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RUSSIA'S GAS SECTOR AFTER 2022

WAR FINANCING, EXPORT CRISIS AND CLIMATE RISKS

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NOTE:

This report uses Russian government, corporate, and industry sources. Some of these materials may be inaccessible to users outside Russia without a VPN connection through Russian servers.

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Green Think Tank is an independent research platform focused on industrial pollution in Russia, the cross-border environmental consequences of extractive industries, and the environmental transformation of the energy and industrial sectors.

Analytical Report

RUSSIA'S GAS SECTOR AFTER 2022
War Financing, Export Crisis, and Climate Risks

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INTRODUCTION

Russia's full-scale invasion of Ukraine has pushed the Russian natural gas industry into its deepest crisis since the collapse of the Soviet Union.

Before 2022, Europe was the core of Gazprom's business model. It provided high-margin pipeline exports, hard currency, budget revenue, and geopolitical leverage. That model has now broken down. Russian pipeline gas supplies to Europe, including Turkey, fell from 185.1 bcm in 2021 to 16.8 bcm in 2025. Exports to China are growing, but they cannot replace Europe in volume, profitability, or infrastructure logic. LNG exports preserve part of Russia's gas revenue, yet further expansion faces sanctions, foreign technology constraints, and a shortage of specialized ice-class LNG tankers.

This matters directly for Western policymakers. Gazprom and Novatek still provide a significant share of Russia's federal budget revenues. Remaining gas exports continue to support Russia's wartime economy. The EU phase-out of Russian gas by 2027 will therefore affect Moscow's fiscal capacity, the future of Russian LNG, and the credibility of Europe's sanctions strategy.

The gas sector also carries a growing environmental and climate risk. Since 2022, Russian industrial lobbies have used war and sanctions as arguments for weaker environmental regulation, delayed modernization, and lower transparency. Public environmental expertise has been brought under state control. Gazprom has stopped publishing full sustainability and emissions reporting.

Independent monitoring is becoming essential. As access to official and corporate environmental data in Russia continues to shrink, independent satellite monitoring tools such as NASA FIRMS help researchers, policymakers, and civil society assess emissions and operational activity at oil and gas facilities, providing an important source of transparency where public information is increasingly limited.

This report examines Russia's gas sector as a strategic system under pressure: a source of war financing, a weakened export business, a geopolitical tool, and a growing methane risk. Its relevance for Western readers is clear. The future of Russian gas will shape Europe's energy security, sanctions enforcement, climate policy, and the financial limits of Russia's war economy.

RUSSIAN NATURAL GAS INDUSTRY AND THE WAR IN UKRAINE

AUTHOR: VLADIMIR MILOV

Russia's full-scale invasion of Ukraine and the resulting rupture with Western democracies have led to the loss of its main export market – Europe. Imports of Russian gas into the European Union have fallen by more than 80% compared to 2021, while Russia's share in European gas imports has declined from 45% to 11–12%. Gas exports have been redirected to China, but their profitability is significantly lower.

Gazprom and Novatek continue to export pipeline gas and liquefied natural gas (LNG) to Europe, generating more than EUR 20 billion annually – an important source of financing for Russia's war expenditures and state budget revenues.

In January 2026, the Council of the European Union formally approved[1] regulations on phasing out Russian gas imports by the end of 2027:

- **imports under short-term LNG contracts are prohibited from 25 April 2026**
- **imports under short-term pipeline gas contracts from 17 June 2026**
- **imports under long-term LNG contracts are prohibited from 1 January 2027**
- **imports under long-term pipeline gas contracts from 30 September 2027**

This will deprive Russian gas exporters of their last profitable market and increase financial pressure on Gazprom and Novatek.

Shrinking revenues and rising tax pressure have prompted the gas industry and affiliated business groups to push for weaker environmental regulation.

These trends and their impact on the natural gas sector and environmental regulation are examined further in this report.

GAZPROM AND NOVATEK CONTINUE SUPPLYING GAS TO EUROPE, GENERATING ANNUALLY MORE THAN

EUR 20 BILLION ANNUALLY

RUSSIAN NATURAL GAS INDUSTRY: A KEY CONTRIBUTOR TO THE RUSSIAN STATE BUDGET

Russia's natural gas industry is a major contributor to government revenue. Gazprom, Russia's largest natural gas producer (accounting for more than 61% of total gas production in 2025), is one of the country's two largest taxpayers alongside Rosneft.

In 2024–2025, the company accounted for more than 9% of federal budget revenue and over 5% of consolidated budget revenue, including the federal budget, regional budgets, and extra-budgetary funds.

Together with Novatek, Russia's second-largest natural gas producer (accounting for more than 12% of total production and number 10 among Russian companies by revenue in 2025), Gazprom and Novatek account for around three quarters of total natural gas production in Russia, 10% of federal budget revenue in 2024–2025, and 6.7% of consolidated budget revenue in 2024–2025[2].

The combined annual tax payments of Gazprom and Novatek in 2024–2025 amounted to the equivalent of 2.1% of Russia's GDP.

Table 1.
Share of Major Russian Natural Gas Producers in Russia's Budget Revenue

Source: Gazprom and Novatek annual financial reports, IFRS financial statements, data from the Russian Ministry of Finance.

SHARE OF TAXES PAID BY GAZPROM AND NOVATEK	2021	2024-2025 (AVERAGE)
Share of total federal budget revenue	10.7%	10.0%
of which Gazprom	10.1%	9.3%
of which Novatek	0.5%	0.7%
Share of total consolidated (general government) budget revenue	7.1%	5.7%
of which Gazprom	6.8%	5.4%
of which Novatek	0.3%	0.3%

Facing a potential budget crisis due to Western economic and financial sanctions introduced in response to Russia's full-scale invasion of Ukraine, the Russian government took steps to increase tax revenue from natural gas producers and exporters. As a result, Gazprom's total Mineral Extraction Tax (MET) payments in 2024 increased by 2.3 times compared to 2021 levels in ruble terms, despite an 18.5% decline in natural gas production over the same period.

Beginning in 2025, one of the additional MET surcharges imposed on Gazprom in 2023–2024 was abolished[3]. However, Gazprom's MET payments in 2025 still remained 32% above 2021 levels, despite the company's gas production in 2025 being 21.5% lower than in 2021.

The increase in MET was partially offset by a sharp decline in gas export duties, which fell by nearly 52% in dollar terms in 2024 compared to 2021, largely due to Gazprom's near-total loss of the European market. Most export duties had been collected from gas exports to Europe, while Russian natural gas exported to non-European destinations is largely exempt from export duties. However, the increase in MET was far more significant: as a result, Gazprom's total taxes per barrel of oil equivalent produced increased by 28% in 2024–2025 compared to 2021 levels. (MET and export duties combined account for around 80% of all taxes paid by Gazprom to the state budget.)

Novatek, which accounts for around two thirds of Russia's LNG production and exports, also faced major tax hikes during the full-scale war in Ukraine: in 2024, its total tax payments increased by 1.8 times compared to 2021 in ruble terms, while hydrocarbon production grew by just 4.3%.

However, Novatek still pays significantly lower taxes than Gazprom, because most of its gas production and LNG exports from the Yamal LNG project were exempted from taxes and export duties under Putin's orders at the launch stage of the project.

Table 2.
Dynamics of the Tax Burden on Gazprom and Novatek During the War in Ukraine

	2021	2024–2025 AVERAGE	% CHANGE 2024–2025 VS. 2021
TOTAL TAXES PAID BY GAZPROM, BILLION RUBLES	3274.2	4181.3	+27.7%
INCLUDING MET	1357.7	2422.3	+78.4%
INCLUDING EXPORT DUTIES	1084.8	565.1	–47.9%
TOTAL TAXES PAID BY GAZPROM, BILLION USD (AT CURRENT EXCHANGE RATES)	44.4	46.6	+4.7%
INCLUDING MET	18.4	26.7	+45.0%
INCLUDING EXPORT DUTIES	14.7	6.3	–57.5%
TOTAL TAXES PAID BY NOVATEK, BILLION RUBLES	138.1	271.6	+96.7%
TOTAL TAXES PAID BY NOVATEK, BILLION USD	1.9	3.0	+61.8%
TOTAL TAXES PAID BY GAZPROM, USD PER BARREL OF OIL EQUIVALENT HYDROCARBON PRODUCTION (OIL, GAS, CONDENSATE)	12.7	15.6	+22.8%
TOTAL TAXES PAID BY NOVATEK, USD PER BARREL OF OIL EQUIVALENT HYDROCARBON PRODUCTION (OIL, GAS, CONDENSATE)	2.9	4.5	+55.8%
TOTAL TAXES PAID BY GAZPROM AND NOVATEK, BILLION USD	46.3	49.6	+7.0%
HYDROCARBON PRODUCTION BY GAZPROM AND NOVATEK, BILLION BARRELS OF OIL EQUIVALENT	4.15	3.67	–11.9%

Source: Gazprom and Novatek annual IFRS financial statements.

Overall, annual taxes paid to the state by Gazprom and Novatek in 2024–2025 increased on average by USD 3.3 billion per year, or 7%, compared to 2021 levels, while the combined hydrocarbon production of the two companies declined by 11.9% over the same period.

Gazprom and Novatek may face further tax increases to finance Russia's war effort against the backdrop of a growing state budget deficit.

In 2025–2026, the situation with Russia's public finances was rapidly getting out of control. By the end of 2025, the federal budget deficit had reached RUB 5.65 trillion (USD 68 billion), or 2.6% of GDP, compared to the originally planned level of just 0.5% of GDP[4]. This was roughly 40% higher than the liquid reserves remaining in the government's National Wealth Fund (NWF).

In the first quarter of 2026 alone, the federal budget deficit amounted to RUB 4.58 trillion (USD 59 billion, or 2.1% of GDP[5]), exceeding the annual target by more than one third.

Additional revenues from higher oil prices linked to escalation in the Persian Gulf have so far provided only limited relief for the Russian government. Finance Minister Anton Siluanov stated that additional federal budget revenues generated by higher oil prices in March–April 2026 were offset by declining tax revenues from the domestic economy, as Russia's GDP began to contract and domestic economic activity slowed[6].

This is forcing the Russian government to search for additional sources of budget revenue – turning again to the natural gas industry as a potential donor. In 2023, Vladimir Putin signed amendments to the Russian Tax Code allowing the government to impose a one-time windfall profit tax on companies that had recorded substantial profits in previous years[7]. This mechanism may also be used against Gazprom and Novatek, which are among the primary potential targets.

USD 68 BILLION

BUDGET DEFICIT IN 2025

> **Russian authorities are currently actively discussing the introduction of additional windfall profit taxation in profitable sectors of the economy — with the natural gas industry among the primary targets[8].**

Russian natural gas companies are active contributors to Russia's war effort in Ukraine. In 2024–2025, Gazprom and Novatek contributed on average RUB 4.5 trillion per year (USD 50 billion) in tax payments, equivalent to roughly 35% of Russia's official military budget for 2025 (RUB 13 trillion).

Around one quarter of Russia's natural gas is produced by companies outside Gazprom and Novatek, but these are primarily oil companies which, unlike the gas giants, do not have the right to export gas. Their tax contributions from gas production are therefore far less significant and are not included in this analysis.

According to reports by Russian and international investigative journalists, Gazprom[9] and Novatek[10] are also actively involved in directly financing contract payments to Russian military personnel, as well as other war-related expenditures not directly covered by the state.

GAZPROM AND NOVATEK CONTRIBUTE TO FINANCING RUSSIA'S WAR IN UKRAINE

RUSSIAN GAS AS A TOOL OF GEOPOLITICAL PRESSURE

Russia has traditionally used natural gas supplies as a tool of geopolitical pressure against European gas-importing countries, seeking to achieve Moscow's political goals by threatening supply cutoffs, price increases, and other restrictive measures.

Even before Russia's full-scale invasion of Ukraine in February 2022, Russia had begun actively and deliberately reducing gas supplies to Europe through key pipeline routes such as Nord Stream and Yamal-Europe[11]. This significantly contributed to a record-breaking gas supply crunch and gas price hikes on the European market in late 2021 and throughout 2022[12]. In the fourth quarter of 2021, gas exports to Europe fell by 21% compared to the same period of the previous year[13]. In the first half of 2022, Gazprom completely halted gas exports to Europe via the Nord Stream-1[14] and Yamal-Europe[15] pipelines.

It is now evident that Russia's actions in 2021–2022 were deliberate[16] and aimed at constraining Europe's response to Russia's invasion of Ukraine by depleting European gas storage facilities and provoking an energy crisis.

However, EU member states managed to secure alternative energy supplies, sharply reducing imports of Russian gas. By the end of 2025, gas exports to Europe via TurkStream – the only remaining pipeline route – totaled 18 billion cubic meters (bcm), marking a historic low for Russian pipeline gas exports to Europe[17].

Hungary and Slovakia remain the main importers of Russian pipeline gas within the EU. According to CREA/CSD data, Hungary and Slovakia receive around 70% of their pipeline gas imports from Russia – the highest level of dependence in the European Union. Some Western European countries, primarily Spain, Belgium, and France, while no longer importing Russian pipeline gas, continue to purchase significant volumes of Russian LNG[18].

RUSSIA DEPLETED EUROPEAN GAS STORAGE AS A TOOL OF PRESSURE AHEAD OF THE FULL-SCALE INVASION

Hungary and Slovakia remain the main importers of Russian pipeline gas in the EU

In May 2025, the European Commission presented a proposal under the REPowerEU[19] framework to completely phase out Russian gas imports by the end of 2027[20].
In October, EU member states in the Council agreed on their negotiating position[21].

In January 2026, the Council of the European Union approved regulations banning imports of Russian gas, with transition periods for existing contracts:

- imports under short-term LNG contracts are prohibited from 25 April 2026
- imports under short-term pipeline gas contracts from 17 June 2026
- imports under long-term LNG contracts are prohibited from 1 January 2027
- imports under long-term pipeline gas contracts from 30 September 2027

The regulation introduces mandatory verification of the origin of supplied gas and establishes penalties for violations. The EU has also introduced a number of sanctions against Russia's natural gas and LNG sector.

Under these changing conditions, Russia is adapting its strategy of using natural gas as a geopolitical tool, focusing in particular on the following areas:

- **a large-scale disinformation campaign aimed at shaping public opinion in favor of increased purchases of Russian gas through narratives claiming that "Europe will freeze in winter" and that "European businesses are losing competitiveness without cheap Russian gas"[22];**
- **support for lobbying efforts by major European companies seeking a resumption of Russian gas imports[23];**
- **instigating resistance to the Russian gas phase-out initiative by Moscow-friendly EU member state governments – particularly Hungary and Slovakia – which are actively attempting to obstruct EU plans to reduce dependence on Russia[24].**

Russia openly declares its readiness to resume large-scale gas supplies to the European Union[25], arming Moscow's allies in Europe with propaganda tools aimed at portraying a return to Russian gas imports as 'economically advantageous' for Europeans – while in reality seeking to restore a tool of massive geopolitical influence over Europe.

LIQUEFIED NATURAL GAS (LNG) EXPORTS

In 2024, Russia exported a record volume of LNG – 33.6 million metric tons[26] (mmt), 4% higher than in 2023 and 13% above 2021 LNG export levels. Yamal LNG accounted for 63% of total exports, more than 70% of which were shipped to Europe. Another 30% of exports came from the Gazprom-controlled Sakhalin-2 project. These supplies were delivered to Japan and other Asia-Pacific countries.

In 2025, Russian LNG exports totaled[27] 31.3 mmt, declining by 2.5% compared to 2024. According to Eurostat, Russia accounted for 16% of EU LNG imports and remained its second-largest LNG supplier. Russia accounted for around 13% of total EU gas imports, including 6% delivered via pipeline gas.

33.6 MMT
(MORE THAN $20 BILLION)

2024 RECORD FOR RUSSIAN LNG EXPORTS

JAPAN BLOCKED SANCTIONS AGAINST SAKHALIN-2

In 2025, Yamal LNG retained its central role in the structure of Russian LNG exports. According to Urgewald[28], citing Kpler data, total exports from the Yamal LNG project amounted to 19.7 mmt in 2025, of which 15 mmt were delivered to EU terminals, accounting for more than 75% of the project's total exports. Around 70% of Yamal LNG exports to Europe were supplied under long-term contracts[29]. LNG exports from the Sakhalin-2 project totaled 10.3 mmt in 2025[30].

In 2024, Russia earned more than USD 20 billion in revenue from LNG exports to international markets, although the exact figures remain unknown because the relevant data are classified in Russia.

At the same time, the European Union has in recent years steadily developed a restrictive framework targeting Russia's gas sector. The Council of the European Union not only agreed on regulations for the gradual phase-out of Russian natural gas and LNG imports, but also introduced a number of sanctions[31] against Russia's gas sector.

A number of sanctions against Russia's gas sector:

- **a ban on future investments in Russian LNG plant construction projects and on exports from these facilities;**
- **a ban on the use of EU ports for the transshipment of Russian LNG;**
- **a ban on imports of Russian LNG into specific terminals not connected to the EU gas pipeline network;**
- **a ban on the supply of goods, technologies, and services for Russian LNG and crude oil projects**

The United States imposed several rounds of sanctions against new major Russian LNG projects, including Arctic LNG-2 and others, with the latest package introduced in January 2025[32].

EU and U.S. sanctions against new Russian LNG projects[33,34,35] have had such a significant impact that Gazprom and Novatek were forced to suspend their planned LNG projects, effectively limiting Russian LNG exports to the existing LNG plants – Yamal LNG and Sakhalin-2. However, these two operating projects have not been sanctioned either by the United States or by the European Union.

RUSSIAN LNG EXPORTS IN 2021-2025	2021	2024	2025	% CHANGE IN 2025 COMPARED TO 2021
TOTAL RUSSIAN LNG EXPORTS, MMT	29.7	33.6	31.3	+5.4%
OF WHICH TO EUROPE, MMT	14.1	17.4	16.1	+14.2%
TOTAL LNG EXPORTS FROM THE YAMAL LNG PROJECT, MMT	14.9	21.0	19.7	+32.2%
TOTAL LNG EXPORTS FROM THE SAKHALIN-2 PROJECT, MMT	9.2	9.9	10.3	+12.0%

Table 3. Russia's LNG exports in 2021–2025
Source: Kpler, Eurostat, Reuters.

The United States considered imposing blocking sanctions (SDN designation) against Novatek's operating Yamal LNG project, but such sanctions have not been adopted so far, likely because of European concerns over energy security.

Meanwhile, Novatek remains subject to U.S. sectoral sanctions imposed by OFAC[36].

IN 2025, THE EUROPEAN UNION IMPORTED RUSSIAN LNG WORTH APPROXIMATELY

USD 9.2 BILLION

Sanctions against Gazprom's Sakhalin-2 LNG project were blocked by Japan, the project's largest importer[37]. Mitsui and Mitsubishi jointly hold a 22.5% stake in Sakhalin-2, while the project's sales portfolio includes long-term LNG supply contracts with Japanese buyers.

As noted above, LNG exports are taxed significantly less than pipeline gas exports. However, the rapidly growing federal budget deficit may push the Russian government to introduce a windfall profit tax on LNG exporters[38]. This mechanism already exists under Russian law and is currently being considered[39].

GAS EXPORTS TO CHINA CANNOT REPLACE EUROPE

The decline in Russian pipeline gas exports to the European market (including Turkey) was drastic: from 185 bcm in 2021 to just 17 bcm in 2025 – a decrease of 90%[40].

At the same time, according to Gazprom, Russian gas exports to China increased sharply, rising from 10.4 bcm in 2021 to 38.8 bcm in 2025[41].

Table 4. Russian Pipeline Gas Exports in 2021–2025
Source: Gazprom, ENTSOG.

RUSSIAN PIPELINE GAS EXPORTS, BCM	2021	2024	2025	% CHANGE IN 2025 COMPARED TO 2021
EUROPE (INCLUDING TURKEY)	185.1	28.2	16.8	–90.9%
CHINA	10.4	31.0	38.8	+273%

However, exports to China create serious challenges for Gazprom:

- significantly higher transportation costs due to increased distances;
- a loss of revenue resulting from the discount granted to China under the 2014 Power of Siberia gas supply contract;
- significant unused production and transportation capacity in Western Siberia and the European part of Russia due to the lack of a pipeline connection between Gazprom's gas production facilities in Western Siberia and the Chinese market, as well as the lack of progress in the construction of the Power of Siberia 2 gas pipeline, which is intended to connect Gazprom's main gas-producing regions in Western Siberia with China

At the 2025 St. Petersburg International Economic Forum, Minister for the Development of the Russian Far East and Arctic Alexey Chekunkov confirmed that Gazprom's upstream gas production aimed at Europe, as well as trunk gas pipeline infrastructure, remain stranded due to Russia losing the European gas market and being unable to redirect landlocked gas elsewhere[42]. Gazprom does not disclose the costs associated with maintaining these stranded assets.

When the gas contract with China for supplies via the Power of Siberia pipeline was signed in 2014, the gas price required for the project's profitability was estimated at USD 350–380 per thousand cubic meters[43]. Even at that price level, many international experts viewed the Power of Siberia contract as most likely not profitable[44].

GAS FIELDS AND INFRASTRUCTURE DESIGNED FOR EXPORTS TO EUROPE REMAIN STRANDED

This cannot be definitively proven because Gazprom does not disclose the price or financial results of gas exports to China via Power of Siberia. However, according to forecasts by Russia's Ministry of Economic Development, the actual gas price in 2025 was slightly below USD 250 per thousand cubic meters[45]. According to the ministry, the price stood at USD 268 per thousand cubic meters in 2024, while in previous years it remained below USD 300[46] – significantly below estimates of the price required for profitable exports to China through Power of Siberia.

According to Bloomberg, the average price of Russian gas supplied to China in 2026 will be USD 259 per thousand cubic meters, over 38% below the average price paid by the remaining buyers in Europe. Substantial discounts for China are expected to persist in the foreseeable future[47].

Taken together, these factors suggest that Gazprom's gas supplies to China are hardly profitable at best and, most likely, are generating significant losses. Indirect evidence of this trend can be found in Gazprom's IFRS reporting: average profit per barrel of oil equivalent (boe) nearly halved between 2021 and 2024, declining from more than USD 9 to around USD 5 per boe (Table 5).

Average Urals oil prices in 2021 and 2024 were relatively similar – USD 69 and USD 68 per barrel respectively[48,49]. Gas export prices are typically strongly correlated with and, in most cases, indexed to international oil prices. In 2025, Urals oil prices were substantially lower, contributing to a further decline in Novatek's profitability. Gazprom's dollar-denominated profits increased slightly due to the partial cancellation of the Mineral Extraction Tax (MET) surcharge on natural gas effective from 1 January 2025. Nevertheless, profit per barrel of oil equivalent sold remained nearly half the 2021 level. This is best explained by rising tax pressure and the low profitability of gas exports to China.

Table 5. Profitability of Gazprom and Novatek in 2021–2025
Source: Gazprom and Novatek IFRS financial reports (Gazprom and Novatek financial data); Russian Ministries of Finance and Economic Development (average oil price)

	2021	2024	2025	% CHANGE IN 2025 COMPARED TO 2021
GAZPROM AVERAGE SALES PROFIT PER BARREL OF OIL EQUIVALENT PRODUCED (OIL+GAS), USD/BOE	9.34	5.03	5.27	–43.6%
NOVATEK AVERAGE SALES PROFIT PER BARREL OF OIL EQUIVALENT PRODUCED (OIL+GAS), USD/BOE	5.87	5.09	5.01	–14.6%
AVERAGE URALS OIL PRICE, USD/BARREL	69.0	67.9	57.8	–

Table 5 clearly illustrates how unprofitable gas exports to China are. In 2023, when China overtook the European Union as the largest importer of Russian gas, Gazprom reported financial losses under IFRS[50] for the first time in 25 years. Gazprom later returned to profitability, but this was largely supported by the company's oil business. The falling share of European gas exports and growing volumes of gas exports to China have had a strong negative impact on Gazprom's profitability, as reflected in its financial reporting despite the lack of transparent financial data on Chinese contracts.

The Russian government accelerated increases in regulated domestic gas prices in an attempt to partially offset declining export revenues: tariff indexation for 2023–2024[51], and subsequently for 2025–2028[52], was approved at levels above projected consumer price inflation. Before February 2022, the authorities had instead sought to keep domestic gas price increases in line with inflation.

However, the scope for further increases remains limited: higher gas prices contribute to persistently elevated inflation, while current domestic gas prices (around USD 100 per thousand cubic meters) still remain substantially below export prices and do not generate comparable profitability. Therefore, increases in domestic tariffs – tightly constrained by political and inflationary risks – cannot compensate for Gazprom's declining profitability. At the same time, the government did not support Gazprom's repeated proposals[53] for sharper domestic gas price increases and partial liberalization[54] of the gas market.

Before sanctions were imposed by the United States and the European Union against new LNG projects, Russia had planned to increase LNG exports to 110 million tonnes per year by 2030[55]. At present, Russian LNG exports are effectively capped at slightly above 30 million tonnes annually.

A major obstacle to LNG exports was the refusal of South Korean companies (Samsung and Hanwha Ocean) to build Arc7[56,57] ice-class LNG carriers for Russian companies.

Gazprom's financial capacity has been severely undermined by declining profitability. At the same time, the company has been largely cut off from international financial markets due to Western sanctions, leaving retained earnings as its only available source of financing for large-scale capital investment programs.

Gazprom's profitability has declined sharply, alongside its capital investment program. The approved capital expenditure program for 2025 was reduced to RUB 1.6 trillion, compared to RUB 2 trillion and USD 29 billion in 2022 – a decline of 18.5% in ruble terms and 33.1% in dollar terms. A further sharp reduction in the investment program is planned for 2026 – by 44.4% in ruble terms and 49.4% in dollar terms compared to 2022 levels[58]. The reduction in investment will lead to a decline in Russia's future capacity to produce and export gas.

Table 6. Cuts to Gazprom's capital expenditure program
Source: Gazprom's annual capital expenditure program as approved by company's Board of Directors[59] .

	GAZPROM'S ANNUAL CAPITAL EXPENDITURE PROGRAM, RUB BLN	GAZPROM'S ANNUAL CAPITAL EXPENDITURE PROGRAM, USD BILLION, AT AVERAGE ANNUAL EXCHANGE RATES
2022	1980	29.0
2023	1966	22.9
2024	1642	17.2
2025	1615	19.4
2026 (PLANNED)	1100	14.7
% CHANGE, 2026 VS. 2022	–44.4%	–49.4%

Despite Gazprom's enormous excess production and transportation capacity, these assets remain unusable for diversifying Russian gas exports to China and other Asian countries because of geographical constraints.

Gazprom needs to build entirely new infrastructure, which requires even larger investments. For example, in 2024 the cost of constructing a new pipeline supplying West Siberian gas to China with a capacity of 35 bcm per year was estimated at RUB 1.18 trillion, or approximately USD 15 billion[60] – roughly equivalent to Gazprom's annual capital expenditure program. According to these estimates, a larger pipeline with a capacity of 50–100 bcm per year would require at least USD 20–30 billion in investment.

However, Gazprom's declining profitability and rising tax burden cast doubt on the company's ability to finance such large-scale new investments. Russia's Ministry of Finance has already refused to grant Gazprom tax incentives for the construction of the new Power of Siberia-2 pipeline to China – the Russian government simply no longer has such fiscal capacity given the record budget deficit[61]. Without state tax incentives, the prospects for constructing the Power of Siberia-2 pipeline to China appear problematic.

Thus, it is not so much sanctions themselves, but rather the broader rupture with the West, that has created serious problems for Russia's gas sector. The Chinese gas market does not appear significantly profitable, while plans to redirect gas export infrastructure from Europe to China look extremely costly

ENVIRONMENTAL RISKS AND CROSS-BORDER CONSEQUENCES OF THE CRISIS IN RUSSIA'S GAS SECTOR

ENVIRONMENTAL DEREGULATION AS A COST-CUTTING STRATEGY

As export revenues – primarily from oil and gas – decline, the state's need to finance wartime spending is increasing tax pressure on companies. This, in turn, forces companies to seek ways to reduce costs. One such method is the relaxation of environmental and climate regulations.

The transformation of Russia's gas sector following Russia's full-scale invasion of Ukraine should therefore be viewed not only in economic and political terms, but also in an environmental context.

In practice, the weakening of environmental accountability takes several forms. These include the relaxation of environmental protection requirements[62], restrictions on independent environmental oversight, and reduced transparency and quality of pollution and emissions data[63]. Official estimates of anthropogenic greenhouse gas emissions have also been sharply revised downward[64].

As a result, environmental and climate risks continue to increase despite declining gas production and exports.

RUSSIAN NATURAL GAS LOBBY AGAINST RESPONSIBLE ENVIRONMENTAL AND CLIMATE POLICIES

AUTHOR: VLADIMIR MILOV

In April 2022, immediately after Russia's full-scale invasion of Ukraine, Russia's main industrial lobbying association, the Russian Union of Industrialists and Entrepreneurs (RUIE) submitted proposals to the government that would significantly weaken environmental standards and requirements for businesses[65]. Major natural gas producers, including Gazprom and Novatek, are active members of the RUIE and also participate in the work of its Committee on Climate Policy and Carbon Regulation[66].

The RUIE proposals submitted in April 2022 included more than 40 initiatives aimed at repealing or weakening a broad range of environmental regulations.

The most significant proposals included:

- **postponing deadlines for achieving regulatory targets on reducing pollutant emissions, as well as deadlines for environmental efficiency improvement programs and environmental protection measures;**
- **eliminating penalties for failure to comply with environmental regulatory deadlines;**
- **extending the deadline for installing Continuous Emissions Monitoring Systems (CEMS) from four to eight years after obtaining an Integrated Environmental Permit (IEP);**
- **weakening regulatory oversight by Rosprirodnadzor, Russia's environmental regulatory authority (including limiting fines and environmental damage compensation claims, reducing unscheduled inspections, etc.);**
- **introducing a two-year moratorium on penalties against companies for failure to comply with previously issued environmental orders requiring substantial environmental protection investments;**
- **suspending the development and adoption of draft legislation requiring subsoil users to establish mandatory decommissioning funds (funds intended to finance land reclamation and remediation after field closure; the RUIE has recently renewed calls to postpone mandatory requirements for the establishment and financing of decommissioning and land reclamation funds[67]).**

Although the RUIE's anti-environmental package was not adopted by the Russian government as a single legislative package, many proposals were implemented selectively by the authorities. Requirements for installing Continuous Emissions Monitoring Systems (CEMS) were extended from four to six years[68] through amendments to the Federal Law "On Environmental Protection"[69].

The consequences are serious: an adequate emissions monitoring system at key industrial facilities is absent and may remain absent indefinitely. Large Russian businesses, including gas producers, are likely to continue pushing for further delays, and so far this lobbying effort has been successful.

The reason is clear: CEMS systems rely heavily on imported equipment, and installing them would cost companies an exorbitant amount.

Another major concession to large businesses has been the weak enforcement of regulatory requirements for technological modernization aimed at bringing industrial facilities into compliance with environmental standards. The authorities announced an ambitious program for the mandatory "greening" of Russian industry through the issuance of Integrated Environmental Permits (IEPs). However, as «Kommersant»[70] reported, the application of effectively soft enforcement standards means that only a small number of enterprises are likely to face real fines or sanctions, while the overwhelming majority will continue operating on a business-as-usual basis. The entire environmental modernization program and the IEP mechanism can therefore be regarded as largely performative.

One of the most significant steps toward weakening environmental and climate regulation for large businesses was the substantial revision of State Environmental Expertise (SEE) requirements for new projects. As early as 2021, before the full-scale invasion, Russia adopted legislation that significantly reduced mandatory SEE requirements for new projects, particularly in the Arctic. The amendments eliminated mandatory SEE for infrastructure projects, including exploratory drilling, under the pretext of "accelerating the development of the Arctic's economic potential"[71,72].

Oil and gas companies, including Gazprom, had long pushed for these changes[73]. Russia's Ministry of Natural Resources described their arguments as "convincing" and supported the exclusion of "project documentation for the construction and reconstruction of drilling wells in the Arctic" from the list of activities subject to mandatory SEE, replacing it with vague "consultation procedures"[74].

ATTACK ON PUBLIC ENVIRONMENTAL EXPERTISE

In December 2023, Vladimir Putin signed Federal Law No. 681-FZ[75], which changed the SEE process. The law entered into force on 1 September 2024, and according to independent experts, Public Environmental Expertise (PEE) effectively ceased to function as an independent mechanism after that point[76].

Key changes included[77]:

- **reducing the review period to 42 working days (with the possibility of a 20-day extension at the request of the project developer);**
- **simplifying repeat reviews: they are no longer mandatory if project documentation has already been approved and does not involve significant changes in environmental impact.**

Only NGOs and experts that have undergone mandatory certification and are included in a special Rosprirodnadzor registry are now allowed to conduct PEE[78]. It is clear that independent NGOs and experts critical of major Russian corporations will not be allowed to participate in this process. The law also explicitly prohibits the participation of foreign citizens (non-Russian nationals), individuals designated in Russia as "foreign agents," and representatives or employees of foreign and international organizations. They are no longer permitted to initiate, organize, or conduct PEE.

"We are generally observing a continued trend toward the de-environmentalization of Russian legislation. Environmental restrictions are being removed or at least leveled down. Environmental oversight is being simplified to make doing business easier," says Alexander Veselov, Chairman of the Union of Ecologists of the Republic of Bashkortostan. "Unfortunately, public environmental expertise has now been placed almost entirely under state control and can no longer function independently."

"This is a major restriction on the rights of NGOs and citizens to participate in public environmental expertise. We have been trying to fight this for a long time," says Mikhail Kreindlin, an expert at the NGO Earth Touches Everyone[79].

The original draft law, later adopted as Federal Law No. 681-FZ of 25 December 2023, was first submitted to the State Duma in May 2022. Following the start of the war and discussions about weakening environmental requirements "in response to sanctions," 63 representatives of environmental NGOs and grassroots initiatives sent a collective appeal to the State Duma warning about risks to the institution of public environmental expertise and broader threats to environmental safety[80].

"If this bill is adopted, the quality of both public environmental expertise and State Environmental Expertise will decline significantly. This will create threats to Russia's environmental safety and may lead to widespread violations of citizens' rights to a favorable environment," the appeal stated.

The appeal was clearly ignored, and the law transferring environmental review fully under state control was signed by Vladimir Putin in December 2023.

In May 2025, Russia's Ministry of Natural Resources published draft amendments to the SEE law proposing further weakening of environmental review procedures in the interests of large Russian businesses[81]. In October 2025, the Russian Union of Industrialists and Entrepreneurs (RUIE) sent a letter to Prime Minister Mikhail Mishustin requesting the suspension of payments under the new rates for negative environmental impact charges – a proposal currently under consideration[82].

It is difficult to overstate the importance of environmental review procedures for effective public oversight of environmental damage caused by industrial enterprises. In practice, the early stages of industrial projects are often the only point at which the public can apply some form of "emergency brake" and demand an environmentally responsible approach. Once projects are approved, environmental oversight becomes entirely dependent on state authorities.

Russia abolished its independent environmental regulator in 2000, when Vladimir Putin dissolved the State Committee for Environmental Protection. The current environmental regulator, Rosprirodnadzor, is subordinate to the Ministry of Natural Resources, which is responsible for developing the resource extraction sector. This represents a fundamental conflict of interest, since the ministry's primary objective is to stimulate economic growth through the exploitation of natural resources.

Under these conditions, the effectiveness of state oversight over industrial enterprises is highly questionable. This is illustrated by the Russian government's inability to hold the country's 300 largest polluters accountable or impose significant financial penalties for environmental damage[83].

Gazprom and Novatek regularly face opposition from local communities when pursuing environmentally hazardous projects. This opposition becomes particularly visible during environmental impact assessment hearings and public consultations.

In recent years, residents of the Tazovsky District in the Yamalo-Nenets Autonomous Okrug have actively protested against Novatek's Arctic LNG-2[84] project and Gazprom's offshore gas production project at the Kamennomysskoye field[85]. They used ordinary environmental review procedures, including public hearings and consultations, to raise their concerns.

However, these concerns were completely ignored. The rules governing public environmental review were later revised in favor of large corporations, including natural gas producers.

It should be noted that the remote northern regions where Gazprom and Novatek operate are sparsely populated and are often inhabited primarily by employees of large state corporations and their relatives. Small local communities generally lack the resources needed to effectively oppose large industrial enterprises.

The authorities harshly suppress environmental protests in the regions, as demonstrated in Bashkortostan, where two protesters were killed[86] and more than 80 criminal cases were opened against participants in protests against an environmentally harmful gold mining project. Several prison sentences have already been handed down, while many other cases remain under review[87]. The persecution of participants in local environmental protests has become commonplace in contemporary Russia, with hundreds of activists facing prosecution each year across different regions of the country[88].

Under such conditions, many local residents refrain from participating in protests against environmentally harmful activities by large corporations because of the risk of attacks or prosecution. Local authorities, operating within the Kremlin's centralized power structure ("vertical of power") generally approve environmental review documentation for potentially hazardous Gazprom and Novatek projects with minimal scrutiny.

Even in this tightly controlled environment, corporations continue pushing to weaken environmental standards and reduce transparency.

GAZPROM STOPS DISCLOSING POLLUTION DATA

In recent years, Gazprom has taken unilateral steps to reduce environmental transparency. In March 2025, Gazprom's Board of Directors decided to discontinue publication of the company's annual sustainability report, which included data on environmental pollution and greenhouse gas emissions[89]. Such a report was last published in 2024. In August 2025, Gazprom representatives also proposed removing methane entirely from the official list of air pollutants[90]. At the same time, Gazprom continues to publish non-financial sustainability reporting in the form of social responsibility reports[91].

According to the latest available Gazprom reports, air pollution intensity (per unit of hydrocarbon production) in 2023–2024 remained at or above 2020–2022 levels despite the decline in production activity. This applies both to total emissions across all Gazprom operations – where 62% of emissions come from the core gas business, 23% from the oil business, 7% from the power generation business, and 8% from other group activities – and specifically to the core gas business, whose emissions are presented separately in Table 7.

Table 7. Gazprom's emissions of air pollutants into the atmosphere per unit of hydrocarbon production.
Source: Gazprom's annual sustainability report[92] .

	2020	2021	2022	2023	2024
GAZPROM'S TOTAL ANNUAL EMISSIONS OF AIR POLLUTANTS INTO THE ATMOSPHERE, KG PER THOUSAND BARRELS OF OIL EQUIVALENT (BOE)	779.2	714.9	736.4	837.7	780.2
GAZPROM'S ANNUAL EMISSIONS OF AIR POLLUTANTS INTO THE ATMOSPHERE FOR CORE NATURAL GAS BUSINESS, KG PER THOUSAND CUBIC METERS	3.64	3.32	3.34	3.93	3.48

The data presented in Table 7 indicate that the weakening of environmental regulations and standards in recent years has, to some extent, led to an increase in pollutant emissions per unit of oil and gas production by Gazprom in 2023–2024.

Relative air pollutant emissions returned to – and in some cases exceeded – pre-war 2020–2021 levels, despite the fact that Gazprom Group's total hydrocarbon production declined to 3 billion barrels per year or less, compared to 3.1 billion barrels of oil equivalent produced in 2020 and 3.5 billion in 2021.

RUSSIAN METHANE EMISSIONS AND NEW OPPORTUNITIES FOR INDEPENDENT REMOTE MONITORING

AUTHOR: ARTUR BAKURIANI

The weakening of environmental regulation and declining transparency of official data are making independent assessment of the environmental impact of Russia's oil and gas sector increasingly difficult. Under these conditions, indicators that can be measured independently of national reporting systems become especially important. One such indicator is methane emissions from natural gas production and transportation – a major source of greenhouse gas pollution.

Rapid advances in satellite technologies in recent years have created new opportunities for independent monitoring of methane emissions. Even with limited access to internal industry data, satellite observations make it possible to identify major leak sources and assess the scale of emissions. This section examines the structure of methane emissions in Russia and the new tools available for monitoring them.

Methane (CH_4) is central to the climate risk of Russia's fossil fuel sector. It is the second most important greenhouse gas after carbon dioxide (CO_2) and has a much higher heat-trapping capacity over shorter time horizons[93]. In 2024, it accounted for 17.9% of anthropogenic greenhouse gas emissions contributing to global climate change[94]. Atmospheric methane concentrations are currently more than two and a half times higher than pre-industrial levels[95].

The main sources of anthropogenic methane emissions are fossil fuel production and transportation, livestock farming, and landfills. Together, they account for 60% of all methane emissions[96], and emissions from these sources have increased by 20% over the past two decades[97].

Russia is one of the world's leading methane emitters and ranks fourth globally in total greenhouse gas emissions[98]. However, estimates of Russian methane emissions vary significantly. The International Energy Agency (IEA) estimated Russian methane emissions at 14 million tonnes in 2024[99]. Russia's national inventory of anthropogenic greenhouse gas emissions, which reports data to the UNFCCC, estimated emissions at 291.4 million tonnes of CO_2 equivalent, or 11.6 million tonnes of methane, in 2022, and 257.1 million tonnes of CO_2 equivalent, or 9.18 million tonnes of CH_4, in 2023[100,101]. According to experts from the Moscow Power Engineering Institute, methane emissions in Russia may amount to 15–35 million tonnes annually[102].

As official transparency regarding pollution and greenhouse gas emissions declines, indicators that can be measured independently of national reporting systems become increasingly important. In January 2022, the GHGSat mission[103] detected 13 methane plumes at the Raspadskaya coal mine in Kuzbass, with total emissions estimated at approximately 87–90 tonnes of methane per hour[104]. This became the largest methane leak ever recorded from a single site in the history of satellite monitoring. Unfortunately, GHGSat data are not publicly available, as the mission prefers to work directly with major corporations and governments[105].

2022 RECORD METHANE RELEASE FROM A SINGLE SITE

UP TO 90 TONNES

OF METHANE PER HOUR

An important development for monitoring experts was the launch of the Tanager-1 satellite in August 2024. The satellite makes it possible to detect methane emissions from specific facilities with relatively high precision. Monitoring data are publicly available through the Carbon Mapper platform and make it possible to observe methane plumes over anthropogenic emission sources[106].

According to the Global Carbon Project, agriculture is the world's largest source of anthropogenic methane emissions (40%), followed by fossil fuels (34%), landfills and wastewater (19%), and biomass and biofuel burning (7%)[107]. Meanwhile, according to Tanager-1 satellite observations, the oil and gas sector accounts for 54% of identified methane emission sources worldwide (44% in Russia), landfills account for 21% (4% in Russia), and coal mining accounts for 19% globally (48% in Russia). The remainder comes from wastewater and livestock farming.

COAL MINING ACCOUNTS FOR

48%

OF THE SOURCES OF METHANE EMISSIONS IDENTIFIED IN RUSSIA

The differences between Global Carbon Project data and Tanager-1 observations are explained by the spatially diffuse nature of emission sources associated with agriculture and waste management services, as well as the difficulty of detecting such sources using this satellite platform.

SOURCES OF ANTHROPOGENIC METHANE EMISSIONS IN RUSSIA

According to Tanager-1 data, 258 methane emission sources have been identified across Russia during August 2024 – October 2025 (Figure 1). The largest share comes from the coal industry – 48% (124 sources) – and the oil and gas sector – 44% (114 sources). Landfills for municipal solid waste (MSW) account for 4% (10 sources), while the remainder comes from the power sector and wastewater treatment facilities.

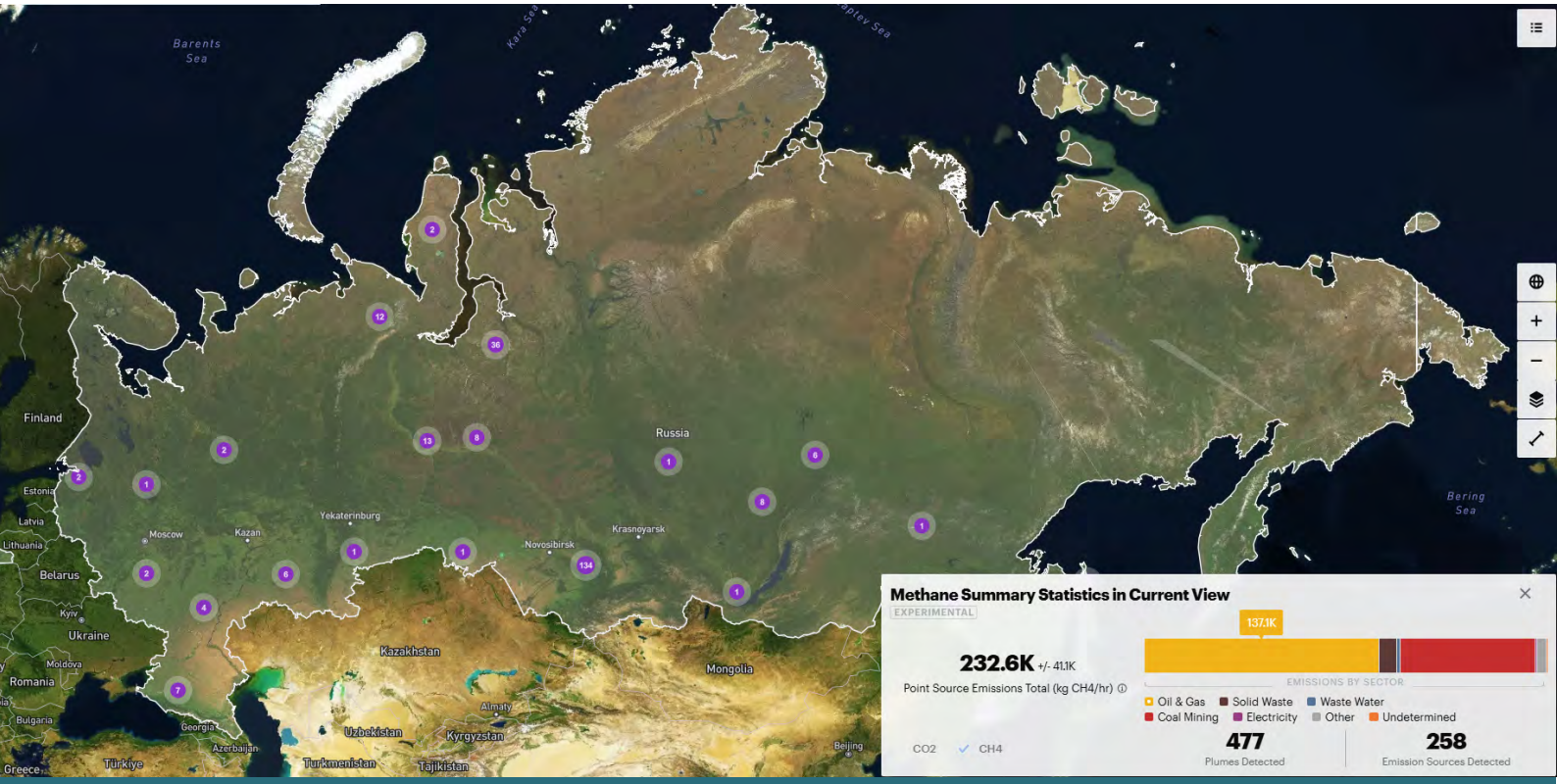

Figure 1. Overview of the Carbon Mapper platform showing methane emission sources in Russia based on Tanager-1 observations

The geographic distribution of methane emission sources shows that the highest concentration is located in Russia's main oil, gas, and coal-producing regions (Figure 1).

COAL SECTOR

According to Carbon Mapper data, the largest number of methane emission sources in Russia is associated with the coal industry. The leading region is Kemerovo Oblast, the center of Russia's coal mining industry[108]. The Komi Republic ranks second. Emissions have also been detected in Novosibirsk Oblast, Krasnoyarsk Krai, and Yakutia.

According to experts, more than 2 billion cubic meters of methane are released annually by the coal mining industry in Kuzbass[109].

Figure 2. Distribution of major methane emission sources

Figure 2 shows the geographical distribution of methane emission sources in the coal sector, as well as data on the five strongest sources detected by satellite observations. The parameters of these five sources are also presented in the table below.

Table 8. Major Methane Emission Sources in the Coal Sector

NO.	FACILITY	LOCATION	METHANE EMISSION RATE, T/H	EQUIVALENT PASSENGER CAR EMISSIONS*, VEHICLES
1	UVALNAYA MINE	Kemerovo Oblast	4.1	21.500
2	VORKUTA CHP-2	Komi Republic	3.4	17.800
3	RASPADSKAYA MINE	Kemerovo Oblast	3.2	16.800
4	YERUNAKOVSKAYA MINE	Kemerovo Oblast	2.8	14.700
5	MEZHDURECHENSKY OPEN-PIT MINE	Kemerovo Oblast	2.4	12.600

** The climate impact equivalent of CO_2 emissions from passenger vehicles was calculated assuming that one ton of methane has the same climate impact as 27.9 tonnes of carbon dioxide, while the average European passenger car traveling at 50 km/h emits 5.3 kg of CO_2 per hour.*

OIL AND GAS SECTOR

Methane emission sources detected by Tanager-1 and associated with the oil and gas sector are located primarily in the Yamalo-Nenets and Khanty-Mansi Autonomous Okrugs, as well as Tyumen and Sakhalin Oblasts. These sources are mainly associated with gas compressor stations and flare systems used for associated gas combustion.

Similar sources are also found in Arkhangelsk, Omsk, Saratov, Volgograd, Irkutsk, and Amur Oblasts, as well as in Bashkortostan, Tatarstan, Yakutia, Stavropol Krai, Krasnodar Krai, Krasnoyarsk Krai, and Primorsky Krai.

Figure 3. Distribution of methane emission sources in Russia's oil and gas sector

Figure 3 shows the geographical distribution of methane emission sources in Russia's oil and gas sector, as well as data on the five largest sources detected by satellite observations. The parameters of these five sources are also presented in the table below.

Table 9. Methane Emission Sources in the Oil and Gas Sector

NO.	FACILITY	LOCATION	METHANE EMISSION RATE, T/H	EQUIVALENT PASSENGER CAR EMISSIONS*, VEHICLES
1	ALEKSEYEVSKOYE GAS PIPELINE	Krasnodar Krai	12.2	64.000
2	BALASHOV COMPRESSOR STATION	Saratov Oblast	7,7	40.400
3	PEREGREBNAYA COMPRESSOR STATION	Khanty-Mansi Autonomous Okrug	7.5	39.400
4	BOVANENKOVO FIELD	Yamalo-Nenets Autonomous Okrug	6.6	34.600
5	URENGOY COMPRESSOR STATION	Yamalo-Nenets Autonomous Okrug	6.1	32.00

MUNICIPAL SOLID WASTE (MSW) LANDFILLS

Landfills and waste disposal sites where methane emissions have been detected through satellite monitoring are located in Krasnodar Krai, Moscow, Leningrad, Vologda, Chelyabinsk, and Irkutsk Oblasts, as well as in the Khanty-Mansi Autonomous Okrug and Yakutia.

Figure 4. Distribution of major methane emission sources

Figure 4 shows the geographical distribution of methane emission sources in the municipal solid waste management sector, as well as data on the five largest sources detected by satellite observations. The parameters of these five sources are also presented in the table below.

Table 10. Major Methane Emission Sources in the MSW Sector

NO.	FACILITY	LOCATION	METHANE EMISSION RATE, T/H	EQUIVALENT PASSENGER CAR EMISSIONS*, VEHICLES
1	POPOVSKAYA MSW LANDFILL	Moscow Oblast	3.5	18.4
2	KRASNODAR MSW LANDFILL	Krasnodar Krai	2.2	11.5
3	BELORECHENSK MSW LANDFILL	Krasnodar Krai	1.8	9.4
4	GATCHINA MSW LANDFILL	Leningrad Oblast	1.1	8.9
5	CHELYABINSK MSW LANDFILL	Chelyabinsk Oblast	0.8	4.2

INTERPRETATION OF METHANE EMISSIONS DATA IN THE OIL AND GAS SECTOR

Tanager-1 data reveal a clear pattern: the largest single sources of methane emissions in the oil and gas sector are associated with pipelines and compressor stations, apparently as a result of accidents, leaks, and features of the technological process.

A substantial share of emissions also comes from flare systems, where natural gas or associated petroleum gas is supposed to be burned.

According to Russian regulatory standards, "the release into the atmosphere of gases containing hydrogen sulfide and other harmful substances without neutralization or combustion is prohibited"[110]. In other words, a flare system is expected to operate in only two modes: burning or not burning.

However, a comparison between methane leak sources detected by Tanager-1 and NASA FIRMS data – which identify thermal anomalies (hot spots) from satellites, including wildfires, industrial stacks, and flaring – shows that methane releases from flare systems often coincide with the absence of a thermal signal at the same location. This indicates that the gas supplied to the flare was not being burned, but instead was released directly into the atmosphere.

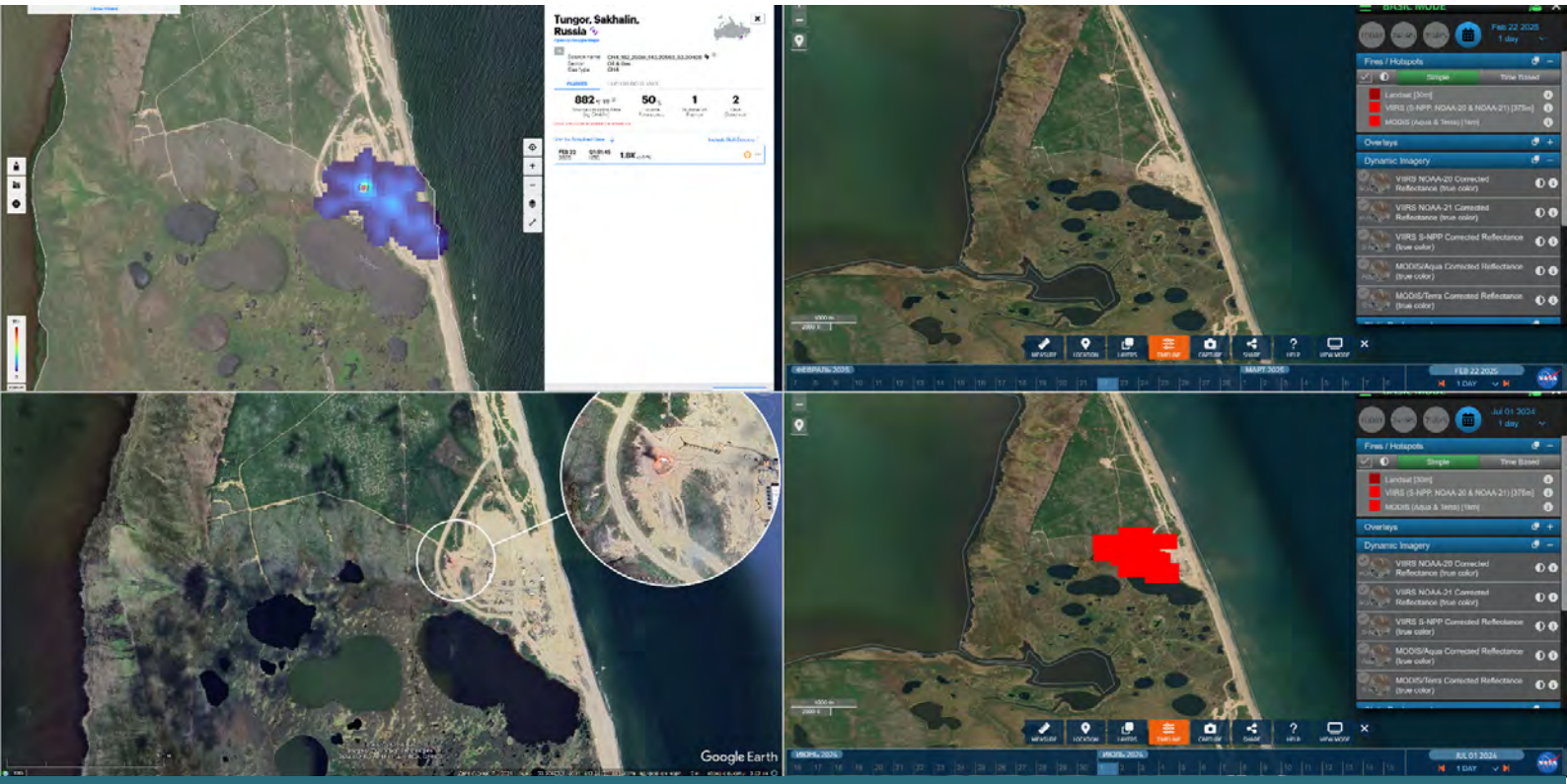

Figure 5. Methane emissions at the Tangor field on Sakhalin Island

Figure 5 presents Tanager-1 and NASA FIRMS imagery (top row) of the Tangor oil field site in northern Sakhalin Island dated 22 February 2025. The methane release from the flare corresponds to the absence of a thermal signal in NASA data, indicating that the gas was not being burned.

The lower row shows imagery of the same site from Google Earth (left) and NASA FIRMS (right) dated 1 July 2024. In this case, the operating flare – also shown in the enlarged inset – corresponds to a thermal signal detected by NASA.

Thus, flare systems at oil and gas fields appear to operate in three distinct modes:

- **the flare is burning and the gas is being combusted;**
- **the flare is not burning and no gas is being released;**
- **the flare is not burning and gas is being released into the atmosphere.**

It should be noted that in some cases methane emissions coincide with an operating flare. Most likely, the satellite is detecting methane released into the atmosphere as a result of incomplete combustion at the flare.

According to the Global Gas Flaring Report prepared for the World Bank, Russia is the global leader in associated gas flaring[111]. However, when gas is released directly into the atmosphere rather than burned – as observed in Tanager-1 satellite monitoring data – its climate impact is substantially greater. Burning methane in a flare, which produces water vapor and carbon dioxide, has roughly ten times less climate impact than releasing methane directly into the atmosphere

Preventing methane releases from flare systems and gas transportation infrastructure should therefore be a priority for Russia's climate policy.

THE RELEASE OF 1 TONNE OF METHANE HAS THE SAME CLIMATE IMPACT AS THE EMISSION OF 27.9 TONNES OF CARBON DIOXIDE

BURNING 1 TONNE OF METHANE PRODUCES 2.75 TONNES OF CARBON DIOXIDE

CONCLUSION

Russia's natural gas industry has lost the export model that sustained its financial power for decades. Europe was Gazprom's largest and most lucrative market, providing high-margin sales, hard currency, budget revenue, and geopolitical leverage. That market has largely been lost as a result of Russia's aggression against Ukraine and the broader rupture with the West.

There is no easy replacement. Gas exports to China are growing, but they are far less profitable than former European exports, geographically constrained, and unable to absorb the production and transportation capacity built for Europe. Large parts of Gazprom's upstream production and trunk pipeline infrastructure are now stranded or underused. New export routes to Asia would require major capital investment at a time when Gazprom's profitability, access to finance, and investment capacity are all under pressure.

The industry is also facing rising taxation. Gazprom and Novatek remain major contributors to Russia's state budget and war effort, but shrinking profits and growing fiscal pressure are turning the natural gas industry into a donor for a state increasingly short of revenue. Further tax increases are likely as Russia's budget problems deepen.

This makes the EU phase-out of Russian gas strategically important. If implemented by the end of 2027, it will further reduce the profitability of Russian gas exports and weaken the ability of Gazprom and Novatek to provide revenue for the Russian state and its war against Ukraine. The credibility of Europe's sanctions and energy security strategy will depend on whether this phase-out is enforced in practice, including against indirect Russian gas flows and potential origin-masking schemes.

Existing LNG exports remain the most important remaining revenue channel in Russia's gas business. They preserve foreign currency earnings and fiscal contributions even as pipeline exports collapse. Sanctions against new LNG projects are therefore necessary but insufficient: Western policy must also address the operating LNG projects and contractual, shipping, and transshipment channels through which Russian LNG continues to reach international markets.

At the same time, financial pressure on the gas sector has strengthened incentives for companies and the broader industrial lobby to cut environmental costs. Since 2022, environmental deregulation has become part of the Russian government's policy response to the consequences of the war. The authorities have weakened environmental oversight, delayed modernization requirements, reduced penalties, limited independent public environmental expertise, and reduced transparency around pollution and emissions data.

The environmental consequences are already visible. Gazprom has stopped publishing full sustainability and emissions reporting, while the remaining data show higher pollution intensity in 2023–2024 compared with pre-war levels. As official and corporate transparency declines, independent monitoring becomes increasingly important for assessing the real environmental and climate impact of Russia's fossil fuel sector.

Methane is the most immediate and measurable climate risk associated with Russia's gas infrastructure. Satellite monitoring through Tanager-1, Carbon Mapper, and NASA FIRMS now allows independent experts to identify methane plumes at specific oil and gas facilities and compare them with thermal signals from flaring. In some cases, the data indicate direct methane releases from flare systems instead of combustion, producing a much greater climate impact than ordinary flaring. These tools should become part of climate risk assessment, sanctions compliance, and independent scrutiny of Russia's fossil fuel sector.

The crisis of Russia's gas sector is therefore an economic, fiscal, geopolitical, and climate issue at the same time. Western policy should treat the phase-out of Russian gas, restrictions on LNG expansion, enforcement against indirect Russian gas flows and origin-masking risks, and independent methane monitoring as parts of one strategy. The phase-out will have real strategic impact only if it is enforced across the supply chain – including origin verification, shipping routes, transshipment, resale schemes, and remaining LNG exposure. Without such an approach, Russia will continue using remaining gas revenues as a wartime lifeline while shifting the hidden costs of its aggression onto the environment, the global climate, and future generations.

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