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THE TRANSFORMATION OF JAPAN–CENTRAL ASIA COOPERATION IN THE CONTEXT OF ENERGY TRANSITION

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ABOUT ARTICLE

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Abstract: The article examines how Japan's energy engagement with Central Asia has changed from resource-oriented diplomacy towards cooperation in power-sector modernization, energy efficiency and supply-chain resilience. It asks through which mechanisms a distant, land-locked region can contribute to Japan's energy security when direct fuel deliveries remain limited. The study combines qualitative analysis of policy documents, corporate disclosures and JICA project evaluations with a structured comparison of three cases: Japanese participation in Kazakhstan's Kashagan field, the modernization of Uzbekistan's Navoi thermal power plant and the 2026 industrial energy-efficiency loan to Uzbekistan. The author proposes an analytical framework that separates resource access, delivery security and partner-country resilience. The results show that equity participation, supply-side modernization and demand-side efficiency are distinct channels of cooperation with different standards of evidence, and that none of them is equivalent to physical fuel imports into Japan. Documents of 2025–2026, including the Tokyo Declaration of the first "Central Asia plus Japan" summit, confirm a growing emphasis on low-carbon investment and energy efficiency. Recommendations are made on performance reporting, measurement of savings and separate indicators for each objective of cooperation.

ENERGETIK O'TISH SHAROITIDA YAPONIYA VA MARKAZIY OSIYO HAMKORLIGINING TRANSFORMATSIYASI

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MAQOLA HAQIDA

Kalit so‘zlar: Yaponiya, Markaziy Osiyo, O‘zbekiston, energetik xavfsizlik, energetik o‘tish, energiya samaradorligi, muhim minerallar, “Markaziy Osiyo + Yaponiya” muloqoti.

Annotatsiya: Maqolada Yaponiyaning Markaziy Osiyo bilan energetika sohasidagi hamkorligi resurslarga yo‘naltirilgan diplomatiyadan elektr energetikasini modernizatsiya qilish, energiya samaradorligi va ta’minot zanjirlari barqarorligi sohasidagi hamkorlik tomon qanday o‘zgargani tadqiq etilgan. Uzoqda joylashgan va dengizga chiqish yo‘li bo‘lmagan mintaqa yoqilg‘ini bevosita yetkazib berish cheklangan sharoitda Yaponiyaning energetik xavfsizligiga qaysi mexanizmlar orqali hissa qo‘shishi mumkinligi o‘rganilgan. Tadqiqotda siyosiy hujjatlar, kompaniyalar ma’lumotlari va JICA loyihalari baholarining sifat tahlili uchta holatni tizimli qiyoslash bilan birlashtirilgan: Qozog‘istondagi Qashag‘an konida yapon kompaniyasining ishtiroki, O‘zbekistondagi Navoiy issiqlik elektr stansiyasini modernizatsiya qilish va 2026-yilda sanoatda energiya samaradorligini oshirish uchun berilgan qarz. Muallif resurslardan foydalanish, yetkazib berish xavfsizligi va hamkor davlat energetika tizimining barqarorligini farqlovchi tahliliy modelni taklif etadi. Natijalar ulushli ishtirok, ishlab chiqarishni modernizatsiya qilish va iste’molda samaradorlikni oshirish turli dalil talab qiladigan alohida hamkorlik kanallari ekanini, ularning hech biri Yaponiyaga yoqilg‘i importiga teng emasligini ko‘rsatdi. 2025–2026-yillar hujjatlari, jumladan “Markaziy Osiyo + Yaponiya” muloqotining birinchi sammitida qabul qilingan Tokio deklaratsiyasi past uglerodli investitsiyalar va energiya samaradorligiga e’tibor kuchayganini tasdiqlaydi. Natijalar to‘g‘risida hisobot berish, tejamni o‘lchash va hamkorlikning har bir maqsadi uchun alohida ko‘rsatkichlar belgilash bo‘yicha tavsiyalar berilgan.

ТРАНСФОРМАЦИЯ СОТРУДНИЧЕСТВА ЯПОНИИ И ЦЕНТРАЛЬНОЙ АЗИИ В УСЛОВИЯХ ЭНЕРГЕТИЧЕСКОГО ПЕРЕХОДА

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О СТАТЬЕ

Ключевые слова: Япония, Центральная Азия, Узбекистан, энергетическая безопасность, энергетический переход, энергоэффективность, критически важные минералы, диалог «Центральная Азия + Япония».

Аннотация: В статье рассматривается, как энергетическое взаимодействие Японии с Центральной Азией сместилось от ресурсной дипломатии к сотрудничеству в модернизации электроэнергетики, энергоэффективности и устойчивости цепочек поставок. Исследуется, через какие механизмы удалённый регион, не имеющий выхода к морю, может вносить вклад в энергетическую безопасность Японии при ограниченных возможностях прямых поставок топлива. Качественный анализ политических документов, корпоративной отчётности и оценок проектов JICA сочетается со структурированным сравнением трёх случаев: участия японской компании в месторождении Кашаган в Казахстане, модернизации Навоийской тепловой электростанции и кредита 2026 года на повышение энергоэффективности промышленности Узбекистана. Автор предлагает аналитическую модель, разграничивающую доступ к ресурсам, безопасность поставок и устойчивость энергосистемы страны-партнёра. Результаты показывают, что долевое участие, модернизация генерации и повышение эффективности потребления представляют собой самостоятельные каналы сотрудничества с разными требованиями к доказательствам и ни один из них не равнозначен физическому импорту топлива в Японию. Документы 2025–2026 годов, включая Токийскую декларацию первого саммита «Центральная Азия + Япония», подтверждают растущее внимание к низкоуглеродным инвестициям и энергоэффективности. Даны рекомендации по отчётности о результатах, измерению экономии и раздельным показателям для каждой цели сотрудничества.

Introduction. Central Asia holds an unusual place in Japan's external energy relations. The region has large hydrocarbon and mineral reserves, yet it lies far from Japan and has no outlet to the open sea, so fuel produced there cannot easily reach Japanese consumers. The research problem therefore concerns the channels through which cooperation with the region can still add to energy security once transport costs and supply-chain risks are counted. Resource abundance alone explains little; the links between production, investment and final consumption have to be traced one by one.

Official statistics give a more exact picture of Japan's exposure than general statements about near-total import dependence. According to the 2025 edition of *Japan's Energy*, the energy self-sufficiency ratio was 16.4% in FY2024, and coal, oil and liquefied natural gas together made up 81.2% of primary energy supply [1, p. 1–2]. In 2024 about 95.1% of Japan's crude oil imports came from the Middle East [1, p. 3]. Each figure measures a different side of vulnerability: the weight of domestic supply, the composition of the fuel mix and the geographic concentration of one imported commodity.

The aim of this article is to identify the mechanisms through which Japan–Central Asia energy cooperation contributes to energy security and to propose criteria for assessing each of them. Three research questions follow from this aim. First, how did Japan's energy interest in the region change between the Eurasian diplomacy of the late 1990s and the present energy-transition agenda? Second, through which mechanisms can cooperation with a distant, land-locked region strengthen energy security when direct hydrocarbon deliveries to Japan remain limited? Third, what evidence is required to confirm that a particular project delivers the benefit attributed to it?

The novelty of the study is an analytical framework that separates resource access, delivery security and partner-country resilience, together with its application to three documented cases: Japanese participation in the Kashagan oil field in Kazakhstan, the modernization of the Navoi thermal power plant and the 2026 industrial energy-efficiency loan in Uzbekistan. The framework is meant for researchers and practitioners who evaluate Japanese-supported projects in the region.

Literature review. The literature relevant to the topic falls into two groups: general studies of energy security and studies of Japan's Central Asia policy. In the first group, the International Energy Agency defines energy security as the uninterrupted availability of energy sources at an affordable price and distinguishes a long-term dimension, linked to timely investment, from a short-term one, linked to the ability of the energy system to react quickly to sudden changes in supply and demand [2]. D. Yergin treats diversification of supply as the starting principle of energy security and stresses the resilience of the whole system, including spare capacity, stocks and information exchange among consumers and producers [3]. B. Sovacool and I. Mukherjee argue that a single indicator cannot capture the concept and propose a synthesized approach built on five

dimensions: availability, affordability, technology development, sustainability and regulation [4]. These works show that energy security cannot be reduced to the physical origin of imported fuel, a point that is central to the present study.

The second group concerns Japan's policy in the region. The collective volume edited by C. Len, T. Uyama and T. Hirose traces the origins of Japan's "Silk Road diplomacy" and its later development, and assesses its results in politics, economics and security [5]. A chapter in the same volume by K. Shimao discusses Japan's energy strategy towards West and Central Asia in the context of globalization and shows that resource interests formed only one part of Tokyo's motivation [6]. T. Dadabaev examines Japan's strategies and initiatives in Central Asia against the background of other major partners of the region [7]. In a later article he finds that Japan has concentrated mainly on maintaining, modernizing and rehabilitating existing infrastructure, while other partners have emphasized new construction in energy and transport [8]. S. Insebayeva analyses Japanese official discourse and shows how initiatives such as Eurasian (Silk Road) diplomacy, the "Central Asia plus Japan" Dialogue and the "Arc of Freedom and Prosperity" shaped Tokyo's understanding of the region and its policy choices [9].

This research has explained the diplomatic and identity sources of Japan's engagement and the general character of its aid. Less attention has been paid to separating the specific energy-security channels of cooperation, especially after the Economic and Energy Dialogue was launched in 2023 and the first summit of the "Central Asia plus Japan" Dialogue was held in December 2025. The present article addresses this gap.

Methodology. The study uses qualitative document analysis and a structured comparison of three cases that represent different forms of cooperation: upstream resource participation in Kazakhstan, power-plant modernization in Uzbekistan and demand-side finance for Uzbek industry. The historical part draws on a Japanese strategic assessment published by the National Institute for Defense Studies. Recent developments are examined through official Japanese energy statistics, reports of the International Energy Agency, corporate disclosures, JICA ex-ante evaluations and the documents of the December 2025 summit. The period of analysis runs from the announcement of Eurasian diplomacy in 1997 to the loan agreements signed in 2026.

Three categories guide the analysis. Resource access refers to the ability of companies or public institutions to take part in production, investment or contracting. Delivery security refers to the capacity to bring a usable energy product to the consumer under both normal and disrupted conditions. Partner-country resilience refers to the ability of the partner's energy system to provide reliable and affordable services. The categories can reinforce one another, but evidence for one does not prove the others. An equity stake may earn revenue without securing a single dedicated

cargo, and an efficient power plant may cut domestic fuel use without creating an export surplus (Table 1).

Table 1. Analytical framework for assessing Japan–Central Asia energy cooperation (author's proposal)

Category	Definition	Typical instrument	Main beneficiary	Evidence required	Case in this study
Resource access	Participation of firms or public bodies in production, investment or contracts	Equity stake, production-sharing agreement, public equity finance	Investing company and its shareholders	Participating interest, production and revenue data	Kashagan (Kazakhstan)
Delivery security	Ability to bring usable energy to the consumer in normal and disrupted conditions	Offtake contract, transport route, storage, diversified suppliers	Importing country and its consumers	Contracted volumes, route availability, behaviour during disruptions	Not demonstrated by the cases; discussed as a requirement
Partner-country resilience	Ability of the partner's energy system to supply reliable and affordable services	ODA loans for modernization and efficiency, technical cooperation	Partner-country utilities, enterprises and households	Measured output, efficiency and savings against a baseline	Navoi TPP; industrial energy-efficiency loan (Uzbekistan)

Each case is compared by four criteria: the policy or financing instrument used, the immediate beneficiary, the expected security mechanism and the evidence needed to confirm the result. Planned targets and estimated savings are kept apart from realized performance. The study has clear limitations. It does not estimate a causal effect on Japanese import prices, does not build an econometric measure of bilateral energy dependence and does not use interviews or plant-level operating data. Several project documents are appraisal-stage evaluations. The findings are therefore analytical propositions supported by documented cases and should be tested later with operating and trade data.

Results. *Historical foundations of Japan's regional energy engagement.* Japan's Eurasian approach grew out of diplomatic initiatives that combined economic engagement with a wider interest in regional stability. The National Institute for Defense Studies points to Prime Minister Ryutaro Hashimoto's "Eurasian diplomacy" address of 24 July 1997 and to the Mission for Dialogue with Russia and Central Asia that visited the region in June–July 1997; the government later adopted the slogan of "Silk Road diplomacy" for the former Soviet republics [10, p. 93, 95]. The same assessment notes that the geographical remoteness of the region left Japan without a

sense of urgency and that its mainly bilateral approach made multilateral regional diplomacy difficult [10, p. 93].

Access to resources was thus one element of a broader diplomatic agenda from the start. A purely extractive reading cannot explain why institutional dialogue, infrastructure and human-resource development became lasting areas of cooperation. These activities matter because an investment relationship depends on information, administrative coordination and confidence in future policy. Their effect is indirect: they lower the uncertainty around cooperation, yet they neither remove commercial risk nor create a viable transport link.

The gap between diplomatic intent and operational capacity is important for assessing earlier proposals. Resource diplomacy can widen the circle of potential partners long before a commercially competitive supply chain appears, and counting agreements as finished projects overstates success. A historical assessment should follow each project from political access to a contract, then to construction and sustained operation. Only the last two stages allow conclusions about outcomes for the energy system.

Japan's energy transition and the changing value of Central Asia. Japan's official outlook for FY2040 envisages renewables providing about 40–50% of electricity generation, nuclear power about 20% and thermal power about 30–40%, while the energy self-sufficiency ratio is expected to rise to 30–40% [1, p. 1]. These shares refer to electricity generation, not to total primary energy supply. The same publication sets out the "S+3E" principles: safety as the basic premise, followed by energy security, economic efficiency and environmental compatibility [1, p. 1]. Japan's external energy agenda therefore has to be read alongside domestic technological change.

This direction creates a double task. Japan must keep access to conventional fuels during the transition and at the same time limit the risks attached to new technologies and materials. For Central Asian partners the matching task is to meet growing demand and raise industrial competitiveness without locking avoidable fuel consumption into new infrastructure. Cooperation is most convincing where the two tasks overlap. Equipment, maintenance skills and financing arrangements can be valuable even when no fuel is exported to Japan.

Supply chains for transition materials add a further dimension. The International Energy Agency reports that the average market share of the top three refining countries for key energy minerals rose from around 82% in 2020 to 86% in 2024, and the share of the top three mining countries from 73% to 77% [11]. This concentration gives a reason to treat supply-chain diversification alongside hydrocarbon security. It does not establish that any particular deposit in Central Asia is economically recoverable, technically suitable or available to Japanese buyers; such conclusions require project-level geological and commercial data.

Mineral cooperation should accordingly be assessed along the whole chain, from exploration to the material a manufacturer actually uses. A new mine can widen the geography of extraction while processing stays concentrated elsewhere, so upstream diversification may coexist with downstream vulnerability. A credible partnership would state where processing takes place, which quality standards apply, who buys the output and how environmental liabilities are financed. The number of deposits or memoranda says little about these conditions.

Kazakhstan: participation and physical supply. The clearest example of Japanese corporate participation in the region is the Kashagan field in the North Caspian Sea. INPEX holds a 7.56% interest in the Offshore North Caspian Sea Contract Area through its subsidiary; crude oil shipments began in October 2016, and cumulative production reached one billion barrels in July 2025 [12]. These facts confirm a working commercial connection. They do not show how much Kashagan oil reaches Japan, where individual cargoes go or whether Japanese consumers would receive priority in a supply crisis.

The case shows why energy security cannot be inferred from the nationality of an investor. Participation brings financial returns, diversifies a company's asset base and keeps Japanese expertise in a producing region. Physical security requires further arrangements for export access, transport, marketing and delivery. If these benefits are not reported separately, a commercially successful overseas asset may be mistaken for a dedicated national fuel reserve.

A useful evaluation would compare the commercial exposure of the project with the risks borne by Japan's import system. The relevant questions are whether transport routes stay open during disruptions, whether other buyers and sellers can be used and how contracts allocate losses. The answers may differ between normal market conditions and a regional emergency. The analytical value of Kashagan lies in showing a concrete form of engagement whose contribution to security has to be specified case by case.

Uzbekistan: modernization of the power system. Uzbekistan illustrates a different mechanism. According to JICA's ex-ante evaluation, the loan agreement for the Navoi Thermal Power Plant Modernization Project (Phase 2) was signed on 19 December 2019 for 128,246 million yen. The project aims to increase electricity supply and generation efficiency; its indicators include a target maximum output of 600 MW, and the expected reduction of greenhouse-gas emissions is estimated at 994,931 tonnes of CO2 per year [13]. These are appraisal targets and estimates. Verified operating results will become available only through later monitoring and ex-post evaluation.

The security logic of this project works first through Uzbekistan's own electricity system. If a modernized unit produces the same output with less gas, it eases pressure on fuel allocation and improves the reliability of supply. Whether this creates an exportable surplus depends on later

demand, gas production and domestic policy. The link with Japan is therefore better described through technology, finance and implementation capacity than through any transfer of saved gas to Japanese consumers.

The engineering benefit also has to be distinguished from the financial result. A plant may become technically more efficient while remaining exposed to fuel prices, tariff collection and maintenance costs. The JICA appraisal provides for the supply of spare parts and technical guidance over six years [13], which reflects the importance of operating capability after construction. Long-term performance will depend on the organization that runs and maintains the equipment as much as on the equipment itself.

Uzbekistan: demand-side cooperation. Recent documents show a shift from generation projects towards demand-side measures. On 18 June 2026 JICA and the Government of Uzbekistan signed a loan agreement for the Project for Promotion of Energy Efficiency in Industries for up to 14,969 million yen. The National Agency for Energy Efficiency is the executing agency, the funds are channelled as a two-step loan to support the installation of energy-efficient equipment in industry, and completion is planned for November 2030 [14]. On the same day a second agreement, for up to 21,788 million yen, was signed for energy efficiency in public buildings such as schools, preschools and health facilities [14].

The ex-ante evaluation of the industrial project identifies a lack of knowledge among enterprises about energy-efficient technologies and their benefits, as well as limited outreach by financial institutions, as obstacles to investment. It treats the reform of electricity tariffs for enterprises since October 2023, the 2024 law on energy efficiency and the establishment of the National Agency for Energy Efficiency in 2025 as conditions that favour the project. The evaluation sets targets for 2032, two years after completion: primary energy savings of 2.6 million GJ per year, a reduction of 120,000 tonnes of CO2 per year and efficiency improvements at 40–50 sub-borrowing firms [15, p. 1–5]. These figures describe an agreed intervention and its intended effects; actual savings will have to be measured.

Demand-side finance faces different implementation problems from the construction of a single generating unit. It must reach many firms, help them identify suitable investments and maintain the capacity of participating banks to appraise such loans. An assessment should therefore look at uptake, verified savings and repayment performance, not only at the size of the credit line. For enterprises the expected benefit is lower energy use per unit of output; for the national system it is a reduction in avoidable demand; for Japan the project sustains technological partnerships and commercial opportunities. These outcomes are linked, but they should be measured separately, especially where public finance serves development objectives.

Table 2. Comparison of the documented cases of Japan–Central Asia energy cooperation (compiled by the author)

Case	Instrument	Documented status	Main mechanism	Documented data	Evidence still needed
Kashagan, Kazakhstan [12]	Corporate equity participation (INPEX)	In production; shipments since October 2016	Resource access	7.56% interest; 1 billion barrels cumulative output by July 2025	Volumes reaching Japan; contractual position in a disruption
Navoi TPP Phase 2, Uzbekistan [13]	JICA ODA loan with technical guidance	L/A signed 19 December 2019	Partner-country resilience (supply side)	Loan 128,246 million yen; target 600 MW; estimated 994,931 t CO2/year reduction	Measured output, efficiency and availability after commissioning
Energy efficiency in industries, Uzbekistan [14; 15]	JICA two-step loan through financial institutions	L/A signed 18 June 2026; completion planned November 2030	Partner-country resilience (demand side)	Loan up to 14,969 million yen; 2032 targets of 2.6 million GJ/year and 120,000 t CO2/year	Number of sub-loans, verified savings, repayment record

Regional institutions and the implementation gap. The Tokyo Declaration adopted at the summit of the "Central Asia plus Japan" Dialogue on 20 December 2025 records that the Economic and Energy Dialogue was launched in September 2023 and held its second meeting in September 2025. It names "Green and Resilience", "Connectivity" and "Human Resource Development" as priority areas and sets a target of business projects worth 3 trillion yen in Central Asia over five years. The declaration also refers to the Joint Crediting Mechanism, the strengthening of critical-mineral supply chains needed for the clean-energy transition and the Trans-Caspian International Transport Route [16, p. 1–4]. The document shows a wider institutional agenda; it does not certify that each proposed activity has reached financial close or operation.

A broad institutional framework helps coordination, but it can blur differences between sectors. A transport corridor that improves access to world markets is not automatically a hydrocarbon export route. A crediting mechanism is not in itself a source of project finance, and neither guarantees an independently measured emissions reduction. The practical task is to tie each instrument to a specific project, a responsible institution and a verifiable result.

The five Central Asian states should not be treated as a single uniform energy partner either. The choice of intervention has to follow national demand, infrastructure and investment conditions. A regional framework can serve information exchange and the coordination of cross-border activities, while procurement and project design remain national. A success in one country cannot be assumed to be technically or financially transferable to the others.

Discussion. The cases point to three complementary mechanisms, each with its own standard of evidence. Corporate participation calls for data on operating interests and commercial performance. Infrastructure cooperation calls for evidence on construction quality, reliable output and maintenance. Demand-side cooperation calls for a defensible baseline and measured savings. Taken together, the mechanisms explain the breadth of Japan's engagement; assessed separately, they prevent announcements in one area from being used as proof of results in another. This finding is consistent with the multidimensional view of energy security proposed by B. Sovacool and I. Mukherjee [4]: the Kazakh case concerns mainly availability, while the Uzbek cases concern technology development, affordability and sustainability.

A key policy implication is that diversification must be judged against the specific risk it is meant to reduce. D. Yergin calls diversification the starting principle of energy security [3], yet adding a partner can lower commercial concentration while leaving a transport bottleneck unchanged. An efficient plant can improve electricity supply while preserving dependence on one fuel, and new mineral extraction can leave refining concentrated. A sound strategy identifies the residual vulnerability after each intervention instead of assuming that more agreements automatically mean more security.

Project evaluation should also compare the chosen option with realistic alternatives. Thermal modernization improves performance relative to continued operation of old equipment, but its long-term value depends on utilization, fuel availability and compatibility with a changing power system. Efficiency projects should be assessed for technical savings and for the possibility that lower operating costs encourage higher consumption. These considerations do not weaken the case for the projects; they define the evidence needed to confirm their benefits under real operating conditions.

The results also support T. Dadabaev's observation that Japan's comparative strength in the region lies in modernization, rehabilitation and know-how rather than in large new construction [8]. The 2026 efficiency loans extend this pattern from power plants to factories and public buildings. For Uzbekistan this fits the national course of reforms in the energy sector; for Japan it offers a form of engagement that does not depend on long-distance fuel transport.

Conclusion. The study answers its three questions as follows. First, Japan's energy interest in Central Asia began in the late 1990s as part of a broad Eurasian diplomacy in which resource access was one goal among several, and since 2023 it has moved towards energy transition, efficiency and supply chains for transition materials. Second, cooperation strengthens energy security through three distinct channels: commercial resource access, supply-side modernization and demand-side efficiency in partner countries. The evidence does not support describing the region as an established alternative source of hydrocarbons for Japan. Third, each channel requires

its own evidence: operating interests and production data for upstream investment, measured output for power projects and verified savings against a baseline for efficiency programmes.

Several practical recommendations follow. For Uzbekistan, it would be useful to publish regular performance data for modernized power units, including output, efficiency and availability; to strengthen energy-audit and measurement-and-verification capacity at the National Agency for Energy Efficiency and the participating banks; to link Japanese-financed projects with training in operation and maintenance; and to register verified emission reductions under the Joint Crediting Mechanism. For Japan, it would be useful to state for each project whether it serves commercial participation, development cooperation, emission reduction or supply security, and to assign separate indicators to each objective; to extend ex-post evaluation to demand-side programmes; and, in mineral cooperation, to support processing stages in partner countries as well as extraction.

Future research should combine document analysis with project-level operating data, interviews and trade statistics. It could test whether efficiency investments reduce fuel use after controlling for changes in output, and whether overseas resource participation improves Japan's procurement flexibility during disruptions. The durability of Japan–Central Asia energy cooperation will depend on reliable services, measurable savings and viable long-term partnerships more than on the number of announced initiatives.

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