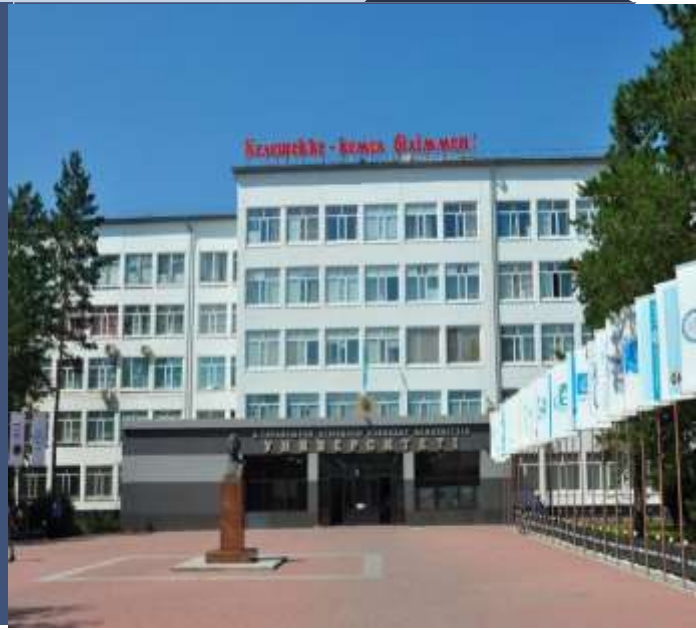
TORAIGHYROV UNIVERSITY
НЕКОММЕРЧЕСКОЕ АКЦИОНЕРНОЕ ОБЩЕСТВО

ToU 65-лет ВУЗу

Prospects for Utilizing Waste from the Fuel and Energy Complex of Northeastern Kazakhstan and Adjacent Regions of the Russian Federation in Waste Processing



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Research Objective

The objective of the study is to identify possibilities and formulate recommendations for the effective inclusion and processing of waste from the fuel-energy complex (TEC) in the northeastern Region of Kazakhstan and adjacent territories of the Russian Federation.

Research Task is in order to achieve the specified goal, the study addresses the following objectives:

Analysis of Current State: Assessing the scale and characteristics of accumulated waste in the region's TEC sector, identifying acute problems related to environmental pollution and their influence on population health.

Evaluation of Sustainability Factors: Determining key factors influencing the sustainability of the region's fuel-energy complex, taking into account economic, social, and environmental aspects.

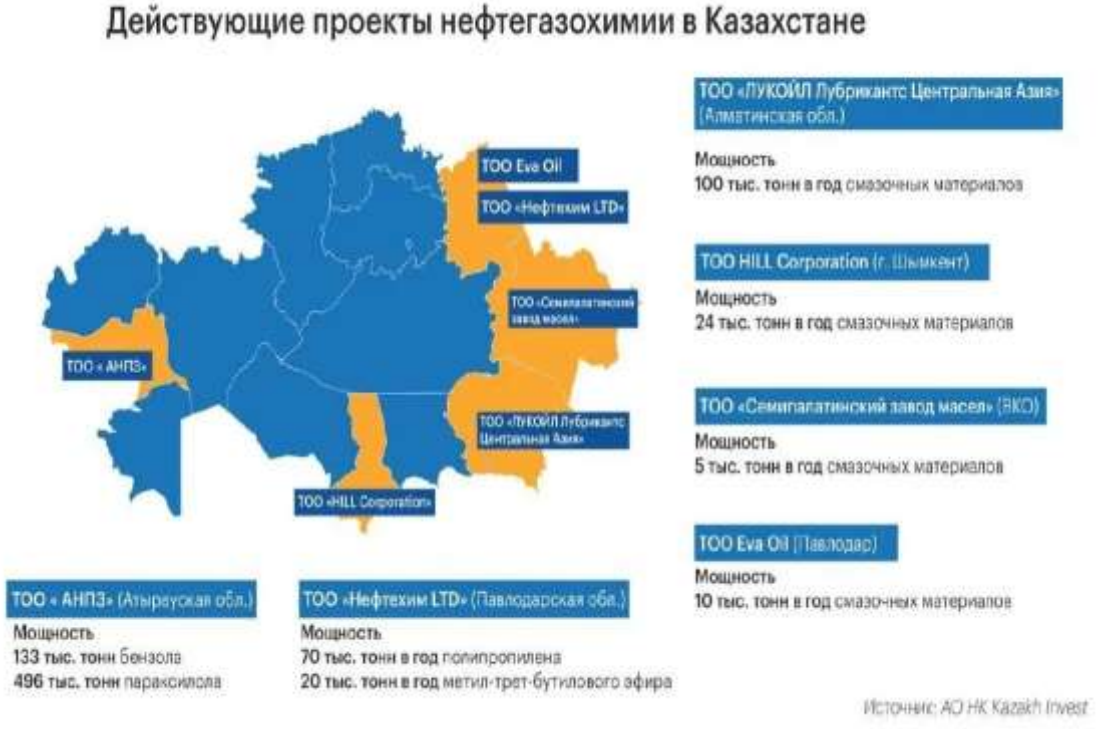
Study of Best Practices: Exploring and adapting world-class practices in waste processing, application of modern technologies, and approaches to monitoring and controlling greenhouse gas emissions.

Development of MRV Mechanism: Improving the system of monitoring, reporting, and verification (MRV) to enhance accuracy in assessing and controlling greenhouse gas emissions and other pollutants.

Formulation of Sustainability Pathways: Developing concrete directions and initiatives aimed at increasing the region's environmental sustainability through the introduction of effective waste processing technologies and reduction of anthropogenic pressure on natural resources.

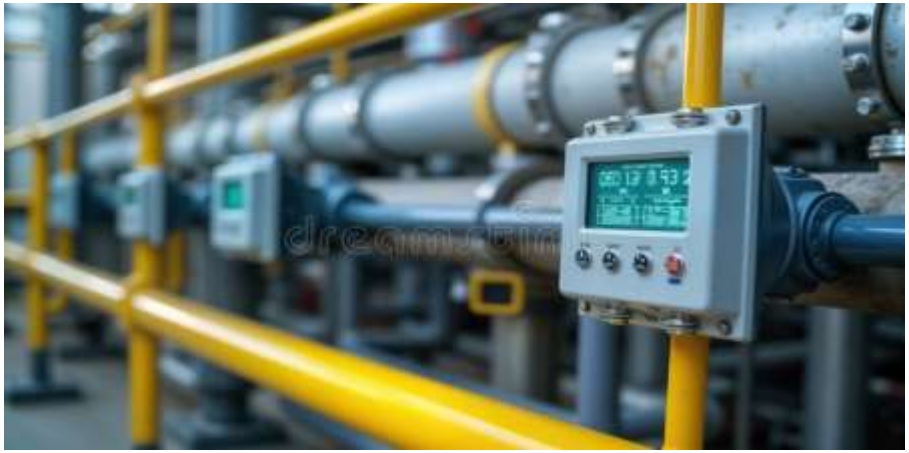
The oil and gas sector in Kazakhstan

The oil and gas sector holds pivotal importance for both Kazakhstan's and nearby Russian Regions' economies and energy supplies. Nonetheless, extensive hydrocarbon exploitation brings substantial challenges, including environmental deterioration, heightened pollution levels, land degradation, diminished water reserves, and considerable emissions of greenhouse gases—predominantly methane and carbon dioxide.



Theoretical and Conceptual Foundations

- Monitoring, Reporting, and Verification (MRV) systems, facilitating precise oversight of hazardous substances and streamlined abatement initiatives.
- Leak Detection and Repair (LDAR) protocols serve to curtail natural gas leaks, especially methane—a potent contributor to climate change exceeding even CO_2. Additionally, carbon regulatory frameworks impose rigorous controls and tracking mechanisms for CO_2 discharges, embedding environmental compliance within organizational financial models



Industrial gas processing plant shows gas leak detection sensors. Modern safety equipment monitors gas levels. Pipeline network shows industrial tech.

Policies and Management Systems in the Republic of Kazakhstan

In pursuit of carbon neutrality by 2060, Kazakhstan has launched its “Green Bridge” initiative emphasizing green economic expansion and ecological integrity

GREEN BRIDGE PARTNERSHIP

Government policies also mandate transparency in transferring property rights, regulating income derived from fossil fuel exports, and providing accessible information on extractive ventures per guidelines outlined by the Extractive Industries Transparency Initiative (EITI).

Key Sustainability Challenges in the Oil-Gas Sector

Prominent obstacles confronting sustainable development include:

•Unchecked methane emissions stemming from accidents or inadequate gas flow management, addressable through LDAR technologies and networked collection infrastructures.

•Excess gas flaring contaminating airspace and squandering finite resources, potentially alleviated by converting surplus gas into value-added products.

•Contamination of aquatic environments and soil erosion resulting from faulty storage of drilling liquids and residual oils, requiring purpose-built landfill sites and state-of-the-art cleansing techniques.

•Suboptimal redistribution of profits among citizens coupled with insufficient public engagement regarding major industrial enterprises, underscoring the necessity for greater transparency and inclusive dialogue on infrastructure and community welfare initiatives.

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Case Study: Kazakh National Company Experience

We examine the efforts undertaken by KazMunayGas (KMG)—the country's flagship oil-and-gas entity—to introduce energy-efficient programmes and diminish gas incineration rates. Despite notable strides in methane reduction achieved through upgraded leak-detection gear and automated workflows, outstanding challenges persist concerning peripheral area maintenance and harmonious relationships with resident stakeholders.

КазМұнайГаз
ПАВЛОДАР МҰНАЙХИМИЯ ЗАУЫТЫ

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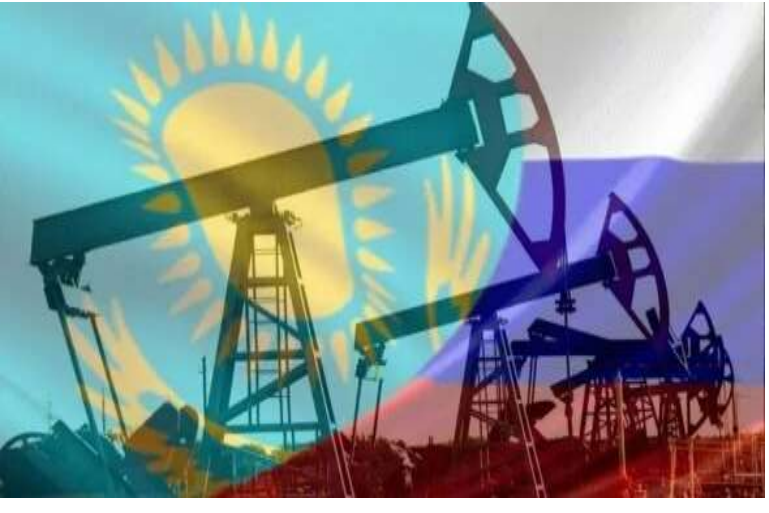
Proposal of Regional Support Measures:



Formulating recommendations to encourage regional authorities and businesses to create favorable conditions for involving waste in recycling and reuse, promoting active participation of local communities in decision-making processes.

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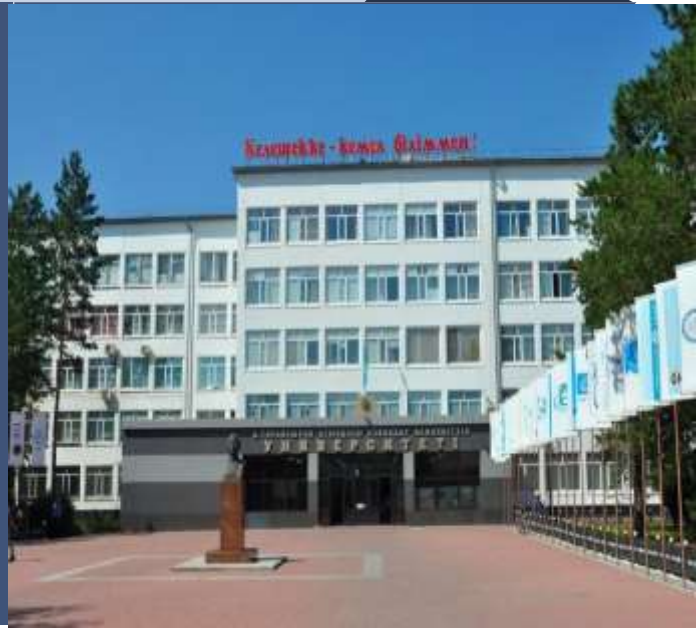

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