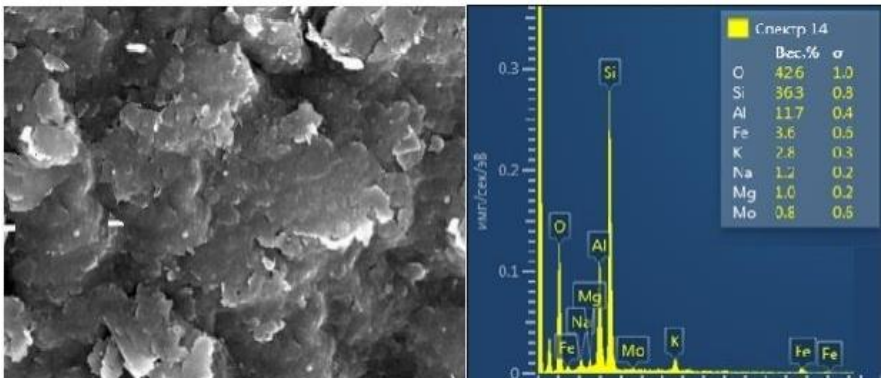
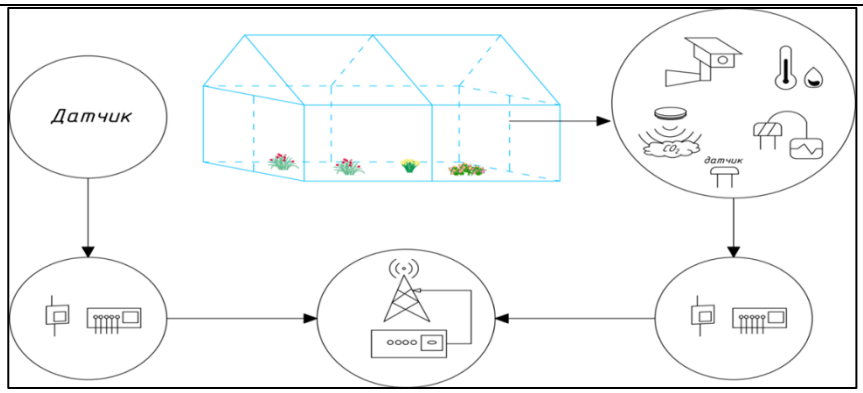
University: Navoi State University of Mining and Technologies
Country: Uzbekistan
Web Address: https://www.nsumt.uz/

[6] Education & Research
[6.16] Number of sustainability-related startups and grant projects

No.	Information
1	**Startup name:** Development of effective and economically favourable methods of treatment of tailings pond water and recycled water of the BIOX shop of GMZ-ZPZ **Startup category in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** WS **Date establish:** 03.10.2020 **Budget (in USD):** 30000 **Employees: Project manager:** Umirov Farkhod **Description:** Development of effective and economically favourable methods of treatment of tailings pond water and recycled water of the BIOX shop of GMZ-3 using local raw materials. A representative sample of water from the pond of the tailing pond of the A representative sample of water from the tailings pond of GMZ-3 and recycled water from the BIOX shop of GMZ-3 was used for the research. **Photos**: 
2	**Startup name:** Project development and creation of SMART-Greenhouse for Dustlik agro-firm of NKMK SE **Startup category in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** SI **Date establish:** 10.2020 **Budget (in USD):** 52000 **Employees: Project manager:** Kadirov Yorkin **Description:** The goal of the project is to develop and implement a management system for controlling the technological parameters of greenhouse operations, utilizing cloud technologies to monitor and manage microclimate conditions effectively.

	Photos: 
3	**Startup name:** Development of a zero-waste technology for recycling used car tires.**Startup category in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** WS **Date establish**: 05.2023 **Budget (in USD):** 117000 **Employees: Project manager:** Jurayev Shokhrukh **Description:** In our country, one-third of ground transport vehicles consist of products made from polymer-based composites (such as tires, seals, tubes, gaskets, and others). The number of these items is increasing day by day. Among polymer products, vehicle tires are the largest in terms of size and weight, with some weighing up to 3 tons. By recycling tires, not only can alternative fuel be produced, but it also becomes possible to obtain paronite from the combustion byproducts, thereby fully preventing environmental pollution. **Photos:** 
4	**Startup name:** Development of a scheme and introduction into production of devices for measuring and monitoring the quality of air entering the internal combustion engines of mining equipment **Startup category in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED): EC** **Date establish:** 12.2023 **Budget (in USD):** 66500 **Employees: Project manager:** Makhmudov Azamat **Description:** This startup focuses on developing and implementing advanced sensor-based devices to measure and monitor the quality of air entering internal combustion engines used in mining equipment. By ensuring optimal air quality, the system enhances engine efficiency, reduces fuel consumption, and minimizes harmful emissions. This innovation contributes to improving environmental performance in the mining sector and aligns with broader goals of reducing the carbon footprint of heavy machinery operations.

5	**Startup name:** Development of an intelligent management system to ensure the reliability of industrial consumers' operations during emergency power outages in electrical supply systems. **Startup category in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** EC **Date establish:** 01.2023 **Budget (in USD):** 31300 **Employees: Project manager:** Jumayev Odil **Description:** Objective of the project is ensuring the optimal operation of the electric power system in normal, pre-accident, emergency and post-accident situations by managing energy and power flows according to the criteria of reliability and stability of the energy system and inter-system connections, as well as maintaining the specified reliability conditions and quality indicators for consumers. **Photos:** 
6	**Startup name:** Development of products to neutralize soils and plants contaminated with heavy metals in Navoi region. **Startup category in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** ED **Date establish:** 2023 **Budget (in USD):** 23500 **Employees: Project manager:** Temirov Uktam **Description:** The objective of the project is to implement innovative solutions to increase the productivity of pastures in arid regions by preserving the natural moisture collected from rainfall during the last weeks of April and the first and second decades of May. One solution to address this issue is to study various chemical agents that, when introduced into the soil, can retain atmospheric and soil moisture over an extended period, thereby allowing plants to benefit from this moisture for a longer duration.

	Photos: 
7	**Startup name:** Establishment of a new method for producing ferric chloride for high-quality purification of industrial wastewater based on local raw materials. **Startup category in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** WR **Date establish:** 2023 **Budget (in USD):** 76500 **Revenue (in USD):** 64600 **Employees: Project manager:** Khurramov Navruz **Description:** Currently, the production of coagulants for primary water treatment has been established, but existing production does not fully meet the needs of the country. Therefore, we propose a technology to obtain coagulants that can be effectively used for treating industrial wastewater, with plans to implement them on an industrial scale. As a result, a coagulant containing 40-43% ferric chloride will be produced. **Photos:**  
8	**Startup name:** Creation of an environmentally efficient technology for processing waste gases from industrial enterprises in Navoi region. **Startup category in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** EC, WS **Date establish:** 2023 **Budget (in USD):** 79000 **Revenue (in USD):** 16000 **Employees: Project manager:** Tursunova Iroda **Description:** The aim of the project is to develop an environmentally efficient technology for the

	use of emitted gaseous waste from chemical and metallurgical production in the processing of oxide and sulphide ores and waste (tailings) from metallurgical production. **Photos:** 
9	**Startup name:** Production of reinforced concrete beams as a substitute for wooden beams using existing construction materials. **Startup category in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** SI **Date establish:** 2024 **Budget (in USD):** 78132 **Revenue (in USD):** 16000 **Project manager:** Sattorov Erkin **Description:** The main objectives of the project implementation are: To replace imported wooden materials, widely used in individual housing construction, with lightweight reinforced concrete structures made from local raw materials. To effectively utilize locally produced construction materials. To ensure the manufactured products comply with standards and incorporate new technologies, creating ease of use. To reduce production costs and enhance competitiveness of the manufactured products. **Photos:** 
10	**Startup name:** Recycling Technologies for Educational 3D Printing and Industrial Steel Slag Reuse. **Startup category in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED):** WR

	Date establish: 2024 **Budget (in USD):** 2000 **Revenue (in USD):** 1000 **Project manager:** Okhunjon Sayfidinov **Description:** The project focuses on advancing waste recycling and circular economy practices through two key initiatives: the use of recycled plastic materials in 3D printing for educational purposes and the scientific investigation of steel slag waste for industrial reuse. A state-of-the-art 3D printer utilizes recycled plastic to produce educational models that help students, particularly in technical disciplines, visualize complex concepts and enhance practical learning experiences. In parallel, researchers at Navoi State University of Mining and Technologies, in collaboration with the Navoi Machine Building Plant, are conducting a research project on the microstructural and chemical characterization of high-manganese steel slag generated during Hadfield steel production in electric arc furnaces (EAFs). Advanced analytical techniques, including scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS), are used to evaluate the material's potential for industrial applications. **Main Objectives:** 1. Promote the reuse of recycled plastic materials through educational 3D printing technologies. 2. Enhance student learning by providing practical models produced from recycled resources. 3. Investigate the potential industrial reuse of high-manganese steel slag as a secondary raw material. 4. Support circular economy principles through the recovery and valorization of industrial waste. 5. Reduce environmental impacts associated with waste disposal and resource consumption. 6. Develop sustainable solutions for steel slag utilization in steel production, cement manufacturing, road construction, soil treatment, and environmental remediation.  **Fig. 1. Hadfield Steel slag particle from Navoi Machine Building Plant.** **Photos:**

Additional evidence link *(i.e., for videos, more images, or other files that are not included in this file)*: