Development of BAT Reference Documents in Kazakhstan and the Experience of Obtaining Integrated Environmental Permits

Non-Commercial Joint-Stock Company «International Center for Green Technologies and Investment Projects»

The Non-Commercial Joint-Stock Company "International Center for Green Technologies and Investment Projects" was established by the Resolution of the Government of the Republic of Kazakhstan dated April 27, 2018.

1. Facilitating the transition of industry to Best Available Techniques (BAT) principles through the development of BAT Handbooks.
2. Identifying and promoting innovative green projects in the fields of ecology, sustainable development, and quality of life improvement.
3. Execution of international grant programs aimed at supporting and financing green initiatives (Readiness-2, GCIP-Kazakhstan).
4. Conducting environmental and sustainability education programs (webinars, trainings).

Mechanism for the transition of the Republic of Kazakhstan to BAT principles

Assessment of the current state of the industry for compliance with BAT principles and identification of potential for BAT implementation

CTA
(Comprehensive Technological Audit)

BAT RD
(BAT Reference Document)

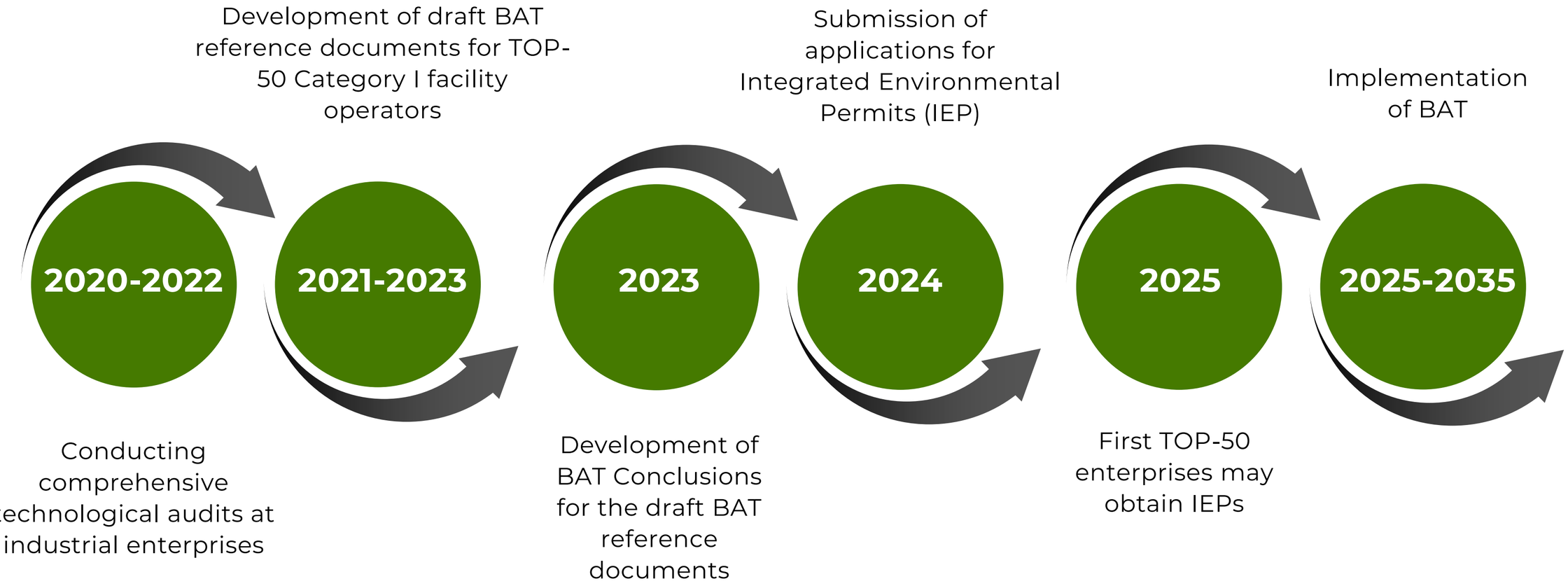
A document containing a list of BAT and environmental indicators for the industry

A document with key findings on the application of BAT in the industry

BAT RD Conclusion

IEP
(Integrated Environmental Permit)

Unified permit for Enterprises establishing Environmental conditions based on BAT application


2020-2022
Conducting comprehensive technological audits at industrial enterprises
2021-2023
Development of draft BAT reference documents for TOP-50 Category I facility operators
2023
Development of BAT Conclusions for the draft BAT reference documents
2024
Submission of applications for Integrated Environmental Permits (IEP)
2025
First TOP-50 enterprises may obtain IEPs
2025-2035
Implementation of BAT

Objectives of Best Available Techniques (BAT)

- Reduction of negative environmental impact (emissions, discharges, waste)
- Improvement of energy and resource efficiency of production
- Modernization of enterprises and introduction of modern techniques
- Alignment with international standards
- Creation of incentives for “green” investments and innovations
- Formation of sustainable and competitive industry

Effect of BAT implementation (reduction of emissions)

Oil and Gas Sector **- 13%**

Chemical Sector **- 60%**

Cement Sector **- 35%**

Mining and Metallurgy **- 70%**

Wastewater treatment **- 75%**

Energy Sector

Reduction of energy consumption **- 40%**

Emission reduction **- 78%**

ANALYSIS

Comprehensive Technology Audits are conducted by the Bureau of Best Available Techniques (BAT Bureau) through site visits and/or collection and analysis of relevant data from the facilities.

EXPERTS

For the purpose of conducting a Comprehensive Technology Audit, independent experts may be engaged in accordance with the qualification requirements approved by the relevant technical working group.

CONCLUSION AND RECOMMENDATIONS

Comparison of the BAT implemented at the enterprise with internationally applied techniques. Recommendations for modernization and BAT implementation to enhance operational efficiency.

REPORT

The completion of the Comprehensive Technology Audit is marked by the issuance of an Expert Assessment Report for the applicant's facility.

General information

The scope of Best Available Techniques (BAT) application, encompassing descriptions of the relevant industry, subsector, activity type, technological processes, and specific techniques.

Description of the main environmental problems

Assessment of current environmental parameters: emission rates, waste generation, accumulation and disposal quantities, energy and water resource usage.

Description of techniques

Existing techniques submitted for evaluation and identification as Best Available Techniques (BAT).

Economic indicators

Assessment of required investments and financial specifics of the project.

Evaluation

Benefits of Implementing Best Available Techniques (BAT) for the Environment

Methods

Information used to reduce negative environmental impact that does not require technical retrofitting or reconstruction of the facility causing environmental impact.

New techniques

Information on the latest techniques undergoing research and development (R&D) or pilot-scale implementation.

Conclusion

Conclusions on Best Available Techniques (BAT), including the technical performance indicators associated with the application of such techniques.

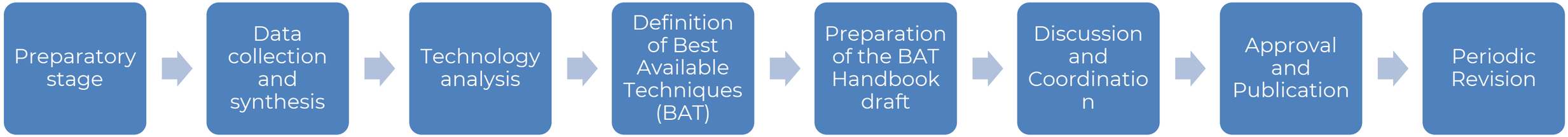
The development of a Best Available Techniques (BAT) Handbook is a highly complex and resource-intensive undertaking

Conducting a Comprehensive Technology Audit (CTA)

Compilation of Technologie Recognized as BAT
Establishment of Technological Performance Indicators (TPIs)
Determination of BAT-Associated Emission Level Ranges

Discussion of the BAT Handbook draft within the Technical Working Group (TWG).
Incorporation of revisions and clarifications based on discussion outcomes.
Public consultation with stakeholders

Monitoring of BAT Handbook Application.
Consideration of New Technologies and Strengthening of Environmental Requirements.
Revision and Updating of BAT Handbook (every 8 years)



Industry/Subsector Identification
Initial Data Collection and Analysis
Formation of a Technical Working Group (TWG)

Technology Benchmarking Against Global Solutions
Identification of Eco-Friendly, Energy-Efficient and Resource-Saving Technologies
Applicability Assessment for Kazakhstan's Conditions

Systematization of Information within the Handbook Structure.
Description of Industry Sector, Technological Processes (TP), and Environmental Aspects.
Inclusion of BAT List, Technological Performance Indicators (TPIs), and Recommended Emission Levels

Coordination of the draft with the authorized body.
Approval of the handbook by Government Resolution.
Publication in open access for use by enterprises when obtaining IEPs

Possible risks in the implementation of BAT

Financial	Technological	Organizational	Regulatory	Social	Environmental
High capital intensity	Limited availability of modern technologies in the region.	Business resistance due to additional costs.	The risk of non-compliance with requirements during the transition to new technologies.	Potential workforce reduction at outdated production facilities.	Incorrect technology adaptation may lead to the "pollution transfer effect."
Long payback period.	Adapting foreign solutions to local conditions	Shortage of qualified specialists for operating BAT systems.	Lack of synchronization between ministries	Need for personnel training	Risk of using "outdated" solutions presented as BAT.
Lack of preferential loans and subsidies.	The possibility of technological failures during the transition period.	Imperfections in the regulatory framework and absence of clear methodological guidelines.	Potential fines and sanctions for delays in implementation.	Lack of understanding of BAT significance among the public and businesses.	

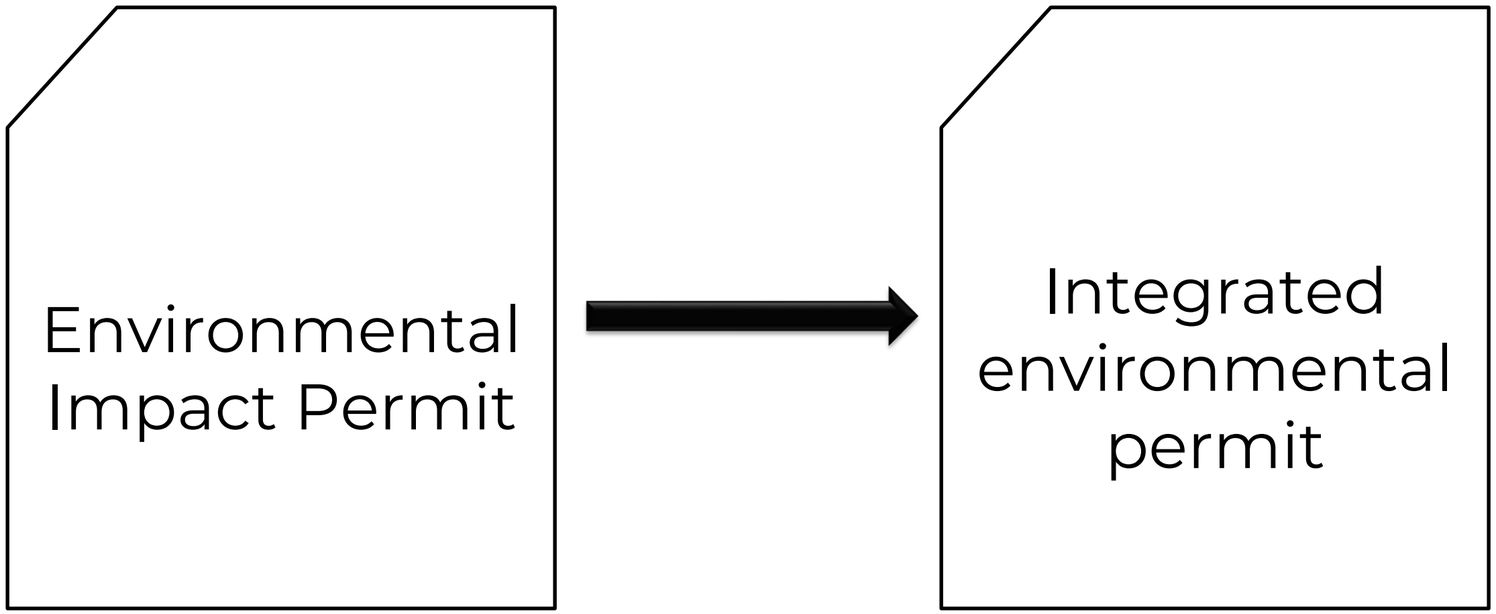
Management of Monitoring, Analytics and Integrated Environmental Permits

A key function of the management is to provide advisory services for obtaining integrated environmental permits.

Consulting services are provided in two stages:

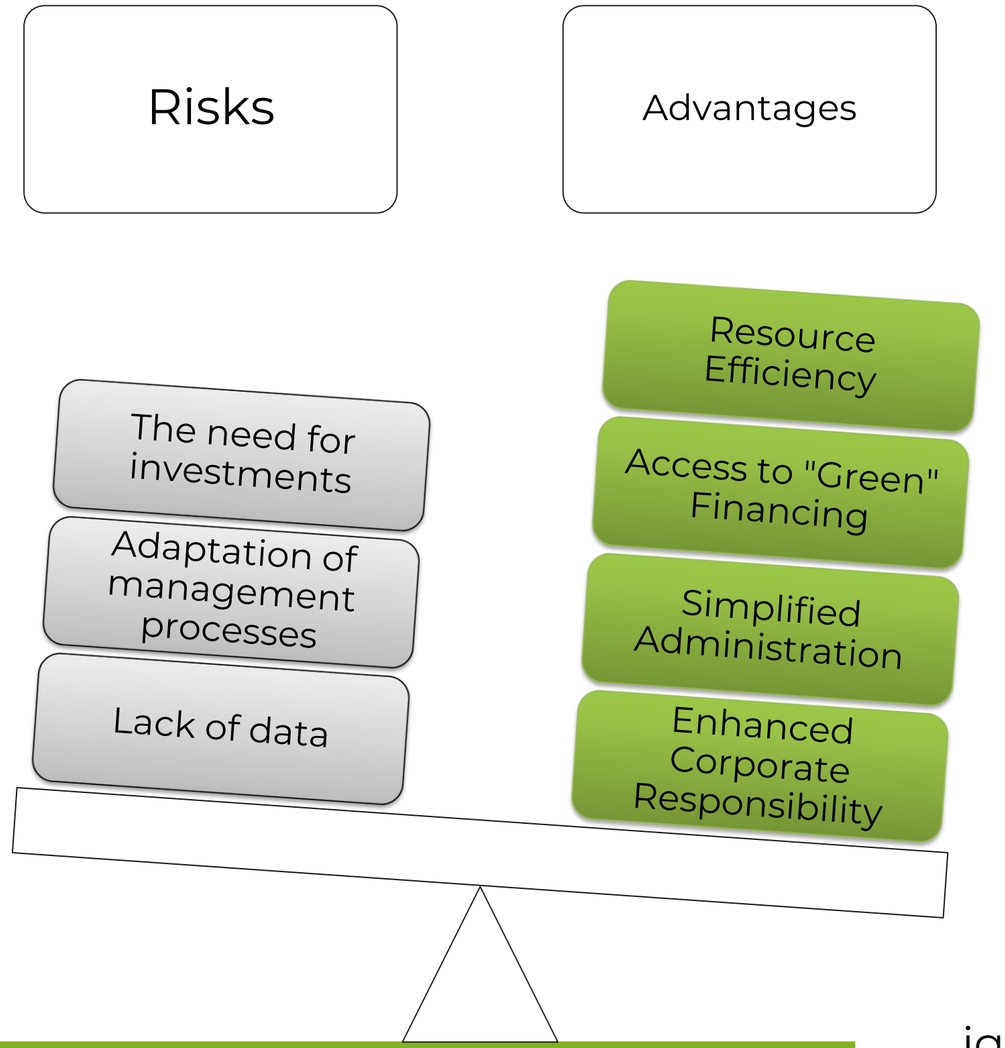
Stage 1: Development of the draft justification for technological standards and the environmental efficiency improvement program, along with expert support in completing the application for an Integrated Environmental Permit (IEP).

Expert support during the review of the Integrated Environmental Permit (IEP) application by the state authority.



An Integrated Environmental Permit (IEP) is a comprehensive set of documents aimed at ensuring integrated pollution prevention and control by applying Best Available Techniques (BAT), minimizing and controlling negative anthropogenic impacts on the environment.

Integrated Environmental Permit (IEP): Advantages and Risks

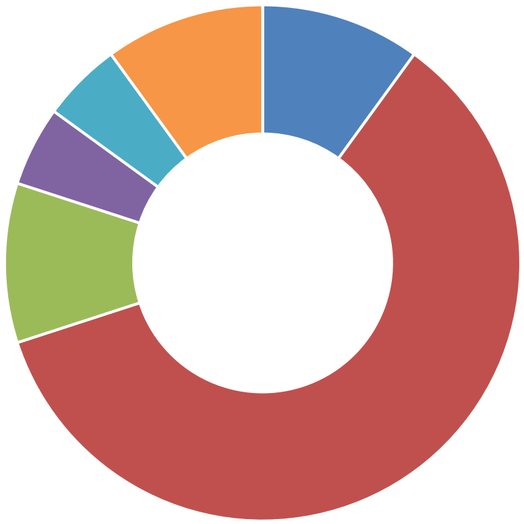


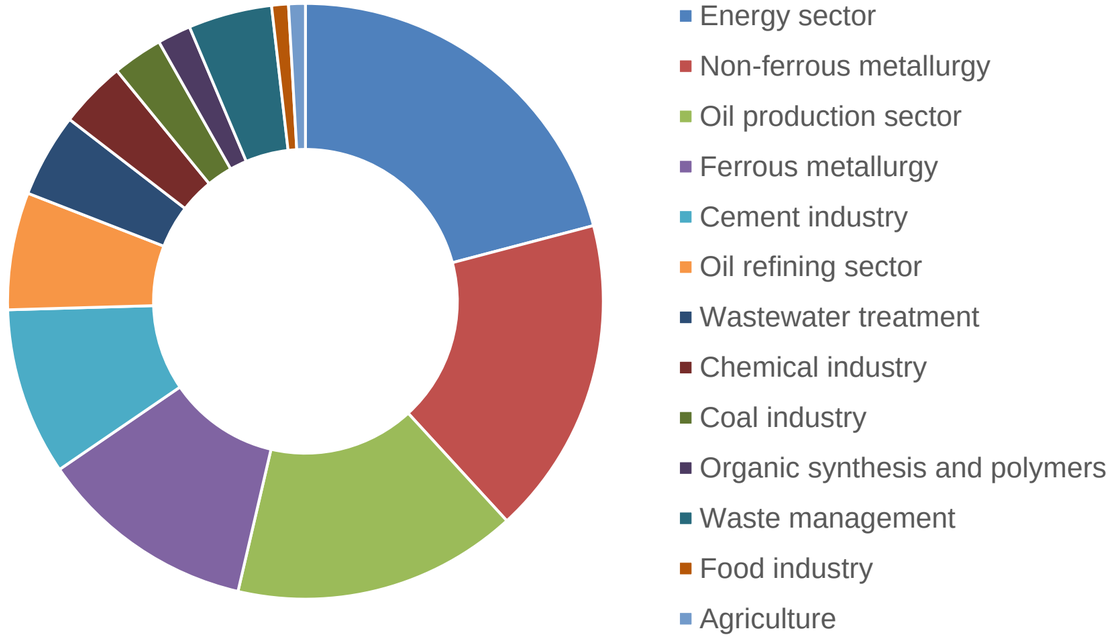
Prospectively, the Integrated Environmental Permit (IEP) system will become the primary regulatory instrument for Category I enterprises, i.e., those with the highest level of environmental impact.

The transition to Integrated Environmental Permits (IEPs) incentivizes enterprises to modernize their production processes, enhancing their long-term competitiveness. This aligns with global trends: sustainable development, ESG approaches, and the green economy.

Assessment and monitoring of emissions

Leveraging internal expert capacity and international support, **over 100 comprehensive technological audits** have been conducted to date at large industrial enterprises.





20 BAT Reference Documents have been developed, 7 of which have no equivalents in the European Union:

- Aluminum production (alumina production using the Bayer-sintering method);
- Mining and beneficiation of non-ferrous metal ores (including precious metals);
- Mining and beneficiation of iron ores (including other ferrous metal ores);
- Oil and gas production;
- Titanium and magnesium production;
- Wastewater treatment;
- Coal mining and beneficiation.

CURRENT STATUS OF BAT HANDBOOKS		
1	Production of inorganic chemicals	September 9, 2023 № 821
2	Cement and lime production	October 24, 2023 № 941
3	Zinc and cadmium production	October 19, 2023 № 921
4	Oil and gas refining	November 23, 2023 № 1024
5	Lead production	November 11, 2023 № 998
6	Production of copper and precious metal-gold	November 11, 2023 № 999
7	Burning of fuel in large installations for energy production	January 23, 2024 № 23
8	Energy efficiency in the implementation of economic and (or) other activities	January 23, 2024 № 24
9	Mining and processing of non-ferrous metal ores (including precious metals)	December 08, 2023 vN№ 1101
10	Mining and processing of iron ores (including other ferrous metal ores)	December 29, 2023 № 1251
11	Production of ferroalloys	December 27, 2023 № 1203
12	Oil and gas production	December 27, 2023 № 1202
13	Production of cast iron and steel	December 27, 2023 № 1199
14	Production of products for further conversion of ferrous metals	December 29, 2023 № 1252
15	Coal mining and processing	December 27, 2023 № 1201
16	Aluminum production	December 27, 2023 № 1200
17	Production of basic organic chemicals and polymers	June 16, 2025 № 446
18	Wastewater treatment of centralized wastewater disposal systems in populated areas	May 17, 2025 № 348
19	Titanium and magnesium production	May 14, 2025 № 339
20	Monitoring of emissions of pollutants into atmospheric air and water bodies	June 16, 2025№ 447

Analysis and improvement of legislation. Waste Management Concept for all types of waste.

Goal:

To create an effective and sustainable waste management system in the Republic of Kazakhstan, ensuring the definition of strategic goals for the development of the waste management industry, taking into account the approved documents of the State Planning System.

Unique directions presented in the Concept:

Development of Laws

The need for the development of regulatory legal acts is driven by the following factors: fragmented regulation and the absence of a unified systemic law; increasing international requirements for environmental safety and resource conservation.

Register of Historical Waste

Systematization of data on accumulated waste to facilitate its integration into economic circulation and reuse as secondary raw materials.

Establishment of a National Waste Management Center

Empowerment with the authority to: conduct inventories of waste dumps and tailings storage facilities, perform geochemical analysis;

select processing technologies.

Innovative Technologies

Real-time monitoring of problematic areas, covering over 90% of the country's territory, with data updates every 24 hours.

Stimulating the Implementation of Green Technologies (GT)

Promotion of "green" projects, securing financing, commercialization, and launch of a technological business incubator for green technologies.

Environmental Education and Advertising

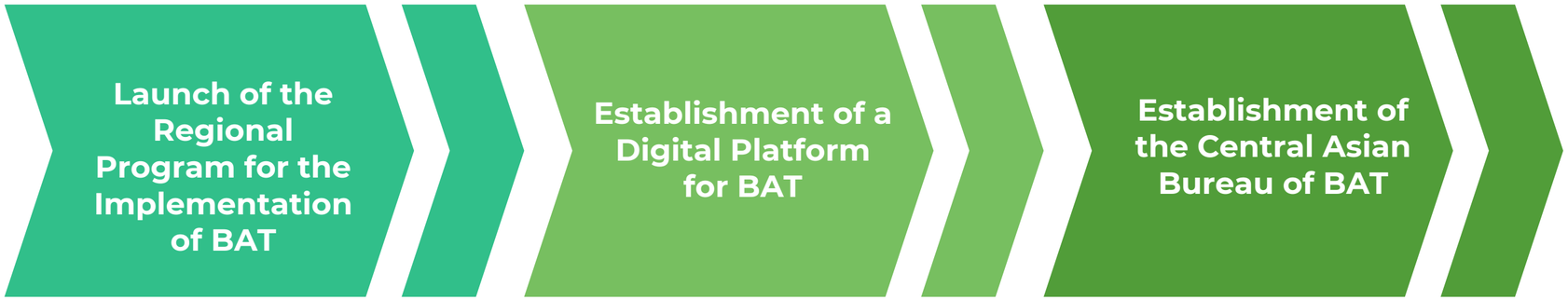
Development of environmental education and awareness, including ecological advertising and programs that foster responsible behavior among the population and businesses.

International and Regional Cooperation. Central Asian Bureau for Best Available Techniques (BAT).

Goal:

Formation of an interstate scientific and technical coordination center to facilitate the transition of Central Asian countries' industries to BAT principles.

Steps:



Expected Results:

Harmonization of environmental legislation in Central Asian countries.
Creation of regional BAT reference documents and a database.
Increased competitiveness and investment attractiveness of the industry.
Improved environmental situation in the region.

Plans for a comprehensive technology audit

CTA Coverage in 2025

- Food and beverage production, dairy products
- Intensive pig and poultry farming
- Asbestos production and asbestosbased products
- Animal slaughterhouses and meat processing plants

CTA Coverage in 2026

- Pulp production from wood or other fibrous materials
- Glass and ceramics production
- Textile fiber dyeing, bleaching, finishing
- Tanning, dyeing, and processing of hides and leather

CTA Coverage in 2027

- Uranium ore mining and processing
- Fine organic synthesis products
- Cattle farming
- Mining and processing of common minerals

Plans to develop reference books on the best available techniques

BAT Reference Documents planned for development in 2026

- Production of rare non-ferrous metals
- Intensive rearing of pigs, poultry
- Slaughter of animals at meat processing plants, abattoirs
- Tanning, dyeing, finishing of hides and leather
- Production of fine organic synthesis products

BAT Reference Documents planned for development in 2027

- Production of wood pulp or other fibrous materials
- Production of glass, ceramic products
- Dyeing of textile fibers, bleaching, dyeing of textile products
- Production of food products, beverages, milk and dairy products

NJSC «International Green Technologies and Investment Projects Center»

Thank you for your attention!