data and National Inventory Report for 1990-2021, and authors' estimates of 2022 GHG emissions

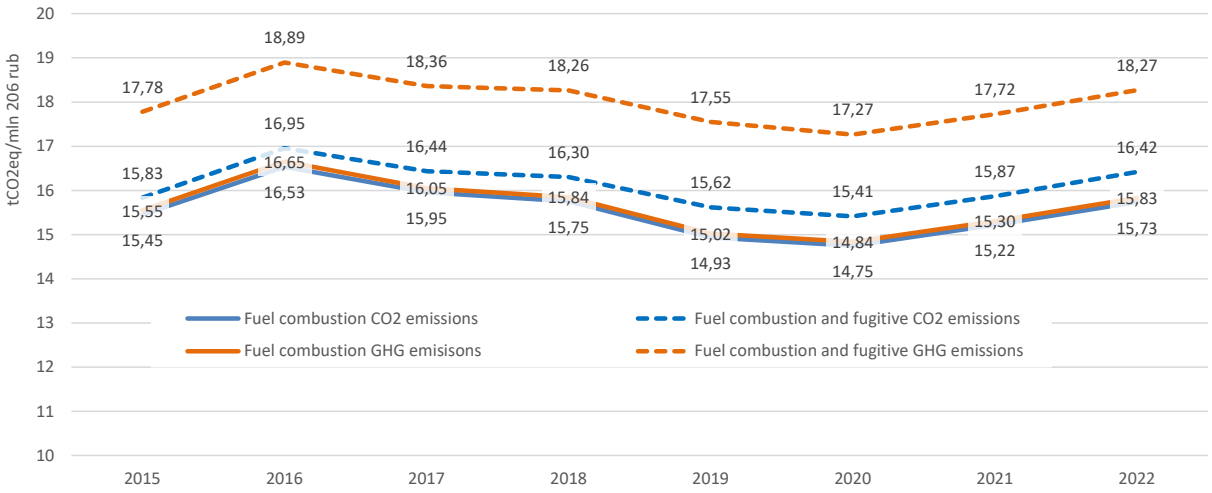
Table 2. –Evaluation of contributions from individual factors to energy related GHG emissions in 2015-2022 (1000 t CO_2eq).

Year	Total	Economic activity of energy	Carbon intensity	Inter-sector structure	Intra-sector structure	Technology	Climate	Capacity load	Saturation	GDP carbon intensity (tCO_2/mln 2016 rub)
2016/2015	98 191	3 030	17 515	27 100	-10 378	46 943	14 622	-886	245	17,8
2017/2016	-16 661	29 087	-16 731	18 796	60	-38 253	-6 452	-2 550	-619	18,9
2018/2017	35 772	44 758	20 988	-601	-12 067	-22 950	7 316	-1 569	-103	18,4
2019/2018	-29 242	35 222	-8 079	-902	-5 562	-25 885	-23 385	-1 118	466	18,3
2020/2019	-67 966	-42 273	-10 403	-1 435	2 438	-15 266	-2 848	1 505	316	17,5
2021/2020	129 646	87 540	-9	616	-5 903	23 156	26 857	-2 280	-331	17,3
2022/2021	**15 876**	**-35 001**	**15 872**	**35 277**	**-9 323**	**17 830**	**-12 098**	**1 509**	**1 809**	**17,7**
2022/2015	**165 616**	**122 364**	**19 154**	**78 851**	**-40 734**	**-14 425**	**4 013**	**-5 390**	**1 783**	

* Emissions are allocated to end-use sectors and include venting and flaring

Source: Calculated by the authors based on MoTFC-16-80-GHG model

Figure 5 – Dynamics of GDP carbon intensity indicators in 2015-2022



Source: Calculated by the authors based on MoTFC-16-80-GHG model

2 Myths and realities – real curses of fuel export-based economic development model in Russia: 1999-2023

2.1. Retrospective: post-2000 macroeconomic policies and their effects

The potential impact of decarbonization policies on the economic development can be assessed against a certain background. This background is the evolution of the Russian economy along the oligarchic raw materials-based pathway over the past 15-30 years. It is important to assess the impact of these economic policies on the economic growth rate and on the distribution of revenues of the key economic agents.

"**If we realize, that we need to be working, there won't be much harm, and we won't lose too much".**[6] Some Russian economists have certain prejudices against the potential effect of the decarbonization on the economic development: they fear that it might slow down the economic growth, lead to a decrease in, or stagnation of, the standard of living, and determine an abrupt price growth.[7] They are warning that decarbonization may cause Russia to lose a lot. Can V. Chernomyrdin be right with his catchphrase as cited above? Importantly, it is not clear, if there is really much to lose after the losses that have been incurred by the preserved state control over the raw materials-based economy. This issue is discussed in this section, which shows that the raw materials-based economic development over 2008-2022 led to exactly what these authors are accusing the decarbonization of: economic development nearly stopped, personal incomes were not growing, and decreasing real energy prices provided no impetus for economic growth.

Post-1999 political and economic reforms (with all their diversity and contradictions in the course of implementation) had two general parallel vectors: 1) roll-back on political

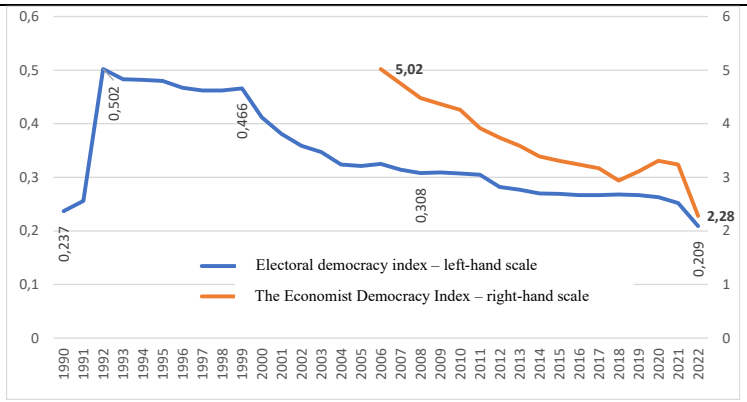
[6] © V. Chernomyrdin.

[7] Porfiriev B., Shirov A., Kolpakov A. Low carbon development strategy: perspectives for the Russian economy. Mirovaya energetika i mezhdunarodnye otnosheniya. 2020. Vol. 64, No. 9. Pp. 15-25, https://doi.org/10.20542/0131-2227-2020-64-9-15-25; Porfiriev B.N., Shirov A.A., Kolpakov A.Y., Edinak E.A. Opportunities and risks of the climate policy in Russia. Voprosy Ekonomiki. 2022;(1):72-89. (In Russ.) https://doi.org/10.32609/0042-8736-2022-1-72-89; Shirov A.A. Sustainable development, climate, and economic growth: strategic challenges and solutions for Russia] https://cenef-xxi.ru; Shirov A. 2021. Presentation "The risks of the low carbon development policies for the Russian economy". The Institute of Economic Forecasting of the Russian Academy of Science. 2021.

competition – the dawn of the democracy; and 2) roll-back on economic competition – the dawn of the efficiency. Democracy has turned into a decorative institution of the autocratic regime,[8] as a tough top-down command structure was rebuilt with the primary purpose to 'preserve the stability', that is, in fact, 'to keep the personal power'; in the Russian environment, this typically leads to stagnation or economic decline by providing zero development incentives.

After 1990, Russia noticeably advanced in the global democracy rankings, yet from 1999 onwards, it began to roll back, and by 2022 the democracy indices were even below the Soviet 1990 values. The Varieties of Democracy (V-Dem) project evaluates four integral indices and a large variety of partial indices that describe the level of democracy. The electoral democracy index (Figure 6) is based on expert assessments and shows the extent, to which political leaders are elected in the course of a free and fair election process which guarantees the freedom of associations and expression of opinions. It varies between 0 (no democracy) and 1 (most democratic).[9] The Economist Democracy Index measures the democracy and some of the political institutions and freedoms.[10] After growth in 1990-1992, the index of electoral democracy stayed relatively high (0.47- 0.5) for a few years (in the developed democracies, it was 0.8-0.9 during the same period), but then was declining rapidly in 1999-2008. Two more notable declines were observed in 2012-2014 and 2022. As a result, all four integral democracy indices, as described by the V-Dem project, were lower in 2022, than in the Soviet Russia of 1990.

Figure 6. Democracy indices and government control sector index in Russia. "Back to the USSR"

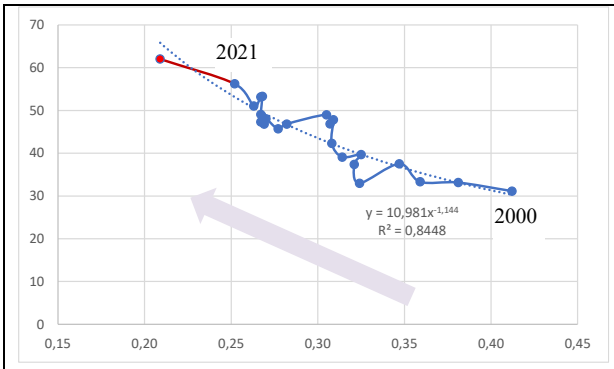


Democracy indices

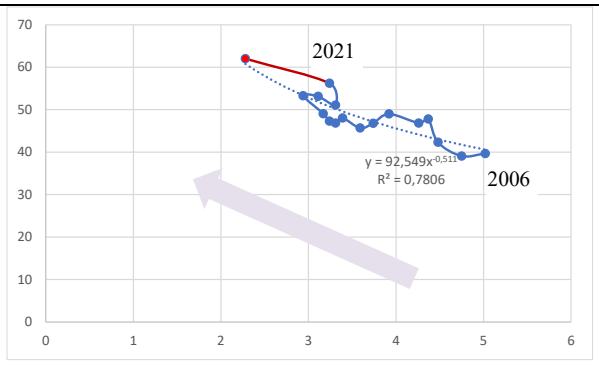
[8] Interactive Maps – V-Dem; The world's most, and least, democratic countries in 2022 (economist.com).

[9] In addition, the following indices are assessed: egalitarian democracy index, which shows, that personal rights and freedoms are equally protected across all social groups, and access to power is not determined by gender or social or economic position; deliberative democracy index reflects the deliberative principle of democracy in the process of state decision-making; Liberal Democracy Index reflects the protection of individual freedoms, supremacy of law, independent judiciary, effective checks and balances to limit the executive branch. The dynamics of all four integral indices in Russia is similar. See Interactive Maps – V-Dem.

[10] The index is based on 60 indicators grouped into 5 categories; it measures pluralism, individual freedoms, and political culture. It classifies each country into one of the four types of regimes: full-scale demorcracies; imperfect democracies; hybrid regimes; and autocracies. The first report on the Democracy Perception Index was published in 2006.



Government control sector index as function of electoral democracy index (2000-2022)



Government control sector index as function of the Economist Democracy Index (2006-2022)

Source: the authors based on data from Varieties of Democracy, V-Dem Interactive Maps – V-Dem; The Economist Democracy Index The world's most and least democratic countries in 2022 (economist.com); Indices (ranepa.ru). The 2022 value assessed by authors.

Around 70% of the Russian population believe, that democracy is important (one of the lowest indicators among 53 world's leading economies) and less than 50% believe, that Russia is a democratic country (only 8 countries[11] out of 53 have a lower indicator). About 30% believe, that there is not enough democracy.

The goal of establishing the government control over the key financial flows in the fuel and raw materials sector was attained. This caused the share of the government control sector grow 1.8-fold – from 31.2% in 2000 to 56.2% in 2021[12] (the author estimates, that it exceeded 60% in 2022). Control over the economy and society was largely established in 1999-2008 and finalized in 2012-2022. The roll-back on democracy was accompanied by the growth in the share of the government control sector in the economy. Each percentage point reduction in the electoral democracy caused (was accompanied?) the share of the government control sector grows by 1.1% (Figure 4.1). The Institute of Comprehensive Strategic Research has estimated the results of Russia's economic development in 2008-2020 as follows:[13]

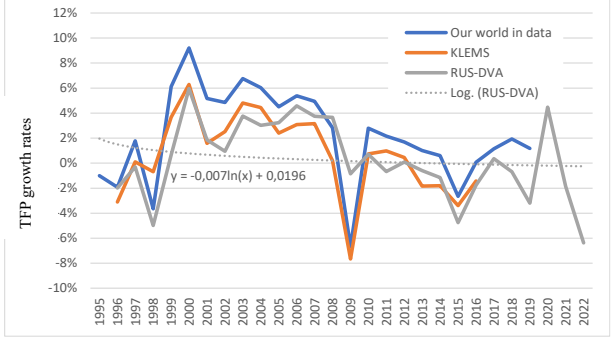
- Despite the ambitions goals and plans (as specified in the Concept of Russia's long-term social and economic development to 2020, including to bring personal incomes and the standard of living to match the indicators seen in the developed countries; to ensure the transition from the raw materials export-oriented model to the innovations-based economic growth, including by establishing a highly competitive institutional environment), the Russian economy failed to make a qualitative breakthrough over those 12 years, and many social and economic problems remain unsolved;
- The raw materials-based economic model and the reliance of the national government on the raw materials export revenues persist;
- Negative trends can be observed in the evolution of the standard of living;
- The institutionalization of economic policies has been attained by establishing state corporations with an access to financing, yet weak control over their performance and with a negative impact on the competitive environment;
- Modernization and infrastructure development rates in Russia remained slow;
- The level of ambition in the strategic planning documents noticeably decreased;[14]

[11] Iran, Hungary, Venezuela, Poland, Peru, Maroc, Nigeria, and Japan. Democracy Perception Index 2023. Democracy Perception Index 2023.pdf (hubspotusercontent-na1.net)
[12] Assessed by Institute for Applied Economic Studies, RANEPA. Indices (ranepa.ru)
[13] Institute for comprehensive strategic research. Review of the macroeconomic situation. June 11, 2020. Makro_prognoz.pdf (icss.ru)
[14] Including the Low Carbon Development Strategy.

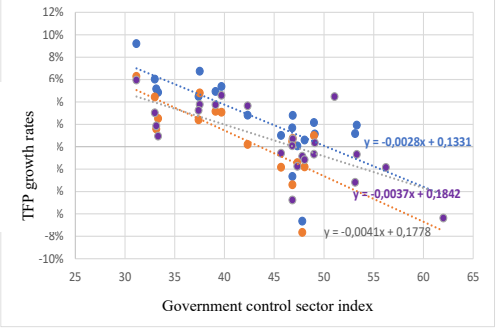
- Economic policies in Russia have moved from large-scale reforms of the 1990s and early 2000s (which fundamentally changed the conditions of doing business in the country and laid the basis for economic growth) to limiting the economic growth for the sake of preserving the "macroeconomic stability" which eventually turned into stagnation.

To this list we can add that the roll-back on competition in 2000-2008 replaced the rapidly growing efficiency of production factors – labour, capital, materials, and energy – with a slow growth in labour productivity, stagnation of energy intensity and materials intensity (Figures 7 and 8).

Figure 7. Total factor productivity (TFP) and the impact of government control sector



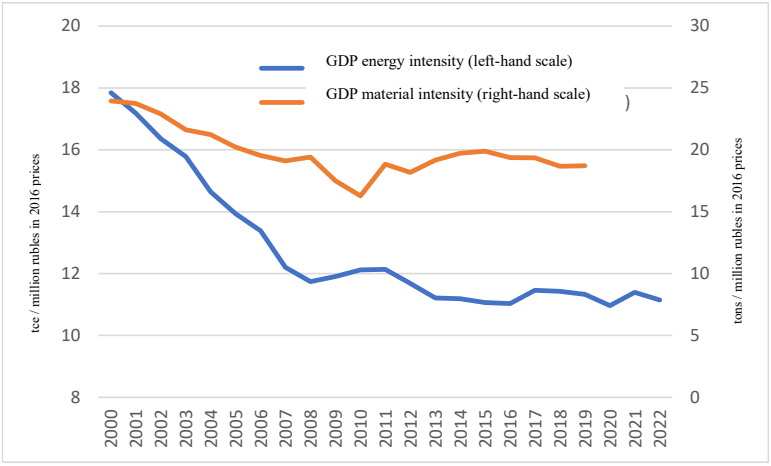
Evolution of TFP for entire economy (Our World in Data and KLEMS) and for non-oil-and-gas sector (CENEf-XXI)



Relationship between various assessments of TFP and government control sector index

Sources: Our World in Data (2023). Total factor productivity, 1970 to 2019 (ourworldindata.org); RUS-DVA - Bashmakov I., V. Bashmakov, K. Borisov, M. Dzedzichek, A. Lunin, I. Govor. 2022. Russia's carbon neutrality: pathways to 2060. CENEf-XXI. https://cenef-xxi.ru/articles/russia's-carbon-neutrality:-pathways-to-2060; KLEMS. National Research University Higher School of Economics. December 2019; https://www.hse.ru/russiaklems/dataklems/; Indices (ranepa.ru)

Figure 8. Evolution of GDP energy and materials intensities



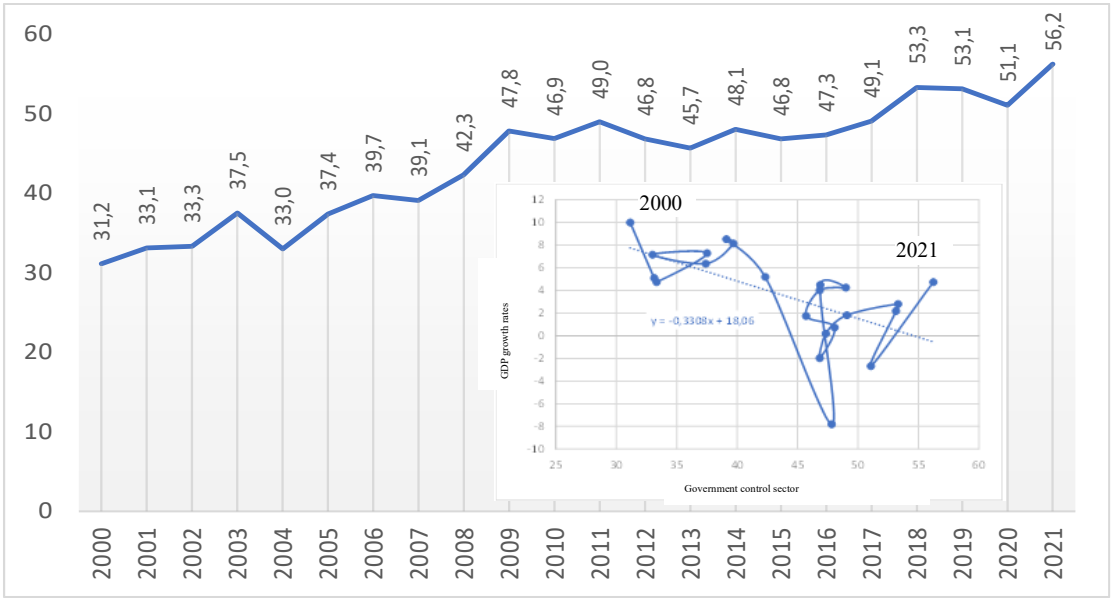
Sources: Energy intensity – Bashmakov I., A. Myshak, V.A. Bashmakov, V.I. Bashmakov, K. Borisov, M. Dzedzichek, A. Lunin, O. Lebedev, and T. Shishkina (2023). Russian energy balance, energy efficiency, and energy-related GHG emission accounting system. Energy Efficiency. 16:67. https://doi.org/10.1007/s12053-023-10132-6; materials intensity – consumption of metal and non-metal ores and biomass based on data from Global Material Flows Database | Resource Panel; GDP – data from Rosstat.

On average, each percent increase in the government control sector share index[15] in 2000-2021 was accompanied by a 0.33% decrease in GDP growth rates (caused mainly by the declining efficiency of use of the key production factors), and where the share of the

[15] Privatization 30 years later: government control sector size and effectiveness / A.D. Radygin, R.M. Entov, A.E. Abramov, M.I. Chernova, G.N. Malginov. – Moscow, Delo, RANEPA, 2019. - 76 p.

government control sector is above 55%,[16] total factor productivity growth is down to zero (or below) stopping the economic growth. Relatively high (like in 2021) GDP growth rates are attainable only as a result of a post-crisis rebound (for example, after the COVID19 crisis in 2020). Alexey Kudrin claimed that a high share of government control sector in the economy is a factor that slows down economic growth.[17] Indeed, the growing share of government control sector and subsequent decline in the general efficiency of the economy led to a substantial slowdown in the economic growth after 2008 (see Figure 9). The share of government control sector, as estimated by RANEPA, does not include the public services sector (education, health cars, culture, defense, police etc.).[18] With this included, the share of government control sector in the economy grows up to 70%. This indicator is gradually getting back to the 86% observed in the Soviet Russia in 1990.[19]

Figure 9. Government control sector index and GDP growth rates



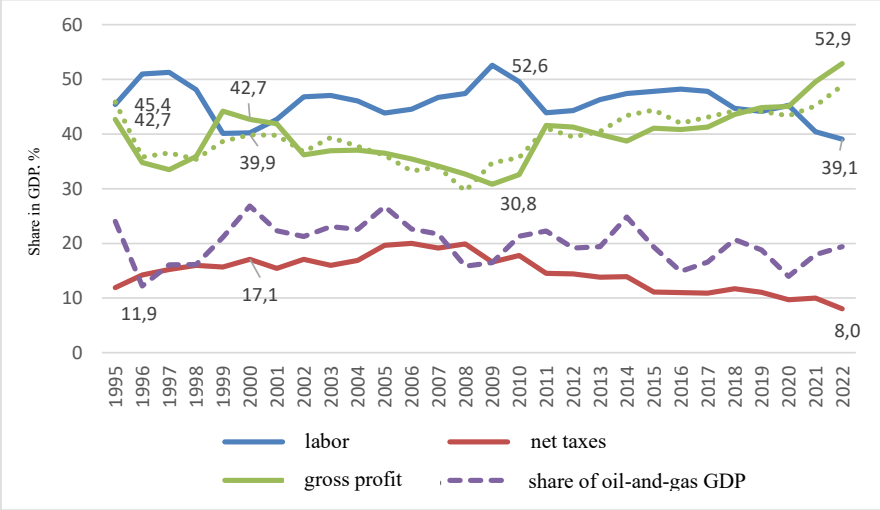
Source: Authors based on data from Indices (ranepa.ru)

Economic growth has already slowed down. Reduced competition and the transition to a purely extensive raw materials-based model, along with a decrease in, or stagnation of, the efficiency of use of the basic resources have caused Russia's GDP growth rates drop 7-10 times: from 6.5% in 2000-2008 to 0.9% in 2008-2022 (or even to 0.6-0.7%, if you don't believe the latest 'revised' figures from Rosstat). Trust in Rosstat's data on GDP evolution is declining.[20] Rosstat has become a "source" of additional economic growth: by revising the data it has added at least 2.7% to GDP since 2018.

Standard of living 'frozen' for 10 years. The first set of proportions for the analysis includes GDP distribution by revenue sources. Three revenue sources are identified: (a) labor compensation (including wages and mixed incomes, which are not included in direct statistical methods); (b) net taxes on production and import; (c) gross profit and gross mixed incomes. The evolution of the GDP structure by revenue sources in 1995-2022 is shown in Figure 10.

[16] =18,06/0,3308.
[17] https://lenta.ru/news/2022/01/13/kud2/
[18] Privatization 30 years later: government control sector size and effectiveness / A.D. Radygin, R.M. Entov, A.E. Abramov, M.I. Chernova, G.N. Malginov. – Moscow, Delo, RANEPA, 2019. - 76 p.
[19] Karpov D.Yu. Government control sector: institutional directions of development in Russian economy. Resume of PhD dissertation (Economics). Saratov, Russia, 2011.
[20] Bashmakov I., V. Bashmakov, K. Borisov, M. Dzedzichek, A. Lunin, I. Govor. 2022b. Russia's carbon neutrality: pathways to 2060. CENEf-XXI. https://cenef-xxi.ru/articles/russia's-carbon-neutrality:-pathways-to-2060

Figure 10. Evolution of GDP structure by revenues in 1995-2022



Dashed line shows approximation of gross profit share based on Equation (4.1).

Source: the authors based on Rosstat's data

Redistribution of income in favour of labor and net taxes in 2000-2009 was accompanied by dynamic economic growth. The post-2009 reverse redistribution of income in favour of large capital was accompanied by economic stagnation. The 2000-2022 period should be viewed as two intervals. In 2000-2009 (a period of dynamic economic growth), the shares of labor and net taxes were growing, while the share of gross profit was declining. During the 1990s and 2009 crises, the share of gross profit was declining, while the share of labor was growing. The share of profit was also declining due to the increasing share of net taxes. Therefore, over these years, a more equal distribution of income due to the growing shares of labor and net taxes was not slowing down economic growth.

After 2009, the government's economic policy, aimed at the conservation of the raw materials-based model, had an important negative re-distributional effect: one fifth of the GDP was re-distributed in favour of the large companies. In 2009-2022, along with extremely slow economic growth, the share of labor in GDP decreased by substantial 13.5%; the share of net taxes also dropped from 16.6 to 8%. This helped to increase the share of gross profit by 22.1%. In other words, one fifth of total GDP was re-distributed in favour of large businesses (primarily raw materials). Important factors that determined growth in the share of gross profit in GDP ($Shprof$) included the share of non-oil-and-gas GDP ($Shnoggdp$), which is characterized by a very high share of gross profit, and net taxes ($Shnettax$):

$$Shprof = 49.6 - 1.456 * Shnettax + 0.565 * Shnoggdp \qquad (4.1)$$

(15.512) (-8.455) (3.682) *t*-statistics

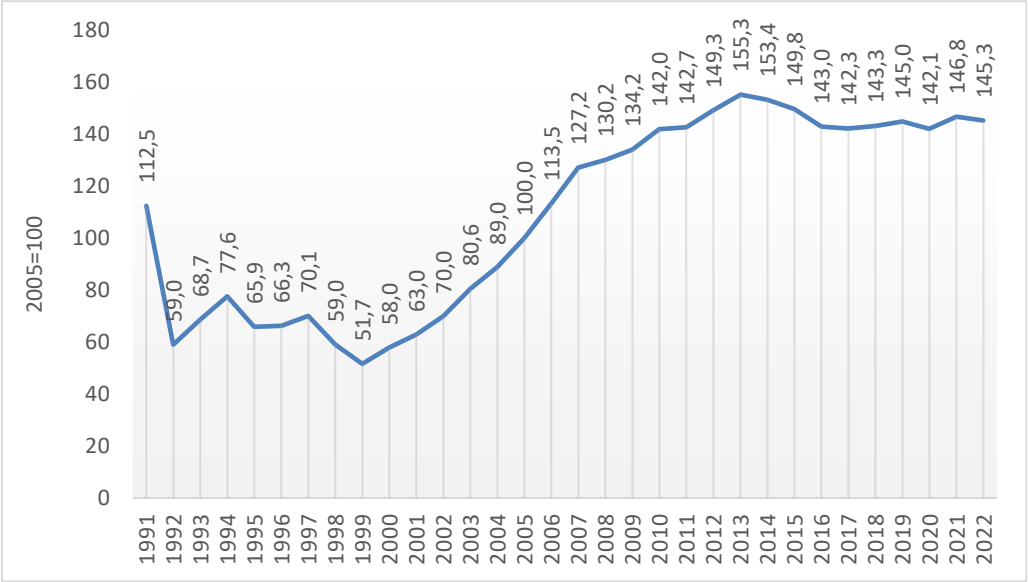
R^2= 0.86; F=35.9

Each percent of change in the share of oil-and-gas GDP causes the share of profit to change by nearly 0.6%; and each percent of reduction in the share of taxes causes it to grow by almost 1.5%. From 2000 onwards, the share of oil-and-gas GDP has been eventually declining; this should have caused the share of gross profit in GDP to decline too. However, this did not happen. Changes introduced to the government's tax and subsidies policy helped to not just maintain, but substantially increase the share of gross profit. The dynamics of the share of gross profit changed noticeably during the years of crises: in the crises of 2015 and 2022, this share did not decline, but grew due to noticeable reductions in tax pressure on business (2.8% in 2015 and 2% in 2022).

The roll-back on market reforms coupled with the conservation of the raw materials-based economic development stopped the growth in people's real disposable incomes: in 2022, they

were 3% below the 2012 level. This result was obtained despite the regular upward revisions of statistical data by Rosstat.[21] If it were not for such revisions, real disposable incomes in 2022 were 3% below the 2010 level. Labor compensation amounts to some 80% (ranging between 76 and 86% in 1995-2022) of gross household disposable incomes. Therefore, the declining share of labor in GDP, coupled with slow economic growth, had a substantial impact on the evolution of real disposable incomes (Figure 11). In 1995-2022, gross profit and gross mixed income contributed 13-22% to real disposable incomes. The change in these components and in the property revenues balance did not allow it to stop the trend towards stagnation of real incomes and avoid the loss of more than 10 years in the growth of the well-being of Russians.

Figure 11. Evolution of real disposable income: 1991-2022

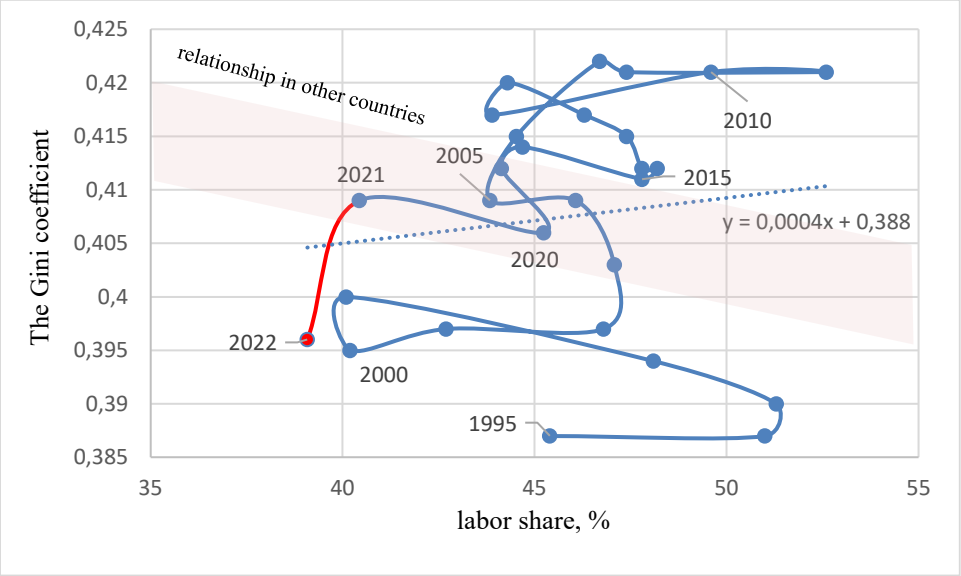


Source: authors based on Rosstat's data

The key indicator of the uneven distribution of people's incomes is the Gini coefficient. The lower it is, the more evenly incomes are distributed across quantiles and deciles. Figure 13 shows the relationship between the Gini coefficient dynamics and the share of labor in GDP. Since wages are the key income of low-income groups, while profit is the key income for the richest, it is safe to say that the higher the share of labor, the lower should be the Gini coefficient. In Russia, the curve in Figure 12 followed this logic only during certain periods. However, in general, the trend inclination over 1995-2022 shows an illogical sign. Particularly interesting is a 3% decrease in the Gini coefficient (based on Rosstat's data) for 2022 along a decline in the share of labor and real disposable incomes (Figure 10).

[21] https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Frosstat.gov.ru%2Fstorage%2Fmediabank%2FKomment_doh_2021.docx&wdOrigin=BROWSELINK

Figure 12. Gini coefficient as a function of labor share in GDP: Russia, 1995-2022



Source: authors based on Rosstat's data

Rosstat's data on the Gini coefficient dynamics conflict the economic logic and the foreign experience,[22] (Figure 13), **so cannot be viewed as reliable and therefore can hardly be taken as a basis for income inequality analysis in Russia.** It appears that following a 10.5 percentage points decrease in the share of labor (20.5%) in Russia in 2010-2022, a significant progress was made towards tackling the income inequality: the Gini coefficient decreased from 0.421 to 0.396 (by 6%). Analysis of the available scientific literature shows the opposite, while a regression analysis for 62 foreign countries (both developed and developing) has shown, that:

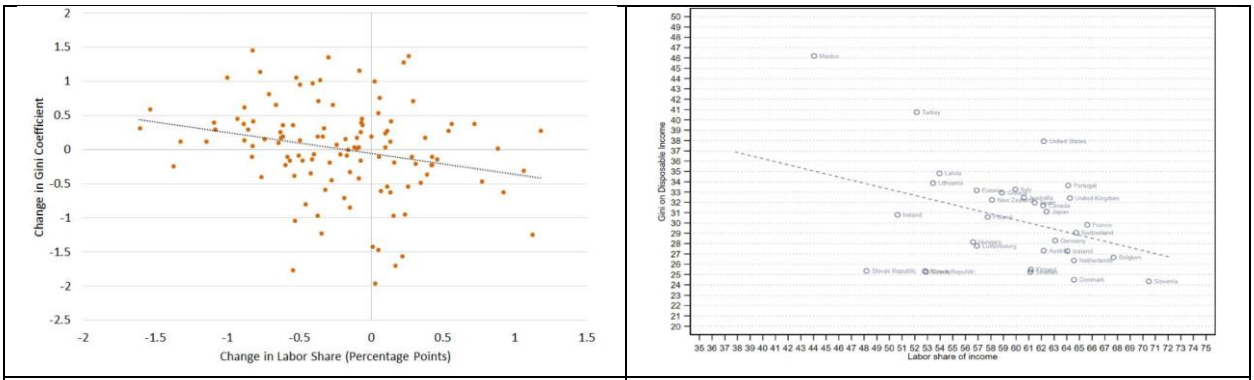
- Low share of labor in GDP correlates with higher Gini coefficient: where the share of labor drops by 1 percentage point, the Gini coefficient grows by 0.36%,[23] because a lower share of labor:
    - is reflected through lower incomes of two lowest quantiles;
    - is weaklier related to the shares of labor for the third and fourth quantiles;
    - is reflected through a higher share of income for the highest, fifth, quantile;
- The lower the quantile, the stronger the relation between the share of labor and the share of income for this quantile.[24]

[22] See literature review in Erauskin I. The labor share and income inequality: some empirical evidence for the period 1990-2015. Deusto Business School, University of Deusto, Pº Mundaiz Donostia-San Sebastián, Spain. Applied Economic Analysis. Vol. 28 No. 84, 2020. pp. 173-195. Emerald Publishing Limited. 2632-7627. DOI 10.1108/AEA-04-2020-0028; EM-AEAJ200014 173..195 (emerald.com) How Income Inequality Is Affected by Labor Share (stlouisfed.org); Bises B., F. Bloise, A. Sciala. Labor share as an "automatic stabilizer" of income inequality. Accepted: 30 April 2023. International Tax and Public Finance. https://doi.org/10.1007/s10797-023-09782-0 Labor share as an "automatic stabilizer" of income inequality | International Tax and Public Finance (springer.com) Ng A., T.T. Theng and T. Z. Gen. WHAT EXPLAINS THE INCREASE IN THE LABOR INCOME SHARE IN MALAYSIA? ADBI Working Paper Series. No. 894 Asian Development Bank Institute. November 2018 https://www.adb.org/sites/default/files/publication/469216/adbi-wp894.pdf

[23] By 0.3%, according to Bises B., F. Bloise, A. Sciala. Labor share as an "automatic stabilizer" of income inequality. Accepted: 30 April 2023. International Tax and Public Finance. https://doi.org/10.1007/s10797-023-09782-0 Labor share as an "automatic stabilizer" of income inequality | International Tax and Public Finance (springer.com)

[24] Erauskin I. The labor share and income inequality: some empirical evidence for the period 1990-2015. Deusto Business School, University of Deusto, Pº Mundaiz Donostia-San Sebastián, Spain. Applied Economic Analysis. Vol. 28 No. 84, 2020. pp. 173-195. Emerald Publishing Limited. 2632-7627. DOI 10.1108/AEA-04-2020-0028. EM-AEAJ200014 173.195 (emerald.com)

Figure 13. Dependence of Gini coefficient on labor share in GDP for other countries



a) b) trend inclination angle is -0.297

Sources: a) How Income Inequality Is Affected by Labor Share (stlouisfed.org); b) Bises B., F. Bloise, A. Sciala. Labor share as an "automatic stabilizer" of income inequality. Accepted: 30 April 2023. International Tax and Public Finance. https://doi.org/10.1007/s10797-023-09782-0 Labor share as an "automatic stabilizer" of income inequality | International Tax and Public Finance (springer.com)

The richest 20% of Russians get nearly a half of the total income; of these, the highest-income 10% account for nearly 30% of the total income in the country. Rosstat has come up with a quite opposite result: following a decrease in the share of labor by 10.5 percentage points in 2010-2022 the Gini coefficient was not 4% up, but dropped by 6%. At that, the share of the fifth quantile in the total income remained in the range of 47-48%. The funds ratio (i.e. the ratio of incomes of the top 10% and bottom 10% of the population) was up from 13.9 in 2000 to 16.6 in 2010, and then declined to 15.2 in 2021 and dropped to 13.8 in 2022. The decile coefficient (it shows how many times the incomes of 10% of the richest population exceed the incomes of 10% of the poorest population) also dropped from 7 in 2021 to 6.5 in 2022. With a growing share of gross profit in GDP such evolution cannot be explained. According to Rosstat, the share of income from business activities in household incomes was up from 5.7% in 2021 to 6.2% in 2022, while incomes from property declined from 5.7 to 5%. In other words, the sum of these two indicators remained almost unchanged during those years – 11.4 and 11.2% – and was above the values for 2017-2020.

Based on the statistics for 19 countries, the share of profit in GDP shows a strong positive correlation with the share of income of the richest 1% of population and also shows a positive correlation with the Gini coefficient (the regression coefficient, depending on the model specification, is 0.2-0.4).[25] According to this logic, post-2009 substantial increase in the share of gross profit in Russia's GDP (Figure 10) should have caused the Gini coefficient to increase, rather than to drop.

The stratification of the Russian society by the level of wealth – resulting from the oligarchic, raw materials-based development – substantially aggravated after 2009, whereas the share of incomes of the richest 1% in the total income increased 1.5-2-fold. These incomes and wealth are mostly concentrated in the hands of the owners of raw materials companies. Rosstat does not provide information on the share of incomes of top 1% of the population. In other countries, each percent of growth in the share of profit in GDP causes the share of incomes of the top 1% of population to grow by 0.5-1.5%.[26] According to this logic, where the share of gross profit in GDP grows 1.7-fold and with an assumption that the share of the top 1% of population in Russia's total incomes was 10% in 2009, this share should have increased by 2022 to 15-20%. With such dynamics there is not a chance that the Gini coefficient could decrease. Russia stands 5th among the countries with the largest number of dollar billionaires (about 100). As of February 23, 2022, the 23 richest Russian billionaires (included in the list of 500 richest people in the world) had a combined net capital of USD 339 billion. 500 'super-rich' Russians account for 40% of the

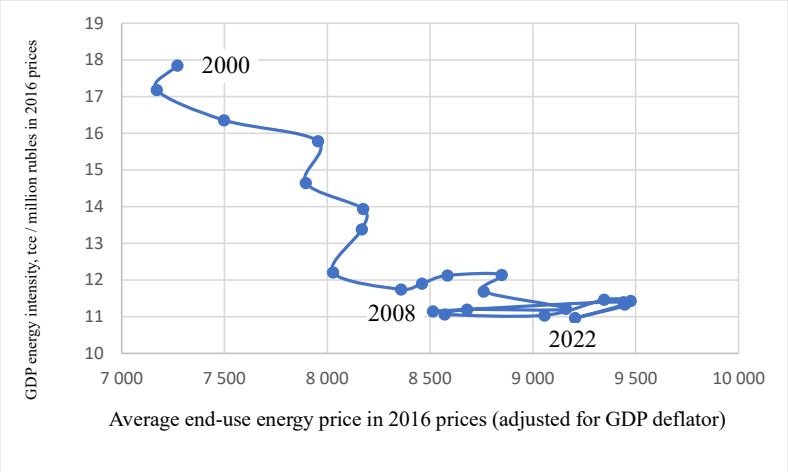
[25] Bengtsson E. and D. Waldenström. Capital Shares and Income inequality: Evidence from the Long Run IZA DP No. 9581 December 2015. Capital Shares and Income inequality: Evidence from the Long Run (iza.org)
[26] Ibid.

entire national wealth, including USD 640 billion in financial assets. The wealthiest Russians have accumulated a share of national wealth, which is 4 times the world average.[27] The owners of raw materials companies are on the top of the list.[28]

12-70% drop in real energy prices over 2014-2022 for a variety of industrial products did not allow it to accelerate economic growth, but slowed down or stopped energy efficiency improvements. Practically no analysis of the impact of energy price dynamics on the efficiency of energy use has been made in Russia. This impact can be estimated by comparing energy prices with the prices for manufactured products. Below these real energy prices are estimated for industry (Figure 3).

The growth in real energy prices led to energy efficiency improvements and accelerated, rather than slowed down, the economic growth, and vice versa. The sampling in Figure 4.9 is divided into three parts: 2000-2008 – a period of growing relative energy prices, rapidly declining energy intensity and fast economic growth; 2008-2014 – a period of relatively high prices, slowly declining energy intensity and moderate rates of economic growth; and 2015-2022 – a period of declining prices with energy intensity and economic stagnation. By adjusting the average energy price across all end-use sectors by the GDP deflator one can evaluate the real energy price for all consumers (Figure 14). Its growth in 2000-2008 was accompanied by GDP energy intensity reduction and dynamic GDP growth, but subsequent stabilization of energy prices at around 8,500-9,500 rubles/tce and the roll-back on competition did not provide any incentives for energy intensity reduction or GDP growth.

Figure 14. Evolution of GDP energy intensity as a function of average real energy price



Source: estimated by authors

The trends that emerged after 2008 first led to supercoupling (i.e. a nearly complete coincidence in 2008-2021 of the evolution of GHG emissions and GDP) and then 'reverse decoupling' in 2022 (i.e. GHG emissions growth against the background of GDP decline), see Figure 4. The strong 'coupling' in the 1990s gave way to a very weak one in 1998-2008. In 1997, 2000, 2002, 2007, 2013-2014, 2016, and 2019, decoupling was observed. Energy-related GHG emissions are estimated to have increased by 1% in 2022, despite a 2.1% decline in GDP. For the first time since 1990, energy-related GHG emissions were up, while GDP was down.

[27] Billionaires in Russia (tadviser.ru)
[28] List of Russia's richest businessmen (2021) — wikipedia.org

3 News related to low carbon technologies deployment, plans and innovations in Russia

Below are materials from a review by the Russian Association of Wind Energy (RAWI) of low carbon technologies deployment in Russian in 2023.

A report on the actual performance of grid RE sources in August 2023 was published on the website of the Russian Power System Operator.[29] As of August 1, 2023, the installed certified solar capacity is 1,788.3 MW and wind capacity is 2,360 MW; plant capacity factor is 20% for both.

JSC "Power Machines" is planning to launch the production of wind generators in Tatarstan in 2025.[30] The design production capacity is up to 150 installations per year. At the first stage, the plan is to produce 60-80 installation per year. At the beginning, Chinese components will be used for production. In 2 or 3 years, the goal is to produce wind turbines from domestically produced components only.

En+ Group in cooperation with China Energy is going to build a windfarm in Blagoveshchensk (Amurskaya Oblast).[31] The windfarm is expected to export up to 3 billion kWh per year to China.

The Hydrogen Energy Research Institute of the Ural Federal University is ready to demonstrate a prototype of a solid oxide fuel cell (SOFC) stack from Russian-made materials.[32] Structurally, a SOFC stack is a small 2kW device, typically made of 15x15 cm elements.

According to the Russian Ministry of economic development, 3,187 electric cars have been produced in Russia in 2023.[33] This basically includes the assembly of Chinese cars at the Moskvitch plant (2,041 pcs.) and at Motorinvest Plant in Lipetsk (1,131 pcs.). Nine cars were assembled by GAZ plant and six cars by Electromobili Manufacturing Rus. The target is to produce 7.4 thousand electric cars before the end of the year. Last year, during the same period, 1,745 electric cars were produced, and the target was 2.5 thousand cars.

Sber has presented Russia's first voluntary certification system for low carbon energy.[34] This is the first Russian voluntary certification system registered with Rosstandart, which allows to certify the fact and the volume of low carbon energy production / consumption by issuing and redeeming green certificates. Telestar Communications took part in the pilot project by deploying 100 MWh of solar energy. It has also covered 1.5 times its annual electricity consumption through green energy.

NGO Sovet Rynka [Market Council] has set up a LLC "Energy Certification Center" to launch a national certification system for low carbon energy generated from wind, hydro, and nuclear.[35] Green certificates can help commercial consumers reduce their carbon footprint.

The Osipian Institute of Solid State Physics of the Russian Academy of Science has created a material which can be a filler for hydrogen transport and storage[36] - quartz glass with an addition of lithium oxide. It can absorb and release hydrogen. This might be one possible solution for hydrogen storage and transport.

[29] 2023 | JSC Russian Power System Operator (so-ups.ru)
[30] Wind turbines production may be launched in Tatarstan in 2025 — RBC (rbc.ru)
[31] En+ Group, KRDV and Amurskaya Oblast will cooperate to set up a 1 GW windfarm in Amurskaya Oblast (enplusgroup.com)
[32] Clean hydrogen year (Expert.ru)
[33] Electric cars in Russia: production (iz.ru)
[34] Sber has presented the first in Russia system of voluntary certification of low carbon energy (tass.ru)
[35] Interview with Maksim Bystrov, Chief of "Sovet Rynka" [Market Council], about green certificates for RE electricity generation (kommersant.ru)
[36] Russian scientists have produced a material for hydrogen storage and transport (otr-online.ru) (In Russian)

In Sakhalin, a group of companies, including JSC RAOS (part of Rosatom), Gasprom neft", H2 tech, and LLC "H2 clean energy", are going to produce hydrogen in Sakhalinskaya Oblast.[37] 36.5 thousand tons of hydrogen per year will be produced using steam conversion of methane; from 2030 onwards, this amount will increase. Hydrogen will be produced to meet the domestic demand and for export to the Asia-Pacific region.

4 Recommendations for financial institutions on how to account for climate risks

Central Bank of Russia has drafted "Recommendations for financial institutions on how to account for climate risks" (36 pages, released August 28, 2023). It has decided to conduct stress tests to assess the impact of climate risks on the Russian economy. Different risk scenarios will be assessed to evaluate the macroeconomic effects of scenarios associated with a reduction in Russian hydrocarbons demand.[38]

The risks, including 'climate transition risks' (i.e. the likelihood of losses associated with the low carbon economy transition, including measures taken by governments and regulators to combat climate change and adapt to it, which break down into political, legal, technological, market and reputational risks), will be explored. The purpose is to provide recommendations regarding climate risk management to financial institutions.

The recommendations include:

- To identify the risks and develop a monitoring system for significant and potentially significant risks;
- To make scenario analysis to assess these risks and analyze the effectiveness of possible corrective measures to mitigate the impact of climate risks. It is recommended that a scenario analysis of climate risks be made on a regular basis, at least annually, and the results be taken into account when developing strategies and as part of risk management;
- Based on the results of scenario analyses of financial organizations to identify the required risk mitigation measures;
- On an annual basis, to review the results of risk assessments and the opportunities arising from climate change and to take them into account when assessing and approving strategies and business plans of financial institutions;
- To set up risk management systems and integrate climate risk management units therein;
- To promote capacity building in climate risk management and climate change adaptation, including through training programs for the Board, executive bodies and employees;
- To consider the following time horizons:
    - short-term horizon (1 to 3 years) to capture the impacts over the normal business planning horizon;
    - medium-term horizon (4 to 10 years); and
    - long-term horizon (10 years to 30 years) to provide insights into the implications of evolving climate risks as they materialize over time;
- To set climate goals as links between a financial institution's strategy and its risk management systems;
- For clients and counterparts who are not managing climate risks appropriately, a financial institution may consider the following measures to reduce climate risks and mitigate their consequences:
    - To integrate provisions in the contracts obliging clients/counterparts to improve climate risk management practices, indicating specific deadlines and activities;

[37] In Sakhalin, a group of companies are planning to build a hydrogen production plant (tass.ru)
[38] The Central Bank of Russia is planning to develop recommendations on how to account for climate risks 03.06.2021 | (banki.ru)

- To reduce loan terms, increase discounts when valuing assets for financing, reduce the limits on financing, investments and insurance;
- To review covenants in financing, investment, insurance and reinsurance agreements;
- To revise lending and financing rates, insurance and reinsurance tariffs.

Summarizing these "Recommendations", financial institutions are called upon to develop the awareness and long-term visions of climate change risks and opportunities for themselves and their clients, and to tailor financial instruments to support low carbon activities, since activities with high carbon footprints incur high climate risks.

5 Climate agenda of the Eastern Economic Forum

On September 10, 2023, the participants of the Eastern Economic Forum (EEF) were discussing the prospects for tightening climate regulation. The "turn to the East" requires preparation for stricter environmental regulations in China and other large Eastern markets. Therefore, carbon footprint becomes an important parameter for competition and market penetration. The companies are evaluating the potential impact of Chinese climate regulations on the Russian exports. Large Russian banks and manufacturers are exploring the impact of the new regulations on Russian exports. China is planning to bring the share of renewable energy up to 80%; this may undermine the competitiveness of Russian products. It is important that the carbon intensity of power generation in Russia go down. So far, the Asian buyers have not made "climate" requirements tough on Russian exporters, but they probably will.[39]

6 Climate agenda for Russia's presidency in BRICS

Russia is starting to tailor its green (climate) agenda for the period of presidency in BRICS. A kick-off meeting was held on October 2 to outline the scope of issues to be considered. Following the meeting a draft agenda was developed and will be discussed in the next few months. SBER (bank) was appointed to lead this activity.

7 Energy and climate mitigation workshops

The 3rd Quarter mostly includes summer months, so only a few conferences, seminars and workshops were scheduled. But a substantial increase on this number can be expected in October and subsequent months.

Workshop on the 35th anniversary of IPCC. A workshop was hosted by the Institute of Global Climate and Ecology on September 18 to discuss the 35 years' experience of Russian scientists' participation in the IPCC activities. About 15 experts shared their experience, some of them started to work in IPCC in 1990. However, one important expert – Oleg Anisimov, a CLA from WGII in several Assessment Reports, was not invited because of his anti-military position clearly stated at the final session of WGII 6AR approving process. This obviously demonstrates, that the IPCC experts in Russia are under political pressure from the Russian authorities.

In relation to the participation of Russian experts in WGIII a few comments were made by Igor Bashmakov:

- In none of the assessment reports, more than 2 Russian experts have ever worked in WGIII as coordinating lead authors (CLA) or lead authors (LA). I have always been the only CLA from Russia. With such low representation, it is difficult to reflect the achievements of the Russian science, even if quite modest on this topic. In other countries, there is intense competition among scientists to work for the IPCC, but not in Russia.
- In 1998, when I realized that more than 200 people were expected to write a large comprehensive report according to the policy-relevant, but not policy-prescriptive

[39] https://www.kommersant.ru/doc/6210600

principle, I could not believe that this was possible. But the report development framework is tuned to deliver high-level results. It includes four stages of report preparation with several thousand comments per chapter from external experts and governments at each stage, all of which need to be responded to. Discussions are conducted in a way which ensures that the opinions of all participants are taken into account.

- I employed a similar approach for the development of a State Report for the Year of Ecology in Russia in 2016 and for the preparation of supporting materials for the Low-Carbon Development Strategy in 2019. In both cases it worked out great. The reports turned out to be very high quality. This approach should be used for the preparation of any materials for the government.
- Being a CLA is a substantial burden. At first, it is always a linguistic shock, because every participant speaks English with their own accent. Secondly, it requires a vast expertise in all WGIII subjects.
- There is no government recognition of the tremendous effort made by Russian IPCC experts. The Russian government has never provided secretarial support for CLAs. I once approached the State Hydrometeorologic Committee with a request to finance the work of a secretary to liaise my activities under IPCC, but was told that the IPCC works on a voluntary basis, so I can't really expect any aid from the Russian government. In 6AR, we were given a Chapter scientist from IPCC, and this resolved the issue.
- Russia has never organized any official meetings of IPCC experts.
- IPCC reports are extremely valuable in the eyes of governments and provide the basis for the development and implementation of policies by many countries to control greenhouse gas emissions. That is why the wording of these reports is so important for any government and the approval process is slow and difficult.
- Very few experts in Russia familiarize themselves with WGII reports, but people sometimes complain about SPM wording. This is strange, because these summaries are a joint product of the IPCC and all national governments, including Russia.
- Russian-language literature on WGIII issues is rarely cited for obvious reasons: a) the majority of world specialists do not speak Russian; b) Russian specialists do not publish much on WGIII topics, and when they do, the publications are mostly in Russian. In WGIII, Russian science is underrepresented (only 2 chapters out of 17), and this does not allow for a better reflection of Russian scientific literature.
- After the beginning of Russia's operation in Ukraine, I am maintaining normal contacts with my colleagues in WGIII. We stay in touch, share research results, some of them keep taking part in our workshops. However, others are staying away, because some organizations recommend that their employees do not participate in events held in Russia. Foreign journals keep accepting our articles for publication.

Recommendations:

- It is important to promote competition for the participation in the IPCC.
- The government should support CLAs and LAs who work for the IPCC and expand this support beyond the experts and institutions affiliated with the Russian Academy of Science. In terms of the WGIII issues, the Russian Academy of Sciences is more conservative than Russian think tanks, universities or businesses. Russia needs competing studies, rather than putting everything in just 'RAS basket'. Monopolies always cause stagnation, primarily in science.
- It would be good to set up scientific schools around Russia's leading scientists who work in the IPCC.

- It is important to develop assessment reports on WGIII topics for Russia.
- A Russian English-language journal might be set up to publish articles on IPCC topics.
- It is really essential to organize workshops, including by inviting EAEU scientists and participants from other countries.
- One may consider mandatory courses for government climate policy officials, both on the national and regional levels, to raise their awareness of the results obtained by the IPCC.
- It is critical to more actively engage in the IPCC activities. Apparently, this will be possible only after the end of Russia's operation in Ukraine.
- All this requires financing, which should be extended beyond the Russian Academy of Science.

RAWI Round Table (September 21) "Additional perspectives for low carbon development in Russia". The agenda included the following issues:

- State-of-the-art and perspectives for Russia's sustainable development
  - What are the most actual trends in Russian companies' low carbon transition?
  - Low carbon generation: development and perspectives.
  - RE energy supply opportunities and market perspectives for direct electricity supply contracts.

RAWI has agreed to expand the scope of activities by including (in addition to wind energy) solar, geothermal, hydrogen, small energy, bio, accumulation technologies, electric vehicles and infrastructure. RAWI believes, that the market needs integration, rather than monopolization, and so it is better to unite under the aegis of a non-profit association. RAWI suggests that all the market agents discuss the national programme of RE generation in Russia within the framework of RAWIFORUM'2023 in December 2023. The architecture of the Forum will be based on the current agenda and include new sessions on hydrogen production, electric vehicles and infrastructure, and personnel issues.

Below are some comments on the events scheduled for the early October.

A large 4-days' conference **"Climate change: causes, risks, consequences, problems of adaptation and regulation"** will be organized by the Russian Academy of Science (RAS). About 300 abstracts were submitted to be included in the agenda, and for this reason the Conference was prolonged to take 4 days (9-13 October). Igor Bashmakov has been invited to speak at the plenary session.

Two important observations are as follows:

- There is a huge interest to the subject from natural scientists: many of the 300 presentations are about WGI and WGII IPCC issues;
- The institutes of the Russian Academy of Science show very little (not to say negligible) interest to mitigation options: fewer than 10 scheduled presentations will look into mitigation problems, and half of them will be delivered by non-RAS presenters.

"The territory of energy dialogue" conference. Another conference, "The territory of energy dialogue", supported by the Ministry of Energy is scheduled for October 10. The list of panel sessions (see below) is much more relevant to the climate mitigation agenda:

- "Models and methods for forecasting the development of Russian and global energy"
- "A new way of developing distributed and local energy: technologies, projects, implementation mechanisms"

- “The development of promising energy technologies is an opportunity to develop the industrial potential within the framework of Eurasian integration and to penetrate new markets”
- “Technological development of the coal industry”
- “Prospects for alternative fuels and technologies for motor vehicles”
- “Harmonization of methodological approaches to energy statistics”
- “Russian hydrogen energy technologies: current status and prospects”
- “Energy security: priorities, solutions, opportunities”
- “Energy development strategies of Russia and ASEAN until 2035: Comparative aspects”

Igor Bashmakov has been invited to speak at the “Models and methods for forecasting the development of Russian and global energy” session.