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A bridge between science and innovation



**TOSHKENT DAVLAT  
TRANSPORT UNIVERSITETI**  
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# **ENGINEER**

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**“QURILISHDA YASHIL IQTISODIYOT, SUV VA ATROF-MUHITNI ASRASH TENDENSIYALARI, EKOLOGIK MUAMMOLAR VA INNOVATSION YECHIMLAR” MAVZUSIDAGI RESPUBLIKA MIQYOSIDAGI ILMIY-AMALIY KONFERENSIYA TASHKILIY QO‘MITASI**

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## Modern equipment for ecology protection

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**Abstract:**

This article analyzes the significance of modern equipment in ensuring environmental sustainability and protection. Technologies such as air purification, waste recycling, water resource conservation, and the utilization of renewable energy sources are extensively discussed as means to mitigate environmental issues. The article also provides information on the state policy being implemented in Uzbekistan regarding environmental protection, the declaration of 2025 as the "Year of Environmental Protection and Green Economy," and advanced innovations in this field. This study aims to reveal the potential for effective use of modern technologies in achieving environmental sustainability.

**Keywords:**

Ecological sustainability, HEPA filter, air purifier, bioplastic, energy efficiency, solar panels, wind turbines, wastewater treatment

### 1. Introduction

As humanity continues to develop, environmental problems are also on the rise. Environmental pollution, increasing waste, and the unsustainable use of natural resources are creating global challenges. As a result, science and technology are offering effective solutions to these problems. Modern equipment and innovative solutions are creating opportunities to protect nature, conserve natural resources, and reduce waste.

In Uzbekistan, environmental protection is also considered one of the priorities of state policy. Decrees and resolutions adopted by our President are laying the foundation for significant changes in this field. Specifically, the laws "On Ecology and Environmental Protection," programs for waste management and recycling, as well as decrees on the development of green energy projects are aimed at ensuring environmental sustainability.

In today's world, environmental protection is one of the most crucial tasks facing humanity. As technology advances, new innovative methods and modern equipment are being developed to safeguard the environment. This article discusses some contemporary equipment that helps mitigate ecological problems.

### 2. Air purification equipment

Air pollution has become a major problem as a result of industrialization and urbanization. Modern air purification equipment is being developed to mitigate this issue. For example:

HEPA-filtered air purifiers – effectively remove fine particles from the air and help reduce allergies or respiratory diseases.

HEPA filter – These filters capture up to 99.97% of particles as small as 0.3 microns in the air.

Air purifier equipped with Tefal NanoCaptur® filter – This device effectively eliminates harmful substances such as formaldehyde.

Xiaomi Smart Air Purifier 4 Lite – A compact and smart air purifier that efficiently removes dust, allergens, and other pollutants from the air.

Philips air purifier – This device is equipped with a high-performance HEPA filter, which delivers excellent results in air purification.

Electrostatic filters are used to reduce emissions from industrial enterprises, which prevents air pollution and ensures environmental sustainability.

Vertical forests help purify the air by incorporating plants on the exterior of buildings, which not only improves air quality but also aesthetically enhances the urban environment.

### 3. Recycling and Waste Management Technologies

Recycling waste is crucial to prevent its accumulation. Some technologies used in this field include:

Automated waste sorting equipment - automatically separates waste by type and accelerates the recycling process, which increases recycling efficiency.

Bioplastic production - products made from biodegradable materials instead of traditional plastic reduce environmental harm and contribute to faster waste decomposition.

Energy conversion plants allow for the generation of energy from waste through recycling, which reduces dependence on traditional energy sources.

### 4. Water Resources Protection Technologies

Water is a source of life, and its pollution is a serious problem. The following equipment is used for water protection:

Intelligent filters detect and purify harmful substances in water, which improves the quality of drinking water.

Wastewater treatment systems contribute to the treatment and recycling of industrial and domestic wastewater, which contributes to the reduction of pollution of natural water sources.

Drip irrigation systems - are used to reduce water consumption and efficient irrigation, which plays an important role in water conservation for agriculture.

### 5. Solar and wind energy installations

Traditional energy sources cause many environmental problems. Therefore, the use of renewable energy sources is of great importance:

Solar panels - converting solar energy into electricity, reducing the use of traditional energy sources, while simultaneously reducing electricity costs.

Wind turbines - allow for the efficient use of wind energy, the production of environmentally friendly energy, and reduce harmful emissions into the atmosphere.

Energy-efficient technologies help save electricity in homes and manufacturing enterprises, thereby reducing the carbon footprint.

## 6. Conclusion

The importance of modern equipment in environmental protection is very great. Maintaining clean air, water, and land, recycling waste, and utilizing renewable energy sources are crucial steps for the future of humanity. Along with the development of technologies, their rational use and the fight against environmental problems is the duty of every person. At the same time, public-private partnership plays a crucial role in overcoming environmental crises. Moreover, raising environmental literacy among the population and encouraging the use of modern technologies will help preserve a clean and healthy environment for future generations.

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