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Improving Institutional Mechanisms For Mitigating The Environmental Impact Of Industrial Enterprises In Uzbekistan

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Abstract: This article analyzes the institutional mechanisms for mitigating the environmental impact of industrial enterprises in Uzbekistan. It examines the country's environmental legislation, monitoring systems, inspection and enforcement bodies, and public participation frameworks. The study highlights recent reforms, including the establishment of the National Committee on Ecology and Climate Change, the empowered Ecopolice, and real-time environmental monitoring platforms. Drawing on international best practices, the paper identifies opportunities for improvement, such as integrated permits, risk-based inspections, enhanced transparency and public engagement, economic instruments, capacity building, regional cooperation, and greener industrial policies. The findings emphasize the need to strengthen Uzbekistan's institutional framework to ensure sustainable industrial development without compromising environmental protection.

Keywords: Uzbekistan, industrial pollution, environmental governance, National Ecology Committee, Ecopolice, integrated permits, risk-based inspection, transparency, public participation, environmental legislation, environmental monitoring, environmental protection, green technologies, regional cooperation.

Introduction: Uzbekistan has faced severe

environmental degradation associated with industrial growth. Legacy issues (e.g. the Aral Sea crisis) and ongoing pollution illustrate the challenge: major rivers like the Amu Darya have been called "sewage ditches" for industrial effluent, and atmospheric monitoring shows dangerously high particulate and heavy-metal pollution from factories and smelters. Virtually all deep groundwater aquifers are now reported as contaminated by industrial and agrochemical wastes.

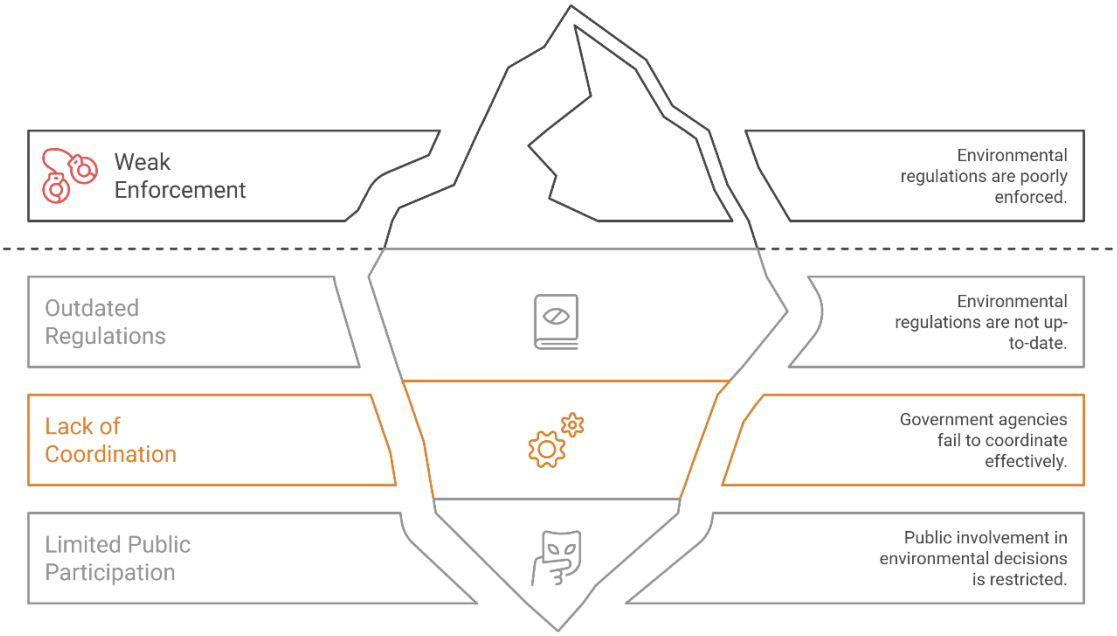

Figure 1. Environmental Regulation Effectiveness Hindered by Hidden Challenges

Urban air is likewise affected: fewer than half of factory smokestacks have adequate filters, leading to excessive emissions of sulfur, NOx and heavy metals. Recognizing these risks, Uzbekistan has built a broad legal framework for environmental protection. Key laws (e.g. On Nature Protection, On Atmospheric Air Protection, On Environmental Expertise) set standards and assign oversight to government bodies. The country is also aligning with international conventions (Basel, Stockholm, etc.) and has recently adopted a Law on Limiting Greenhouse Gas Emissions (2025) mandating emission reporting and reduction targets. Despite these advances, historical analyses noted that Uzbekistan's environmental administration remained a "confused and ill-defined" bureaucracy with weak enforcement. This review assesses the current institutional and regulatory mechanisms governing industrial pollution, identifies gaps, and suggests reforms drawn from international best practices to strengthen Uzbekistan's environmental governance.

METHODS

We conducted a comprehensive policy and literature review, drawing on official Uzbek laws and decrees, government reports, media coverage, and international analyses. Sources include Uzbek government and legal websites, national and regional news media, and academic assessments of Uzbek environmental law. We also consulted international guidance on environmental governance – notably the OECD's Regulatory Enforcement and Inspections Toolkit – to benchmark institutional effectiveness. For example, the OECD toolkit emphasizes data-driven (evidence-based) and risk-based inspection regimes, coordinated enforcement, transparent governance, and inspector professionalism. We compared Uzbekistan's structures and recent reforms against these criteria and identified gaps in coordination, enforcement, and public participation.

RESULTS

Our analysis reveals a complex institutional landscape. Key findings include:

- **Regulatory framework**: Uzbekistan's environmental code comprises dozens of laws and regulations. The foundational Law on Nature Protection establishes the legal basis for environment policy and stipulates that state management of ecology is vested in the Cabinet of Ministers, the State Committee for Ecology and Environmental Protection (formerly the

environment ministry), and local government bodies.

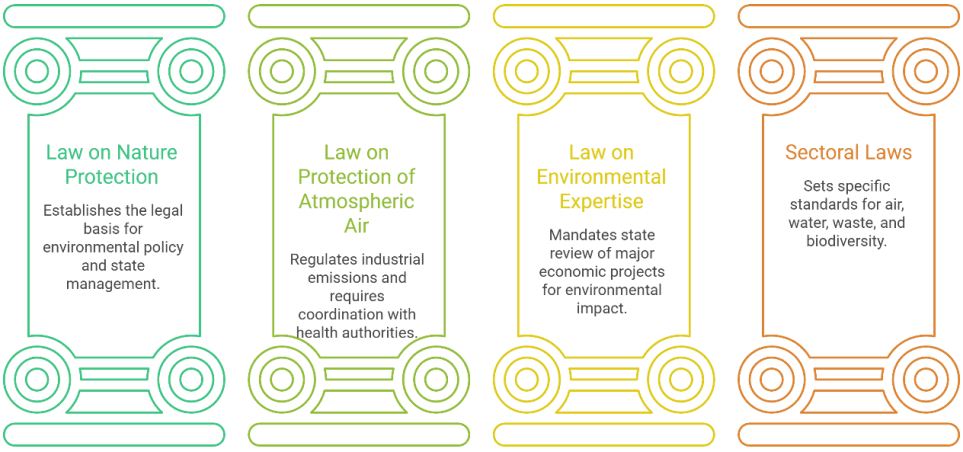

Figure 2. Uzbekistan's Environmental Regulatory Framework

Other sectoral laws set specific standards: for example, the Law on Protection of Atmospheric Air regulates industrial emissions and requires coordination of plant construction projects with environmental and health authorities. A Law on Environmental Expertise mandates state review (environmental impact assessment) of major economic projects. In total, Uzbekistan has more than 30 environmental legislative acts and over 100 by-laws governing air, water, waste, biodiversity, etc.

- **Institutional bodies**: Historically, the national environment ministry (now Committee) and its regional offices oversaw policy implementation. In late 2025 Uzbekistan restructured this framework: the Ministry of Ecology, Environmental Protection and Climate Change was transformed into a National Committee on Ecology and Climate Change, directly accountable to the President and Parliament. The Committee subsumes all former environmental functions and directs specialized agencies (e.g. forestry, afforestation, hydromet, waste management). Its chairman serves as Presidential Advisor for Ecology, signaling the high priority of these issues. The Committee also oversees national projects ("Clean Air", "Green Space", etc.) aiming to improve air quality, expand urban greenery and waste recycling.

- **Enforcement and inspection**: Enforcement has been bolstered by institutional consolidation. In 2018 a single Inspectorate for Ecology and Environmental Protection was formed by merging the biodiversity and waste inspectorates. Under the 2025 reforms, this became an empowered State Inspectorate for Environmental Control (Ecopolice) under the new Committee. Ecopolice officers have law-enforcement authority (including use of force) and are charged with monitoring compliance and prosecuting violations.

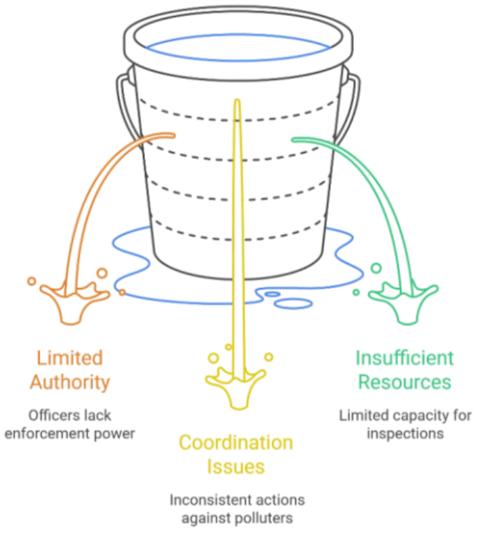

Figure 3. Strengthening Environmental Enforcement in Uzbekistan

In practice, the Committee and Ecopolice conduct regular campaigns: for example, a November 2025 operation inspected 4,869 facilities (industries, greenhouses, construction sites) for air-pollution compliance, temporarily suspending 106 violators and issuing hundreds of fines and warnings. These joint inspections (with the Prosecutor's Office and local officials) reflect a recent push by the President for "decisive and coordinated action" against industrial polluters.

- **Monitoring and data systems**: Uzbekistan is expanding its environmental monitoring infrastructure. Under a recent decree, Category I and II industrial emitters must install automated emissions monitors and connect them to a National Environmental Monitoring Center by early 2026. A unified online environmental data platform is planned, centralizing air, water, soil, and waste quality data. The Committee's territorial branches now operate independently of local governments, reporting directly upward to ensure standardized data collection.

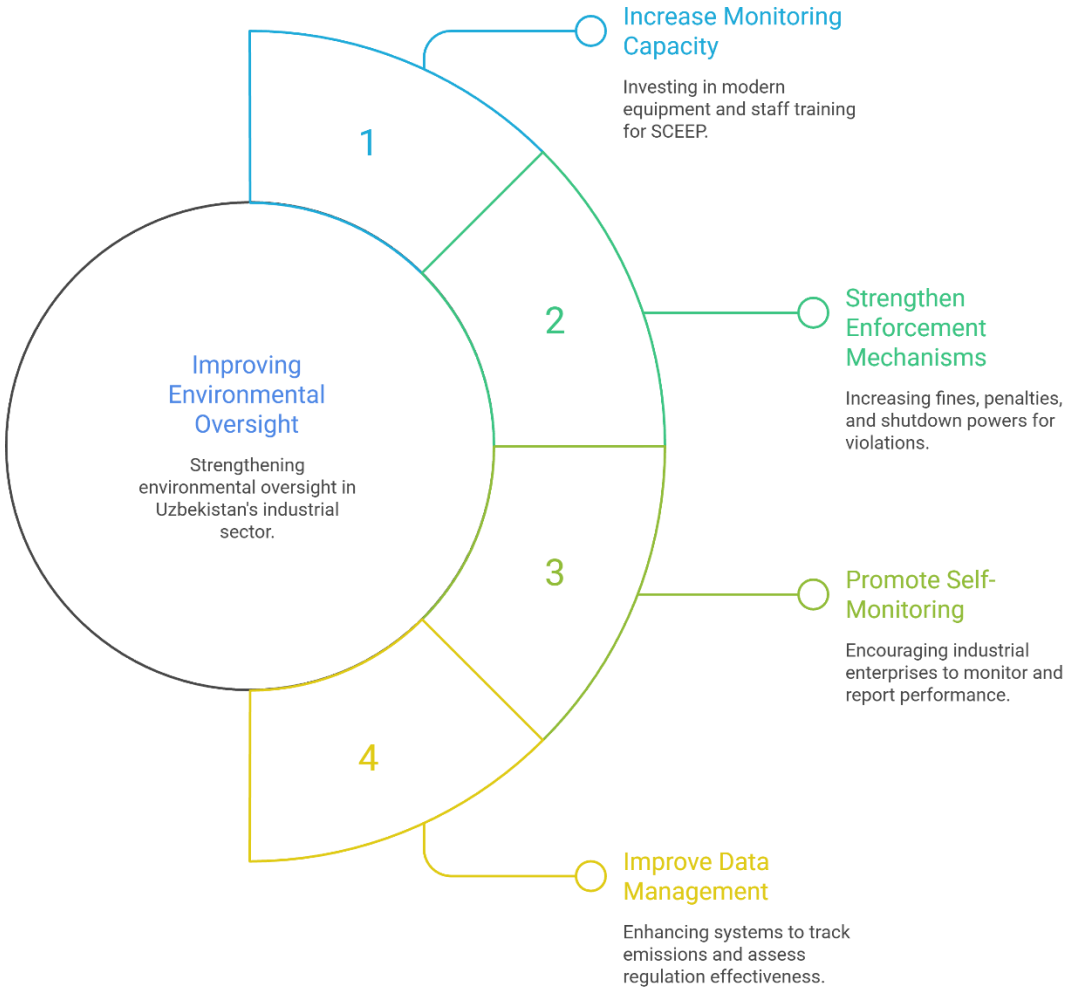

Figure 4. Enhancing Environmental Oversight in Uzbekistan

- **Public participation and transparency**: Uzbek law nominally guarantees public access to environmental information and participation (reflecting its Aarhus Convention accession), but practical mechanisms are limited. The new reforms introduce some participatory tools – for example, citizens can now petition to prevent the reclassification or sale of forested land by gathering local signatures. A Public Council under the Committee provides a forum for stakeholder input. However, comprehensive public hearings on industrial projects remain rare, and environmental data disclosure still lags behind best practice.

Overall, Uzbekistan's framework for industrial pollution control has become more coherent on paper – with central coordination and new mandates – but effective implementation and oversight capacity remain challenges. For instance, despite strict standards, many

older factories lack modern pollution controls. Enforcement is improving (suspensions and fines are now routine), yet gaps persist in remote regions and at smaller enterprises. International assessments have noted that Uzbekistan's ability to enforce environmental rules has historically been limited by bureaucratic overlap and low pollution charge rates. The new Committee and Ecopolice directly address some of these issues, but their long-term impact is still unfolding.

DISCUSSION

Comparing these arrangements to international best practice suggests several areas for improvement:

Integrated permitting and cleaner technology: Uzbekistan should institute integrated environmental permits for large industrial facilities, linking all media (air, water, waste) under one approval – similar to the EU's Industrial Emissions Directive. Such permits would require Best Available Techniques (BAT) to minimize pollution. For example, Kazakhstan's 2021 Environmental Code introduced BAT and new integrated permits for its largest factories, exempting BAT-compliant firms from fees while increasing penalties for others. Emulating this, Uzbekistan can tie permit renewals to technology upgrades (e.g. dust/gas scrubbers in smelters) and benchmark industries against BAT.

Risk-based enforcement: Enforcement resources should focus on the biggest polluters. The OECD recommends evidence-based, risk-focused inspections. Uzbekistan's inspectors could use emissions data (from the new monitors) and industrial registries to target high-risk sites more frequently. Coordination is also key: duplication between agencies should be minimized. The formation of Ecopolice already consolidates functions, but clear mandates are needed to avoid overlaps with local authorities or other ministries (e.g. industry, energy). Establishing a single registry of industrial polluters and a unified inspection schedule would enhance efficiency.

Transparency and public engagement: The government should publish emissions and compliance data to promote accountability. OECD guidelines emphasize using ICT for transparency. An online portal (under development) should make factory emission readings publicly accessible in real time. Moreover, Uzbekistan should strengthen public involvement: require public hearings and consultations for new industrial projects or expansions, as mandated by Aarhus. Enhanced civil society participation (NGO consultative status, ombudsman) would increase social pressure for compliance and inject local knowledge into decision-making.

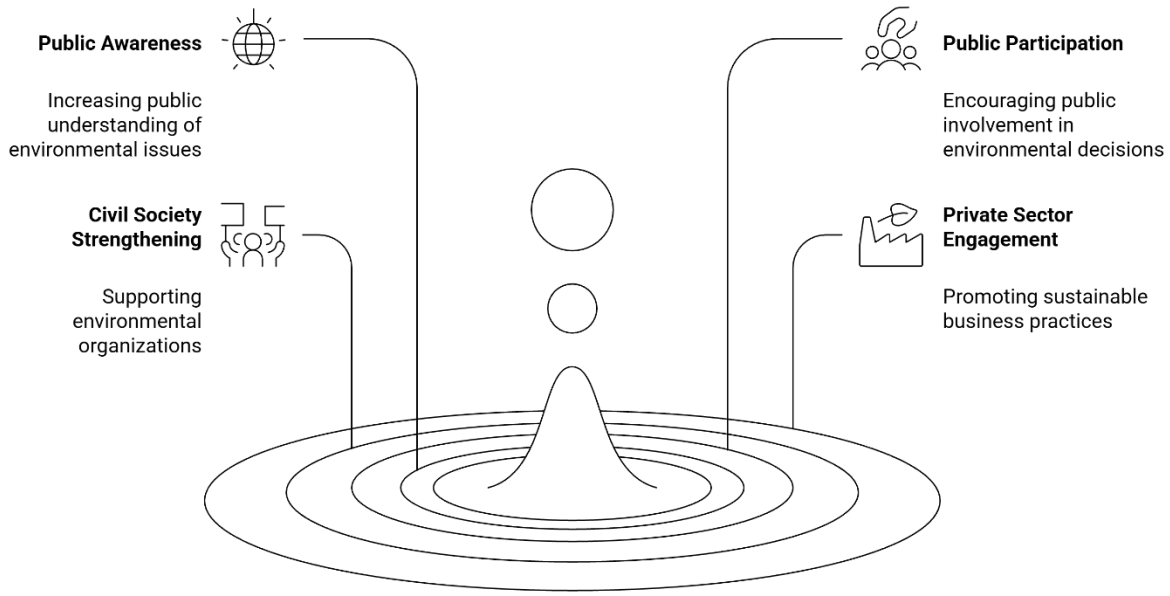

Figure 5. Enhancing Environmental Protection through Public and Private Engagement

Economic and regulatory instruments: Building on the 2025 climate law, Uzbekistan can expand market-based tools. A fully operational carbon trading scheme or tax on emissions would internalize pollution costs. The new law's national registry and carbon credit system could be extended to non-CO_2 pollutants (e.g. a

trading mechanism for sulfur or particulates). Environmental fees and fines should be strictly enforced (the 2025 reforms abolished all blanket exemptions from compensation payments). Revenues from pollution penalties could fund a restoration fund or technology subsidies for green upgrades.

Capacity building: Continued investment in enforcement capacity is essential. Inspectors need specialized training, equipment, and competitive pay to ensure professionalism. Laboratories for air and water testing should be upgraded. Education and technical assistance programs (potentially through UN or World Bank projects) can help industries adopt cleaner processes. For example, grants or low-interest loans could encourage textile and chemical factories to switch to cleaner fuels or waste-recycling technologies.

Regional cooperation: Many challenges require transboundary solutions. Uzbekistan should deepen cooperation with neighbors on shared resources – for instance, harmonizing water quality standards on the Amu Darya and Syr Darya to address upstream mining discharges, as recommended by experts. Regional data-sharing and joint enforcement (e.g. on cross-border smog) would amplify national efforts. Participation in multilateral environmental agreements (beyond the legal ratifications) should translate into regular joint monitoring and contingency planning.

Greening industrial policy: Finally, Uzbekistan could integrate environmental criteria into its economic plans. Current incentives for investment should be reformed so that new industrial projects require rigorous EIA and best practice pollution controls to receive permits. Existing enterprises should undergo periodic third-party environmental audits. Promoting cleaner production (e.g. via national "clean factory" certification) and aligning energy policy (phasing out heavy fuel oil in favor of cleaner gas or renewables, as planned by 2030) will reduce industry's footprint.

CONCLUSION

Industrial pollution remains a critical issue for Uzbekistan's environment and public health. The country has recently overhauled its institutional framework – establishing a high-level National Ecology Committee, an empowered environmental police, stricter laws, and real-time monitoring requirements – demonstrating a clear political commitment. To translate these reforms into cleaner air, water, and land, Uzbekistan must complete the transition to modern governance practices.

This means aligning with international best practices (risk-based inspections, transparent permitting, the polluter-pays principle) and ensuring robust implementation. By strengthening enforcement, improving inter-agency coordination, and expanding public participation, Uzbekistan can enhance the effectiveness of its institutions. These steps, coupled with continued investment in cleaner technologies and regional cooperation, will help ensure that its industrial development proceeds without sacrificing environmental sustainability.

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