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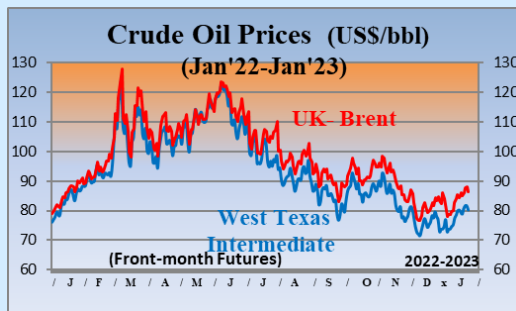
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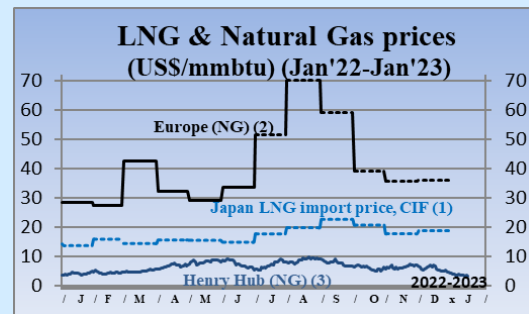
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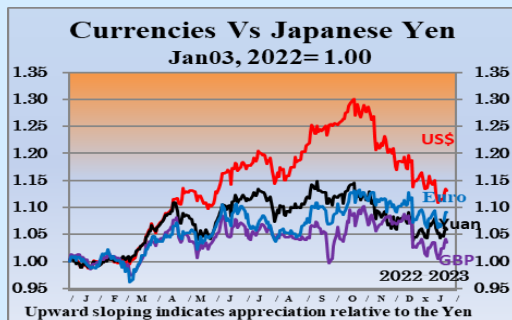
(As of January 24, 2022)



Sources:
 (1) DOE-EIA
 (2) Investing.com



Sources:
 (1) Ministry of Finance "Japan Trade Statistics"
 (2) Ministry of Economy, Trade and Industry (arrival month basis)
 (3) Estimated by World Bank (Netherland Title Transfer Facility)
 (4) DOE-EIA, NYMEX (Front-month Futures)



Source: x-rates.com



Sources:
 (1) Finance. Yahoo.com
 (2) Investing.com

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Key Points for 2023 Summary

1. Overall Energy Policy

In 2023, more concrete measures for achieving the 2030 GHG reduction target (46% from 2013 levels) will be discussed, based on the 10-year roadmap set by the GX Implementation Council.

2. World Energy and the Environment

2.1 Oil

In 2023, the oil market is expected to be tightened, and Brent price will average at \$90/bbl. The market is likely to focus on the possibility of a recession, additional production cuts by OPEC Plus, and the war in Ukraine.

2.2 LNG

The key in the LNG industry in 2023 is whether it is possible to secure the necessary supply in the short term, with cooperation and coordination between operators and consuming markets to that end. Along with the activation of long-term procurement activities, the industry is expected to see progress in LNG production projects.

2.3 Coal

In 2022, the coal market saw turmoil following the invasion of Ukraine, coal prices soared and remained high. In 2023, the coal market will stabilize, and coal prices will decline on an annual average basis, although high.

2.4 Renewable Energy

Renewable energy will continue to expand in and outside Japan, but issues are emerging. It will become ever more important to gain public understanding in taking measures toward carbon neutrality, including introducing renewable energy.

2.5 Nuclear Power

In 2023, we will closely monitor Germany's decision to extend the operating period of its three nuclear reactors, the UK's decision to provide governmental financial support to a nuclear project, and the public debate on nuclear new builds in France.

2.6 Energy Efficiency

In 2023, initiatives mainly for saving gas and electricity in wintertime are expected to continue in many countries, which are facing an energy crisis. In Japan, the revised Act on the Rational Use of Energy will come into effect, and the use of non-fossil energy will be added to the scope of reporting.

2.7 Hydrogen and Carbon Recycling

In 2023, the detailed institutional design for supporting the introduction of hydrogen will be discussed. Sufficient support is necessary also for stable procurement and infrastructure development. There are high expectations for the new carbon recycling hub on Osaki Kamijima Island.



2.8 Policies Related to Climate Change

Internationally, a Global Stocktake, which assesses the progress toward the global target of the Paris Agreement, is scheduled in COP28. In Japan, the main focus will be the institutional design of the growth-oriented carbon pricing system.

3. The Domestic Energy Industry and Its Challenges

3.1 Oil Industry

In 2022, domestic retail prices of petroleum products remained stable, though high, despite the high oil prices and weak yen thanks to subsidies. To achieve carbon neutrality, the oil industry must urgently change its business model and develop innovative technologies.

3.2 Electricity and Gas Industries

In 2023, the risk of higher tariffs due to high fuel prices and tight supply will remain for both the electricity and gas industries. How to keep long-term fuel supply contracts viable in a competition policy will be key.

4. International Politics, Geopolitics, and Energy

4.1 US: Balance between Oil and Gas Exports and Climate Action

The Biden administration has introduced a policy to expand oil and gas exports to address the energy crisis. The course of the policy must be watched, including the response to criticism within the party that it is a backward step in terms of climate action.

4.2 EU: Concerns about Securing Gas Storage Levels and Concrete Industrial Policies

Ensuring adequate LNG supplies is the top priority of many efforts, chiefly the REPowerEU, but concerns remain. Attention must also be paid to the final form of Europe's new industrial policies, which include a new common fund.

4.3 China: A Year That Will Test the New Leadership's Ability to Steer the Country

At the end of last year, China optimized its zero-Covid regulations. In 2023, can China simultaneously achieve the twin goals of economic recovery and pandemic control on the one hand, and stable energy supply and decarbonization on the other, after the pause in 2022? The new leadership's ability to steer the country will be tested.

4.4 ME: Economic Recovery in Gulf Countries; Continuing Turmoil in Iran and Other Conflict Zones

The situation in Middle Eastern countries remains divided: Gulf oil producers enjoyed an economic upturn as the pandemic subsided and Russia invaded Ukraine, while Iran now has little chance of rebuilding the JCPOA due to widespread protests.

4.5 Russia: Signs of a Protracted War and Weakening of Putin's Power Base

The war in Ukraine looks set to continue. With Russia reportedly losing ground, anti-war sentiment growing back home, and economic sanctions biting harder, the Putin administration is under mounting pressure from both in and outside the country.



1. Overall Energy Policy

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On July 27, 2022, the GX (Green Transformation) Implementation Council was established, chaired by Prime Minister Kishida, to deliberate the measures necessary to transition from the current economic, social, and industrial structures based on fossil fuels to clean energy-centered ones. However, the current crisis in Ukraine and the tight electricity supply clearly show that a stable energy supply is a prerequisite for GX. Prime Minister Kishida has also said that “Overcoming the current crisis is our top priority. Without getting this done, the GX by 2030 and 2050 will not be possible. On the other hand, overcoming the current crisis cannot be done separately from implementing the medium- to long-term GX plan.” In addition, the GX Implementation Council is scheduled to develop by the end of 2022 a 10-year roadmap for the five policy initiatives set out in the Grand Design and Action Plan for a New Form of Capitalism, which was approved by the Cabinet in June 2022: establishment of GX Economic Transition Bonds, investment promotion measures that integrate regulations and support, step-by-step development and utilization of the GX League utilization of new financial instruments, and strategies for international expansion, including the concept of the Asia Zero Emissions Community (not yet formulated at the time of writing).

In parallel with the GX Implementation Council, the Strategic Policy Committee of the Advisory Committee for Natural Resources and Energy also began discussing how to re-establish a stable energy supply. In view of Prime Minister Kishida’s earlier statement, the responses for two timeframes are examined: immediate, and medium- to long-term.

In the immediate term, the Committee intends to address concerns about the power crunch this winter and beyond by mobilizing all available initiatives, and is considering measures in four areas: securing resources, electricity and gas, easing supply and demand, and nuclear power. In addition to calling for increasing LNG production and adding power sources, including by restarting suspended thermal power plants, more concrete ideas are being proposed on restarting nuclear power plants, including ensuring that up to nine of the 10 restarted nuclear reactors are in operation and restarting the seven reactors that have obtained a reactor installation and modification permit.

As for the medium- to long-term supply stability, the Committee believes that political decisions must be made to resolve the delays in energy policy, and is discussing measures in five areas: power system, renewable energy, nuclear power, securing resources, and easing the supply-demand balance. While renewable energy is intended to serve as the main clean energy, here too more specific measures for utilizing nuclear energy are being proposed, including mobilizing all parties concerned to restart nuclear power, extending the operational lifetime of reactors, developing and constructing next-generation reactors, and accelerating the processes toward reprocessing, decommissioning, and final disposal of radioactive wastes.

The Sixth Strategic Energy Plan was formulated in November 2021; the Plan is to be revised every three years, and so the next revision will be in 2024. As such, 2023 will likely see the start of discussions toward the revision. In particular, nuclear power may be put at the center of the debate. The meeting is expected to discuss more concrete measures for achieving the 2030 GHG reduction target (46% reduction from 2013 levels), based on the 10-year roadmap set by the GX Implementation Council. Another important issue for 2023 is considering and implementing energy-related diplomatic strategy, taking into account the G7 Summit in May.



2.1 Oil

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In the oil market in 2023, The market is likely to focus on the possibility of a recession, additional production cuts by OPEC Plus, and the war in Ukraine. The IEEJ forecasts that oil supply and demand will be tightened in 2023, and that Brent price will average at \$90/bbl. However, the price may fluctuate wildly depending on how these factors develop.

As for the possibility of deteriorating demand due to economic recession, the International Monetary Fund's World Economic Outlook forecasts that global GDP growth will slow from 3.2% in 2022 to 2.7% in 2023. While some consider that major countries and regions including the U.S. and the Eurozone will fall into a recession, others believe that the U.S. economy will hold up because inflation is slowing and so will the pace of interest rate increases. China, the world's largest oil importer, has eased its zero-Covid policy, but the country shows no inclination to adopt Western vaccines even though the number of cases is reportedly soaring, indicating that Covid-19 will remain a risk for oil demand. In 2023, macroeconomic conditions and the pandemic could cause prices to decrease.

At its December 4 meeting, OPEC Plus decided to continue to cut production by 2 mb/d, stating that it will carefully assess the risk of recession and respond to market trends if necessary by taking additional measures immediately. It also said it will assess the effect of the price cap on Russian oil. The next meeting is scheduled for June 2023, but depending on market conditions, OPEC Plus—or Saudi Arabia or others on their own—may cut more production before the meeting. In addition, OPEC Plus's real surplus production capacity remains extremely low and it has a little buffer to mitigate if supply disruptions happen. It is thus rational to view OPEC Plus related factors for higher prices.

The war in Ukraine is intensifying with no sign of a ceasefire. Despite the various sanctions already imposed, Russia exported 8.1 mb/d of oil as of November last year, which was higher than the 2021 average of 7.5 mb/d. To reduce Russia's oil export revenues and ensure a stable supply of oil, the G7, the EU, and Australia set a price cap of \$60/barrel for Russian oil transported by sea on December 5 last year. On the same day, the EU imposed an embargo on Russian oil. A price cap will also be set for Russian petroleum products from February 5, 2023. It is said that the price cap will be enforced by granting or denying marine insurance by Western countries. However, it is not clear whether the cap will remain effective as Russia is highly likely to exploit loopholes such as their or Chinese marine insurance and transshipment and blending in a third country. There is also the risk of embargo by Russia. On the other hand, if a ceasefire becomes reality, the risks related to Russian supplies will recede. Thus, Russia could be a cause of both higher and lower prices.



2.2 LNG

Hiroshi HASHIMOTO

Head of Gas Group

Fossil Energies & International Cooperation Unit

The main concern in the global natural gas and LNG industry in 2023 is whether the necessary supply will be secured. In order to avoid overheated competition between consumers, coordination between governments and international frameworks will play an important role, alleviating extreme regional and seasonal market tightness.

LNG flows to Europe, shifting from elsewhere, increased in 2022, mainly from sources in the United States. While the share of the European Union (EU) plus the United Kingdom among U.S. LNG shipment destinations was more than 60%, almost doubling from around 30% in 2020 and 2021, LNG imports declined in Japan and China, the world's two largest LNG importers. As among China's reduction of LNG import Chinese buyers' resale of LNG produced in the United States was significant, EU's plus the United Kingdom's LNG imports increased by more than 60% year-on-year to surpass the 100-million-tonne mark in 2022. In 2023, the supply of Russian pipeline gas to Europe is expected to decrease by about 30 million tonnes of LNG equivalent compared to 2022. While assuming no production facility problems, global LNG production is expected to increase by about 9% (about 30 to 40 million tonnes), Europe and China are expected to absorb the increase in LNG production. Spot LNG prices are expected to stay high at an annual average of over USD 30 per million BTUs and LNG imports to Japan of a little over USD 16. Therefore, the LNG procurement environment is expected to continue being challenging for emerging markets.

LNG procurement activities accelerated in 2022, mainly from North American LNG production projects. Term contracts and highly accountable basic agreements amounting to 74 million tonnes per year were announced, with sales from North American LNG projects representing 64 million tonnes. Qatar, which is developing large-scale expansion projects, also accelerated contract marketing activities. While Chinese companies made an annual commitment of 15 million tonnes, sales to the European market amounted to 17 million tonnes per year. Some procurement deals by Japan companies were also announced near the end of 2022. Procurement activities and the development of LNG production projects are expected to gather pace in 2023.

In order to continue stable procurement in markets until 2025, it will be more important to promote cooperation, including joint procurement, among domestic and overseas operators. From 2026 onwards, securing long-term LNG contracts, including those from new projects is crucial. It will be important to take measures to promote investment in the upstream and LNG production sectors. Among LNG production projects, brownfield projects and small- and medium-sized projects are likely to advance. Furthermore, in LNG production projects, measures to reduce GHG emissions, mainly those of CO₂ and methane, are essential.



2.3 Coal

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We expect the coal market to recover from the turmoil caused by Russia's invasion of Ukraine and stabilize in 2023, but that coal prices will remain high. Steam coal prices soared to over \$400/tonne in 2022 and remained high, but will fall from the current level of over \$400 to nearly \$300 in 2023. On the other hand, coking coal prices, which temporarily surged to \$600 in 2022 before falling, are expected to rise to the low \$300 level in 2023 from the current upper \$200 level.

Looking back at the coal market in 2022, the spot price for steam coal (FOB, shipped from Port of Newcastle, Australia) was rising in early 2022 due to the recovery of demand in 2021, poor weather in supplier countries, a coal export ban in Indonesia, and concerns over the Ukraine situation, and after the invasion began, the price surged from mid-\$200/tonne to \$400. The price then temporarily fell, but soared to over \$400 when the EU and Japan announced plans to ban imports of Russian coal and procure alternative coal, as well as heavy rainfall in New South Wales, Australia, and remained high at around \$400 thereafter. In October, the price fell to the low \$300 level on reports that the EU had secured its winter coal supply, but has currently risen to \$400.

The spot price for coking coal similarly surged in March after the invasion of Ukraine, temporarily approaching \$600. The price then declined for a while but soared again after April, exceeding \$500, then fell to the low \$200 level after late June as supply caught up with the market, and has since remained around the low \$200s to just over \$300.

In Asia, China stepped up coal production starting in the fall of 2021, and imports for 2022 will decline (dropped by 27.6 million tonnes year-on-year for January-October). Consumption is expected to pick up in 2023 along with economic recovery, and imports will also increase depending on domestic production. In India, both domestic production and imports increased in 2022 (imports rose 7.4 million tonnes year-on-year for January-October) and are expected to continue to grow in 2023. Imports are also expected to increase in Japan due to the restart of coal-fired power plants in 2022 and 2023 and in Southeast Asia due to the expansion of electricity demand.

In the EU, the invasion of Ukraine exposed problems in the stable supply of fossil energies, forcing the EU to postpone the closure of coal-fired power plants and restart the plants. Coal consumption and imports increased in 2022, and in 2023 imports are expected to remain at the level of late 2022.

On the supply side, coal exports remained sluggish in Australia in 2022 due to a series of natural disasters, but are expected to exceed the previous year in 2023. Indonesia's coal exports were roughly half the level a year ago in January 2022 due to a self-imposed ban on coal exports, but have outrun last year's levels since March and are expected to remain strong in 2023.



2.4 Renewable Energies

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Renewable energy power generation could reach approximately 8,700 TWh in 2022 (including 4,500 TWh of hydropower), and the share of renewable energy in power output could increase from 28% in 2021 to 30%. China, Europe, and the U.S., which are driving the introduction of renewable energy, have introduced policies to expand renewable energy capacity further: China's 14th Five-Year Plan for Renewable Energy Development set a target renewable energy power generation for 2025 (at 3,300 TWh, up from 2,200 TWh in 2020), Europe significantly raised its renewable energy target through the RePowerEU Plan (from the current target of 32% to 45%), and the U.S. extended the tax incentives for renewable energy under the Inflation Reduction Act.

In Japan, the amount of electricity generated by FIT power sources in FY2022 is estimated at 179 TWh. Even if renewable capacity continues to grow by 11 TWh per year, the annual average for the past five years, the cumulative total, including large-scale hydropower, would only be about 320 TWh in 2030, falling short of the target share of 36–38% for renewable energy in the power mix. Curbing the surcharges paid by the public also remains an issue.

Thanks to the auction system introduced in FY2017, the bidding price for commercial solar PV finally fell below 10 yen/kWh in FY2022, although it remains high compared to international levels. In addition, various measures are being launched to deploy new renewable capacity without relying on the FIT system, such as the Feed-in Premium (FIP) system, which aims to make renewable energy competitive in the market, and the Power Purchase Agreement (PPA), a one-on-one contract between renewable power producers and consumers. In 2023, it will be necessary to verify the effects of these new systems.

To reach the target renewable energy capacity, policies must be reinforced further. One notable initiative is Tokyo's revised ordinance that requires all newly built detached houses to be installed with solar panels. The ordinance was enacted on December 15, 2022. During the period until the rule comes into force in April 2025, which will be used for awareness-raising and preparation, housing manufacturers will prepare themselves and the Tokyo Metropolitan Government will come up with various support measures. Views on the revised ordinance vary, but those who support the mandatory installation consider that Japan can afford no more delays to achieve carbon neutrality. On the other hand, those who oppose it argue that the revised ordinance does not fully specify the size of business and the effects, and has not gained public understanding.

Recent examples of a plan gone awry due to a lack of public understanding include onshore wind power development projects. Concerns about impacts on the environment and landscape have led to a series of troubles between onshore wind farm developers and local governments and residents. Measures to achieve carbon neutrality, including renewable energy, affect not only large corporations and energy suppliers but also impact each and every citizen significantly. It will become ever more important to gain public understanding while proceeding.



2.5 Nuclear Power

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The year 2022 saw notable developments in nuclear policy in major European countries.

In particular, Germany made a major historical U-turn. The country had been pursuing a long-term policy of phasing out nuclear power since the 1980s, and by the end of 2021 only three reactors remained. All three reactors were scheduled to be shut down permanently at the end of 2022, but the government decided to keep them running until April 2023 as an emergency response to the energy crisis triggered by Russia's invasion of Ukraine in February. According to a poll in early August of last year (1,313 respondents), more than 80% said that the operating period of the three units should be extended. With no prospect of the energy supply crunch easing in 2023, might there be another U-turn in Germany's radically changed nuclear policy?

In April 2022, the UK government set specific nuclear targets for 2050—a total installed nuclear capacity of 24 GW and a 25% share of electricity demand—in the latest version of the British Energy Security Strategy, reflecting the difficult energy situation since the invasion of Ukraine. As of December 2022, the UK's installed nuclear capacity is nine units totaling 6,530 MW. All but one are old reactors that commenced operation in the 1980s, so the government is aiming to license and start constructing at least one unit each year to reach the target capacity. In June, the Nuclear Energy Financing Act, which features a support policy based on the regulatory asset base (RAB) model, was legislated, and in November, the government designated Sizewell C (EPR, 1,670 MW x 2 units) as the first new construction project to be financed based on the model. The U.K. government will invest 679 million pounds in the project and hold roughly a 50% stake, but third-party investments will also be solicited. We will continue to monitor the investment scheme and progress of this project in FY2023.

On February 10, 2022, French President Emmanuel Macron unveiled France's new energy strategy, announcing a policy to actively expand the development and use of renewable energy and nuclear power. Unlike Germany, this policy was not cobbled together suddenly after the invasion of Ukraine, but is part of the "France Relance" recovery plan, an industrial policy that has been underway since September 2020. The strategy states that six new units of EPR2 innovative light water reactors will be constructed, and the construction of eight more will be considered.

As of December 2022, a public debate on nuclear power and energy has been underway in France via an online participatory platform and in several regions (until December 31). The points to watch in 2023 include the progress of construction of Flamanville Unit 3 (1,650 MW, EPR), which began in 2007, and the long-term outlook for France's nuclear policy.



2.6 Energy Efficiency

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As the world faces an energy crisis, efforts to boost energy efficiency are being reinforced as an immediate countermeasure. Initiatives to save gas and electricity in wintertime are expected to continue in many countries in 2023, especially in Europe.

The EU will provide €250 billion in low-interest loans and subsidies through the Recovery and Resilience Facility to reduce fossil fuel dependence (from 2022 through 2026). Of this amount, efficiency improvements in production processes and energy-saving renovations for homes account for about 30%. Can these economic measures not only help EU countries overcome the near-term crisis, but also put them on a path to green growth? The countries will face the moment of truth in 2023. In addition, the draft amendments to the Energy Performance of Building Directive (EPBD) proposed in 2021 are expected to be approved in the summer of 2023. The amendments deserve attention as they strengthen regulations in a wide range of areas, including (1) modernizing existing houses and other buildings that are less energy-efficient, (2) setting a vision for all new houses and buildings to be “zero-emission buildings” from 2030 (from 2028 for public buildings), and (3) calculating the lifecycle global warming coefficient for all new houses and buildings starting from 2030.

The U.S. Inflation Reduction Act enacted in August 2022 will invest \$60 billion over 10 years in energy efficiency (accounting for 16% of the total amount of \$369 billion for the overall clean energy sector), to support domestic manufacturers as well as to reduce the burden on consumers. A large portion of this amount, \$24 billion, will be spent on housing-related energy efficiency measures such as tax credits and rebates. In addition, measures to enhance energy efficiency as a system will continue to be considered, including “grid-interactive efficient buildings,” in which demand is optimized in line with supply fluctuations by utilizing control systems and integrating sensors and devices.

Meanwhile, emerging economies such as China and ASEAN countries will continue to implement energy efficiency initiatives to meet their medium-term CO₂ emission reduction targets. Countries that depend heavily on energy imports, such as Thailand, implemented power saving measures in 2022 and will strengthen these measures in 2023. In 2023, Japan’s support will be increasingly sought in areas such as finance for energy-saving capital investments in emerging countries, transfer of energy management know-how, and formulation of energy conservation policies.

In Japan, measures need to be accelerated to achieve the target of saving 62 million kL in FY2030 compared to FY2013 levels. The government will provide roughly 160 billion yen as part of multi-year energy efficiency subsidies for the manufacturing sector with the second supplementary budget for FY2022. This is a new mechanism for seamlessly funding investment programs that continue for several years and was established using the multi-year national debt framework; if subsidies are distributed at an even pace, 500 billion yen in subsidies will be disbursed over the next three years. There are high expectations for the benefits.

In addition, the revised Act on the Rational Use of Energy will come into effect in April 2023. This revision will add the use of non-fossil energy to the scope of efficiency improvement measures. Furthermore, with the goal of optimizing demand in line with supply fluctuations, the Act will begin to assess positive and negative demand response (DR) in FY2023.



2.7 Hydrogen and Carbon Recycling

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In 2023, discussions on Japan's policy support system for introducing hydrogen and ammonia will reach the final stage. The specific support being considered is a system in which the government pays the difference between the cost of introducing hydrogen, as estimated by the supplier (the reference price) and the user (the base price). In 2023, deeper discussions on the detailed institutional design are scheduled, including how to actually calculate these prices, reflect the environmental value of hydrogen and ammonia as decarbonized energy sources, and incentivize operators to reduce costs. Meanwhile, these support measures will require a substantial budget, and how to fund such budget is another major issue for the future.

Hydrogen is categorized into “colors” based on how it is produced. In particular, some have suggested that policy support should only be provided for green hydrogen produced from renewable energy sources. Regarding this issue, the international trend has been to include both green and blue hydrogen after the U.S. Inflation Reduction Act enacted in August 2022 decided to include blue hydrogen, which is produced from fossil fuels with CCUS, in the scope of support, but with different levels of support depending on the degree of CO₂ reduction. In 2023, deeper discussions are also slated on the requirements for eligibility for support in Japan. Since the introduction of hydrogen supply infrastructure requires an enormous initial investment, it is necessary to secure as much supply as possible early on. This makes it desirable to allow some leeway in terms of the carbon footprint of hydrogen in the initial phase, and gradually tighten the criteria as costs fall and technology advances.

On the supply side, many new projects on fuel ammonia plants are underway in North America, the Middle East, and Australia, and some projects may reach final investment decisions in 2023. Recently, in addition to South Korea, which, like Japan, has been keen to use fuel ammonia, German companies have been actively developing overseas fuel ammonia production and export projects, indicating that international competition for stable fuel ammonia sources has already begun. As Japan's support program will have a significant impact on the course of fuel sourcing efforts like these, an adequate support system will be essential.

For carbon recycling, a carbon recycling demonstration and research center was established on Osaki Kamijima Island in Hiroshima Prefecture in September 2022. The center is a major carbon recycling hub unlike any other in the world, equipped with demonstration facilities for various carbon recycling technologies, such as concrete and algae fuel that capture and utilize the CO₂ emitted from local power plants. Products made with carbon recycling will inevitably cost more than regular products, and so steady technological development at demonstration facilities like this will be essential to minimize the costs. As Japan is not blessed with resources, there are high expectations for carbon recycling, which treats CO₂ not as a waste but as a resource and reuses it for a wide range of purposes.



2.8 Policies Related to Climate Change

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International trends: At the 27th Conference of the Parties to the UNFCCC (COP27 in Egypt), a Mitigation Work Programme with an annual check on progress was launched in the mitigation area, and technical negotiations on how to operate the mechanism were carried out in the credit area. Ultimately, no agreement was reached on methodological matters or guidance on removals for Article 6.4 (the UN-managed mechanism), and the approach based on Article 6.2 (international transfer of reductions based on voluntary bilateral or multilateral agreements) is expected to be implemented first. Meanwhile, as voluntary credits currently cannot be used for adjusted emission volume or emission potential under the Act on Promotion of Global Warming Countermeasures, it will be important to keep working on J-Credit and JCM initiatives.

COP28 will coincide with the final phase of the first Global Stocktake (GST), a five-year assessment of progress toward the long-term goals of the Paris Agreement. The purpose of the GST is a “world-wide” assessment; it will not evaluate the progress of each country. Nevertheless, it could impact the discussions on Japan’s next Strategic Energy Plan, and thus must be closely watched.

Domestic trends: The biggest focus will be the institutional design for the growth-oriented carbon pricing (CP) initiative. One of the centerpieces of this initiative is GX Economic Transition Bonds, for which the government will make an upfront expenditure of 20 trillion yen in total over 10 years to accelerate decarbonization efforts by companies. GX Economic Transition Bonds will start to be issued in FY2023, with redemptions financed by a new CP program and scheduled to be completed by 2050. The criteria for the technologies and measures to receive support, as well as details of the support methods, will be discussed going forward.

The CP system being envisioned is a hybrid of emissions trading (GX-ETS) and carbon surcharge (GX surcharge). The surcharge will be applied upstream and is expected to be introduced around FY2028. The emissions trading system will be provisionally run by means of the GX-League operating the GX-ETS with a focus on autonomy by member companies, but in order to ensure fairness and effectiveness, third-party certification and discipline will be strengthened from FY2026, and a paid auction will be introduced in phases in the power generation sector from around FY2033.

As the power generation sector may be subject to both emissions trading and surcharges under the proposed CP system, some sort of adjustment measures will be indispensable. While the policy is to reduce the total financial burden compared to current levels (including from petroleum and coal taxes, renewable energy surcharges, etc.), due consideration must be given to the impacts on people’s lives and the international competitiveness of industry. One approach is to allocate the proceeds from Transition Bonds to support companies that are active in the GX League, in addition to decarbonization technologies. In particular, the effects of measures that involve the supply chain, including small and medium-sized enterprises, will trickle down to the base of the supply chain. Furthermore, since trading power generation sector emissions in paid auctions could push up electricity prices at least in the short term and thus hamper electrification, which is one of the pillars of the CN policy, measures to address this issue must be considered. Finally, to set the foundation for introducing CP, a review and clarification of existing policies in this area is urgently required. This is essential for realizing the growth-oriented CP concept, even more so than for the design of the CP system.



3.1 Oil Industry

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In Japan, domestic retail prices of petroleum products have conventionally followed fluctuations in oil prices; however, in 2022, thanks to fuel subsidies that began to be paid on January 27 to curb extreme price increases and stimulate the economy, prices remained stable, though high, despite the rise in oil prices following the invasion of Ukraine and the rapidly weakening yen. The subsidies are intended to control the retail prices of gasoline, kerosene, light oil, heavy fuel oil, and jet fuel by providing wholesale distributors and others with funds for curbing wholesale prices. The amount paid is determined every week based on the fluctuations in crude oil prices and exchange rates and other factors. As a result, in 2022, the domestic retail gasoline price temporarily reached 175 yen per liter in March, the highest since August 2008, but then hovered around 170 yen until the end of the year thanks to increased subsidies. Without these subsidies, the price would have exceeded 200 yen per liter, judging from the price of imported oil. A subsidy of 41.4 yen was provided in the second week of June but as oil prices softened and the yen strengthened somewhat thereafter, the amount was reduced to 13.7 yen by the third week of December. At present, the subsidy program is scheduled to continue through the end of the first half of the next fiscal year, to be phased out from the beginning of 2023 and hopefully end with a soft landing.

As economic activity continues amid measures to combat Covid, Japan's fuel oil demand in the first half of FY2022 (April–September) fell 1.2% from the same period last year to 70.38 million KL. The demand for Bunker B and C rose 28.6% year-on-year with the increase in fuel oil demand for power generation, rose sharply by 23.4% for jet fuel, and also increased by 7.2% for Bunker A, but remained almost unchanged for gasoline and diesel oil, down 0.9% and 0.6%, respectively, while it decreased by 9.5% and 13.6%, respectively, for naphtha and kerosene. Refineries had a capacity factor of 76.6% in the first half of the year, up 8.4 percentage points year-on-year, mainly due to switching from imports to domestic production for gasoline products.

Domestic oil demand had already dropped 38% by FY2021 from the peak in 1999 and the oil industry is managing its business anticipating that demand will halve by 2040. Accordingly, the scrapping of several refineries was announced in 2022, including the shutdown of the Seibu Oil Yamaguchi Refinery and the downsizing of the ENEOS Negishi Refinery. The oil industry urgently needs to shift its business model to a “comprehensive energy and materials business”; it must also utilize existing infrastructure such as by converting service stations into “regional service centers.”

In addition, the oil industry has already declared its goal of becoming carbon neutral by 2040–2050 for emissions arising from its operations (Scope 1+2); furthermore, to reduce emissions from the consumption of petroleum products (Scope 3) to contribute to society, it is working on developing innovative technologies such as hydrogen, synthetic fuels (such as e-Fuel), and CCUS (Carbon Capture, Utilization, and Storage) by leveraging its technological expertise. These endeavors are expected to accelerate in 2023.

Japan's dependence on the Middle East for oil imports reached 95.1% in the first half of FY2022. The figure was 92.5% in FY2021, but rose further as Japan switched to the Middle East after banning Russian oil imports (3.6% in FY2021) as part of economic sanctions. The invasion of Ukraine has reaffirmed the importance of energy security; ensuring a stable supply of oil, including during the transition period, remains an issue.



3.2 Electricity and Gas Industries

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With the rise in fuel prices since the fall of 2021, it became normal for the average day-ahead spot price to exceed 20 yen/kWh in 2022, except in the Kyushu area which has a high ratio of low-carbon power sources. Electricity futures in Europe suggest that prices will remain high until at least March 2024, and so Japan's day-ahead domestic spot market prices, which are closely linked with European wholesale prices, may remain high. In response to the fuel price hikes, five companies have applied to raise also their regulated tariffs (Tohoku, Hokuriku, Chugoku, Shikoku, and Okinawa Electric Power Companies). Meanwhile, more and more major electric power companies have removed the caps on fuel cost adjustments for their liberalized tariffs, and some are now reflecting market price factors in their electricity tariffs. These electricity tariff raises by major power companies will make it easier for power producers and suppliers (PPSs) to raise their rates and thereby alleviate their problems somewhat. It should be noted that the government subsidy to curb extreme electricity and gas price increases requires an application to be filed, and not all consumers are eligible.

While securing long-term LNG contracts is becoming harder due to soaring fuel prices and Europe's vigorous efforts to secure LNG, one possible source of problems is ensuring non-discriminatory treatment of internal and external parties by major power companies, which would require their power generation divisions to sell to both their group companies and external parties, including PPSs, under the same conditions. Some major power companies have apparently already begun to solicit business partners through bidding. However, in a long-term LNG contract, the producer country and the LNG buyer often share the price risk by reflecting fuel supply-demand fluctuations through oil-linked pricing. If the principle of non-discriminatory treatment is imposed strictly, power producers will be required to decide the wholesale price before the LNG purchase price is fixed, which may cause them to shorten the contract period considering the risk of fluctuations in the LNG purchase price. Thus, how strictly the principle of non-discriminatory treatment of buyers will be imposed in 2023 must be watched.

In 2023, both the electricity and city gas businesses will need to focus on ensuring a stable supply. The electricity business is expecting a reserve ratio of around 3% during extreme weather in July during summer in the Tokyo area. The predictability of plant shutdowns has improved since the revised Ordinance for Enforcement of the Electricity Business Act was enacted in November 2022, requiring prior notice of at least nine months before shutting down power sources of 100 MW or more, but vigilance is required as the risk of unplanned outages of aging power plants may be higher than expected. In the city gas business, supply uncertainty is expected to continue due to the change in the LNG supply-demand structure caused by the Ukraine crisis and equipment breakdowns in producer countries. The partial revision of the Gas Business Act and the Act on Japan Organization for Metals and Energy Security (JOGMEC) in November 2022 has made it possible to take measures to stabilize supply on both the supply and demand sides. On the supply side, JOGMEC can purchase LNG at the government's request. On the demand side, it is now possible to issue usage restrictions for gas, as well as electricity. The city gas industry is also working on economic demand response (DR) to enhance gas conservation; it will be interesting to see how successful this is.



4.1 US: Balance between Oil and Gas Exports and Climate Action

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2022 was a year in which the United States, like others, continued to fight the pandemic, combat inflationary pressure, and struggle to deal with the Ukraine crisis from the end of February.

The US possesses large domestic reserves of oil, natural gas, and coal and has a low dependence on energy imports. Nevertheless, 3.2% of the country's oil imports came from Russia as of 2021, but then a complete ban was declared in March as part of the sanctions against Russia. This happened just as US demand for petroleum products was recovering from the pandemic-induced plunge in 2020 and just before refineries ramped up operations for the summer driving season, forcing the refining industry to scramble to secure alternative oil supplies amid declining heavy crude supplies from Mexico and Venezuela. In 2022, the US remained nearly self-sufficient in oil overall, but the rise in gasoline prices caused by high oil prices on the international market had a significant impact on US politics and the economy.

The Biden administration also fast-tracked the approval of construction of terminals for exporting US oil to help European countries end their dependence on Russia. With domestic oil production still below 2019 levels, albeit recovering from the decline in 2020, and with no concrete policies coming from the Biden administration to expand domestic oil production, US domestic oil prices are likely to face further upward pressure if the US actually increases exports.

The US and Russia also have little direct trade in natural gas. Against this backdrop, the Biden administration is expediting the approval of construction plans for terminals, with the aim of expanding LNG exports to support Europe. According to media reports, US LNG operators prefer long-term contracts while European buyers remain cautious toward them, but again, the government's policy of expanding LNG exports could push up domestic energy prices. Further, due to rising gas prices, the ratio of coal to electricity supply, which declined steadily under the Obama and Trump administrations, reversed course in 2021 and the price gap between coal and natural gas widened further in 2022.

The Biden administration's policy of expanding fuel exports, albeit for the energy security of European allies, has caused a backlash from US environmental activists as a backward step in terms of climate action aimed at halving domestic greenhouse gas emissions by 2030. In August 2022, the Biden administration passed the Inflation Reduction Act, which is considered a landmark piece of climate change legislation in US history, which will provide \$68 billion over 10 years to encourage the widespread introduction of decarbonization technologies and strengthen their domestic manufacturing. However, the Act will be implemented in stages starting in 2023, following procedures by federal agencies responsible for its implementation. As a result, the Biden administration's moves, which are rolling back climate efforts, are causing disappointment and a backlash from climate-dedicated liberals as well as suspicion in the fossil fuel industry, which has been urged to make large capital investments, that climate measures may be short-lived.

Heading toward the 2024 presidential election, the process of selecting a candidate will be in full swing after the summer of 2023. Debates in the Democratic Party on the locus of responsibility for rolling back climate action and the acceleration of inflation should be monitored.



4.2 EU: Concerns about Securing Gas Storage Levels and Concrete Industrial Policies

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In December 2022, European Commission President von der Leyen, together with IEA Director-General Birol, outlined the energy outlook for Europe for 2023. Among the many priorities and chiefly the REPowerEU plan, the top priority is ensuring adequate LNG supplies. The EU achieved its target gas storage levels ahead of schedule, but has been drawing down the gas inventories gradually since the winter demand season began. As a result, inventories could be quite low by the spring of 2023. Replenishing inventories from a low level may cause high prices to continue in Europe and negatively affect industrial activity. In addition, the global LNG supply and demand is likely to become even tighter if China's currently sluggish LNG demand revives in 2023 and beyond. The possibility of additional shutdowns of pipeline gas supplies by Russia and a severe winter is also causing concern over gas storage levels in the winter of 2023. To ensure energy security, the EU has launched the EU Energy Platform to negotiate regional demand pooling, efficient use of gas infrastructure, and joint gas and hydrogen purchasing; among these, the initial focus is introducing a common purchasing mechanism. A Council regulation that includes this mechanism was formally adopted at an extraordinary meeting of energy ministers in December.

European industrial policy is another focus of attention. The EU is worried that the tax credits under the US Inflation Reduction Act (IRA) will distort competition in the clean energy sector to the disadvantage of EU companies. President von der Leyen of the European Commission has highlighted the need for a common European industrial policy along with a European Sovereignty Fund (ESF) and noted that a detailed ESF proposal will be presented in the summer of 2023 at the mid-term review of the Multiannual Financial Framework (the EU's long-term budget). Relaxing state aid rules to allow member countries to more easily subsidize companies is also being proposed. The EU is committed to leading the world in technology for a green economy and clean energy; how Europe reshapes its industrial policy in 2023 in response to the IRA in the US could have important implications for Japan and should be watched closely.

Other issues to watch in 2023 and beyond include the launch of the EU hydrogen market and the accelerated diffusion of renewable energies. There are also moves related to critical raw materials, which could also affect the wider use of hydrogen and renewable energy. The Commission published a policy paper on the supply of critical raw materials in September 2022, and a bill is scheduled for the first quarter of 2023 which is said to include targets for improving Europe's self-sufficiency for certain raw materials. Amid the growing global attention on a stable supply of raw materials, the EU's actions must be followed carefully.



4.3 China: A Year That Will Test the New Leadership's Ability to Steer the Country

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In 2022, China attracted the world's attention in various areas. On the political front, the five-yearly National Congress of Communist Party of China (CPC), the 20th, was held in October, and at the first plenary session of the Central Committee Mr. Xi Jinping was elected as the party's leader for a third consecutive term. Regarding governance, the government's goal of simultaneously achieving "zero Covid" and economic recovery did not deliver. China has the lowest rate of positive cases per population among major countries with 132 cases per 100,000 people (as of December 12, 2022, Nikkei website). However, despite the declining virulence of the Covid variant and progress in vaccination, rigorous measures including lockdowns and travel restrictions continued, causing great inconvenience to citizens and sparking protests. Economic recovery was also hampered; GDP growth fell from 8.1% in the previous year to 3% for the January–September period, and is estimated to be around 3.3% for the full year, well below the target of around 5.5%.

In 2022, progress was observed in energy security. As of the end of November, renewable power sources increased to 1.18 billion kW, and the installed capacity ratio increased to 46.9%, up 2.1 percentage points from the end of 2021. Coal, oil and natural gas production in January–November grew by 9.7%, 3% and 6.4%, respectively, while imports fell by 10.1%, 1.4% and 9.7% from the same period last year. The estimated foreign dependence of nominal consumption (production + imports - exports) fell by 1.3 points to 6% for coal, by 0.5 points to 70% for oil, and by 4 points to 40.9% for natural gas. Meanwhile, regarding decarbonization, the share of fossil energy in primary energy consumption declined by 0.6 points year-on-year for January–September, while the share of coal rose by 0.4 points with an estimated 3% increase in consumption. Coal made a comeback. Meanwhile, sales (including exports) of new energy vehicles (NEVs: including EVs, PHEVs and FCVs, but not including HVs) increased to 6.07 million units in the January–November period, up 103% from the same period last year, and the share in overall sales grew by 12 points to 25%.

The year 2023 will mark the start of the third term of the Xi leadership. The Politburo of CPC met on December 6, 2022 and the Central Economic Work Conference meeting was held on December 15–16, and the following basic governance policy was set for 2023: "place top priority on stability and move forward with stability (original text: 穩字當頭、穩中求進)." On December 7th, the government optimized its Covid control measures mainly by easing restrictions, prohibiting total lockdowns of cities and apartment complexes, abolishing population-wide PCR testing, and permitting home quarantine for asymptomatic patients and those with mild symptoms. This has heightened expectations for an economic recovery. However, easing restrictions could also lead to the spread of infections and an economic slowdown. With one eye on the pandemic situation and economic trends in major countries that have eased Covid restrictions, the Chinese government is aiming to simultaneously control infections effectively and revive the economy, by lifting excessive restrictions while concentrating medical resources on the seriously ill and elderly.

The numerical economic growth target has yet to be announced, but many believe that the turmoil that followed the easing of restrictions will be temporary and that the economy will pick up from the second quarter after a sluggish first quarter, with a full-year growth rate of around 5%. In addition, to achieve the goal of building a "modern socialist country" with high-quality growth, China will continue to simultaneously pursue energy security and decarbonization. Matters to watch include whether the instability of power supply and return to coal will be resolved, and whether NEV sales will surpass 10 million units.

Achieving both of the above two pairs of goals simultaneously is a challenge for the entire world. China's progress toward these goals paused in 2022; will the country see success in 2023? The new leadership's ability to steer the country will be tested.



4.4 ME: Economic Recovery in Gulf Countries; Continuing Turmoil in Iran and Other Conflict Zones

Shuji HOSAKA, Senior Research Fellow
President of JIME Center

In 2023, the Middle East will be impacted largely by external factors such as the pandemic and the war in Ukraine. Although restrictions are being eased in most of the Middle East, full recovery of the economy may depend on oil prices, developments in Ukraine, China's zero-Covid policy, and other factors.

Important political events include elections in Tunisia, Turkey, and Libya. Tunisia held parliamentary elections on December 17, 2022. However, the opposition forces, which are critical of the concentration of power in President Said, boycotted the elections, resulting in a turnout of just over 11%, and so confrontation in the country is likely to continue.

Turkey is scheduled to hold simultaneous presidential and parliamentary elections by June, but the elections are likely to be brought forward. However, as there is persistent criticism of the extreme inflation, the weak Turkish lira, and coercive political methods, President Erdoğan's re-election and the ruling coalition's victory are far from assured. In addition, the conflict between Libya's two "governments" which is splitting the country into east and west remains unresolved, making it impossible to even hold a presidential election.

Meanwhile, in Sudan, the military government and the country's main pro-democracy group have agreed to transition to civilian rule, but the future is uncertain. Furthermore, Lebanon held parliamentary elections in May 2022 but has been unable to elect a president due to parliamentary gridlock. Lebanon has been hit hard by economic, energy, and food crises and is in serious difficulty. In addition, if a new cabinet that includes the far-right is formed in Israel, it could worsen the conflict with Palestine. The health of Kuwait's Emir Nawaf is also a concern.

Meanwhile, the anti-regime protests that erupted across Iran show no sign of abating, and, fueled by public dissatisfaction over the worsening economy, the regime is being severely tested. With the West growing increasingly critical of the Iranian regime's clamp-down on the protests, there is little hope for progress in the negotiations to rebuild the JCPOA.

In the energy area, if Russian gas and oil exports remain stalled, the roles of Middle Eastern oil-producers will become even more important. With the UAE hosting the World Future Energy Summit in January and COP28 in November, there is growing interest in shifting away from fossil fuels in the Gulf. So far, the only Middle Eastern countries that have declared the goal of carbon neutrality are the GCC countries (excluding Qatar), Turkey, and Israel, but this list is expected to lengthen.

On the diplomatic front, China's influence is likely to grow as that of the United States shrinks. However, relations between the Gulf Arab states and China will be limited to the economy and energy, and America's position regarding security will remain unchallenged for the foreseeable future. Regarding oil and gas policy, Middle Eastern oil and gas producing countries and Russia are expected to continue to take coordinated action. In particular, military cooperation between Iran and Russia is expected to deepen as the conflict in Ukraine sinks into a quagmire.



4.5 Russia: Signs of a Protracted War and Weakening of Putin's Power Base

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Ten months since Russia invaded Ukraine in February 2022, the war increasingly looks set to continue. On December 3, 2022, the Ukrainian forces recaptured Kherson, the capital of Kherson Oblast in southern Ukraine, and flew the flag of Ukraine on the east coast of the Dnieper River, an area that was occupied by Russia, and set up their base. Footage of the scene spread globally via social media. Ukrainian forces are also striking back hard in many Russian-held areas in Luhansk and Donetsk Oblasts in eastern Ukraine. On December 5–6, two airbases and an oil storage facility in Russia were hit by drone attacks, allegedly carried out by Ukrainian forces.

Meanwhile, Russian forces continue to make rocket and Iran-made drone attacks in various parts of Ukraine, including the capital Kyiv, hitting energy infrastructure facilities in particular. By December 9, 40% of Ukraine's high-voltage transmission network had come under attack. As Russia's stockpiles of shells and missiles are dwindling, on December 10 President Putin suggested the possibility of revising Russia's military doctrine to enable preemptive nuclear attacks. At a G7 Summit held online on the 13th, the members agreed to coordinate to provide air defense systems to Ukraine, and the leaders issued a statement that "condemned Russia's continuous inhumane and brutal attacks." On the same day, at an international conference hosted by France to help Ukraine prepare for winter, Ukrainian President Zelenskyy said that 12 million Ukrainians were without electricity and need urgent humanitarian aid to get through the harsh winter.

According to the Ministry of Economic Development, Russia's GDP growth rate for 2022 is estimated to fall 2.9% year-on-year (announced in the end of November). For 2023, the Ministry of Economic Development and the Accounts Chamber released a GDP growth rate estimate of 1% and the Central Bank of Russia of minus 2.4%. However, the disruption and collapse of domestic supply chains due to unprecedented sanctions, funding and technology shortages due to the exit of foreign firms, and the decreasing supply of workers due partly to outflows across the border are taking a heavy toll on the Russian economy. A top private-sector Russian bank, Alfa-Bank, released a forecast that the GDP growth rate will fall by as much as 6.5% year-on-year in 2023. Apparently, censorship of comments that conflict with the government's official view and pessimism are gradually losing their effect despite the ongoing war.

As the situation for Russian forces worsens, and despite the spreading anti-war sentiment among the public, President Putin is pushing ahead with his policy to continue the war. However, with no military achievements, the annual press conference and direct dialog with the public, held every year for the past 10 years, was canceled in December 2022. In 2023, it is not clear whether President Putin can contain the discontent among the government and Russian society, heading toward the next presidential election scheduled for March 2024. Will the Putin government, which appears to be cornered, try to fight an even bigger war in Ukraine? Would it be possible? The situation remains unpredictable.



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