DYNAMICS OF DEVELOPMENT OF INDUSTRIAL SECTORS IN THE REGIONS OF UZBEKISTAN IN THE CONDITIONS OF A GREEN ECONOMY

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Annotation:
This article analyzes the dynamics of the development of industrial sectors in the regions of Uzbekistan in the context of a green economy. The study aims to identify regional differences in improving the environmental and economic efficiency of industrial enterprises, rational use of resources, waste reduction, and the introduction of innovative technologies. The article analyzes the adaptation of the energy, chemical, metallurgical, transport, and agricultural sectors to the requirements of a green economy, development prospects, and regional differences. The article also provides practical recommendations related to environmental sustainability, job creation, and increasing export potential. The results provide a scientific and practical basis for modernizing Uzbekistan's industrial policy and implementing a green transformation.

Keywords: green economy, industrial sectors, regional development, environmental sustainability, energy efficiency, waste recycling, innovative technologies, sustainable jobs, export potential.

In recent years, with the rapid development of the global economy, environmental problems, in particular resource scarcity, pollution and climate change, have become increasingly important. Therefore, new models of sustainable development and the concept of a green economy have become the focus of wide scientific and practical attention. A green economy serves to combine economic growth with environmental safety, rational use of natural resources and increase energy efficiency. Industrial sectors are of strategic importance in the economy of Uzbekistan and are one of the main sources of the country's national income and export potential. At the same time, the production processes of industrial enterprises exacerbate environmental problems such as energy consumption, waste volume and emissions of harmful substances into the atmosphere. Therefore, the modernization of industry based on the principles of a green economy, the implementation of waste reduction and recycling systems, as well as the introduction of energy-saving technologies are considered urgent tasks.
As can be seen from the table, industrial production in all regions is showing an upward trend in 2020–2024. The highest production is in Tashkent city and Navoi region, which is explained

by the presence of large industrial clusters, chemical and metallurgical enterprises and production sectors with high added value in these regions. The growth rate in Jizzakh region is the highest at 70.7%, which is associated with the creation of free economic zones in this region in recent years, the inflow of foreign investment and the rapid development of the processing industry.

Table 1 Dynamics of growth in industrial production in the regions of Uzbekistan (2020–2024, billion soums)

Regions	**2020**	**2021**	**2022**	**2023**	**2024**	**Growth rate (%)**
Tashkent city	82 500	90 400	98 200	110 300	121 700	47.5
Tashkent region	45 300	49 600	53 800	60 900	67 400	48.8
Samarkand	21 800	23 600	25 700	28 900	32 400	48.6
Fergana	26 700	28 900	31 200	34 800	38 100	42.6
Andijan	23 900	26 000	28 400	31 900	34 500	44.4
Namangan	19 200	21 300	23 000	26 100	28 900	50.5
Bukhara	17 600	19 000	20 400	22 600	25 300	43.7
Navoi	33 900	36 600	39 800	44 200	50 800	49.8
Kashkadarya	15 300	16 400	17 900	20 300	22 700	48.4
Surkhandarya	10 700	11 600	12 800	14 700	16 500	54.2
Khorezm	13 800	15 200	16 900	18 800	21 400	55.1
Karakalpakstan R.	12 500	13 200	14 100	16 200	18 000	44.0
Jizzakh	8 200	9 500	10 400	12 300	14 000	70.7
Syrdarya	7 800	8 600	9 700	10 900	12 200	56.4

The high growth rates in Surkhandarya and Khorezm regions (54.2% and 55.1%, respectively) indicate the growing potential of the energy, construction materials and food industries in these regions. At the same time, significant growth was also observed in Syrdarya and Kashkadarya regions, in which modernization processes in the fuel and energy sector and the chemical industry played an important role. In general, the growth of industrial production in all regions is closely related to modernization based on the requirements of a green economy, the introduction of energy-saving technologies, the expansion of industrial zones, and a stimulating state policy.

Table 2 Energy efficiency indicators in industrial sectors by region (2024, kWh - per 1 million soums of product)

Regions	2020	2022	2024	Change (%)
Tashkent city	190	165	148	–22.1
Tashkent region	210	188	171	–18.5
Samarkand	230	208	185	–19.6
Fergana	215	196	174	–19.0
Andijan	225	202	181	–19.5
Namangan	240	215	190	–20.8
Bukhara	260	239	212	–18.5
Navoi	280	248	220	–21.4
Kashkadarya	250	230	205	–18.0
Surkhandarya	270	248	220	–18.5
Khorezm	235	212	190	–19.1
Karakalpakstan R.	265	242	215	–18.9
Jizzakh	245	219	190	–22.4
Syrdarya	255	230	205	–19.6

Energy saving indicators show stable positive dynamics by region. The largest decrease was observed in Tashkent city, Jizzakh and Navoi regions. This is explained by the widespread introduction of modern energy-saving technologies by industrial enterprises in these regions, an increase in the level of digitalization and automation of production processes.

Jizzakh's leadership with an indicator of 22.4% is due to the opening of new modern production enterprises in this region and the use of energy-saving technologies from the very beginning. In Navoi region, the optimization of energy consumption in accordance with new standards, especially the revision of energy consumption standards at chemical and metallurgical enterprises, has yielded significant results.

The general trend of energy saving shows that the industry of Uzbekistan is actively adapting to the requirements of a green economy, energy audits at enterprises, and the use of renewable energy sources are increasing.

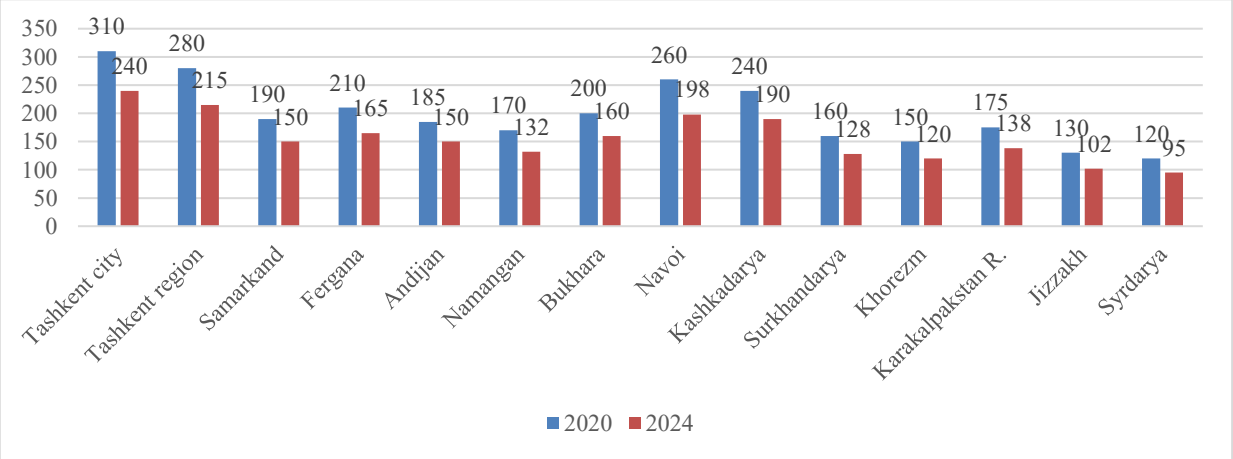
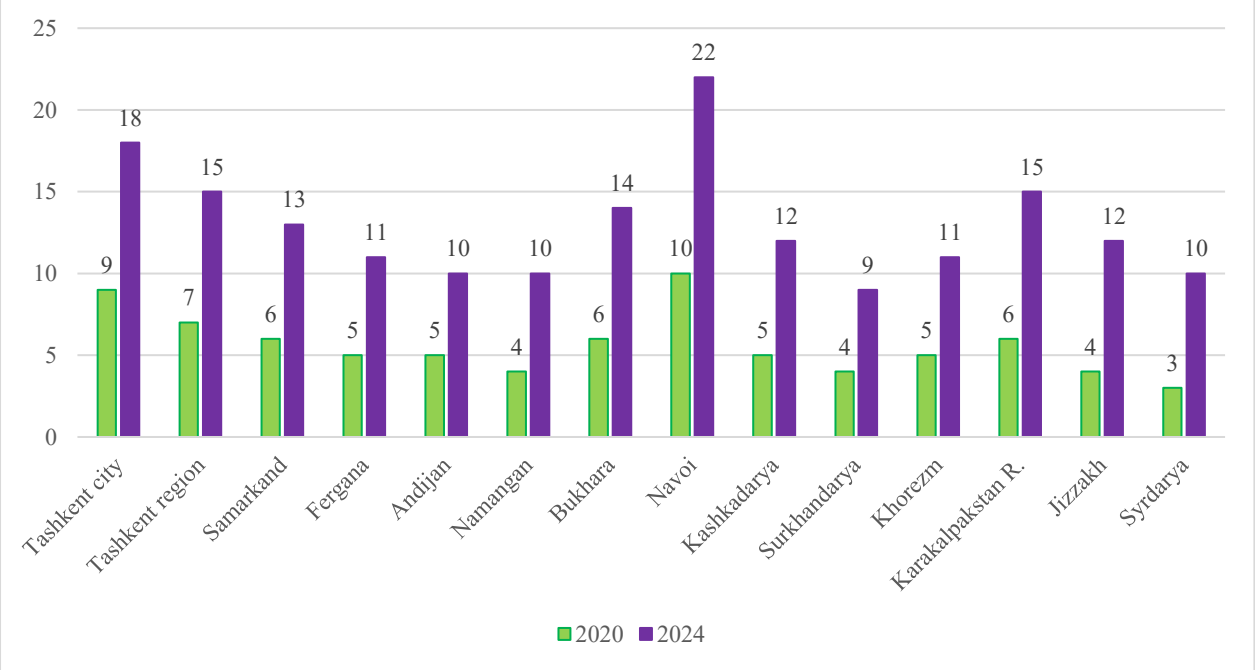


Figure 1. Industrial waste reduction rate by region (2020–2024, thousand tons)

The reduction in industrial waste indicates the acceleration of the process of ecological modernization in the regions of Uzbekistan. The largest reduction was observed in Navoi (23.8%), Tashkent region (23.2%) and Tashkent city (22.5%). It is noteworthy that the number of waste processing enterprises has increased in these regions, and state programs for the introduction of waste-free technologies are being actively implemented.

In Surkhandarya, Khorezm and Syrdarya regions, the reduction rates were moderate, around 20%. Since the economies of these regions are more oriented towards agriculture and light industry, the volume of waste was relatively small.

The changes in the picture indicate that industrial sectors are actively adapting to the principles of sustainable development, environmental safety and green economic transformation.



The sharp increase in the number of industrial enterprises operating on renewable energy indicates that Uzbekistan is further accelerating its transition to a green economy. The highest growth rates are observed in Jizzakh (+200%) and Syrdarya (+233%) regions, which is due to projects aimed at the rapid development of solar and wind energy.

Navoi region has a high share (22%), which is the result of the widespread introduction of solar panels, energy-saving devices and waste heat utilization technologies by large industrial enterprises in this region (NKMK, "Navoiyazot").

In Tashkent city and Tashkent region, enterprises also doubled the share of renewable energy use. The installation of solar panels, the use of heat recovery systems and the introduction of energy-efficient equipment at enterprises played an important role in this.

In general, the increase in the share of enterprises using renewable energy in 2020–2024 confirms the accelerated process of improving energy security, environmental sustainability and resource efficiency in industrial sectors.

Studies on the dynamics of the development of industrial sectors in the regions of Uzbekistan and transformation processes in the context of a green economy show that the country is pursuing a consistent policy to form an environmentally sustainable, energy-efficient and innovative production system. In recent years, the growth of industrial production in the regions, the modernization of production capacities, the introduction of technologies that meet environmental safety requirements, and the expansion of the use of renewable energy sources are accelerating the gradual transition of the economy to a green development model.

The analysis shows that the growth rates of industrial sectors in all regions of the republic are positive, and along with the leading regions, growth is observed in regions with relatively weak industrial development due to new production projects, investment flows and technological innovation. The implementation of the principles of the green economy in practice contributes to reducing energy consumption, reducing waste, rational use of resources, and increasing the environmental sustainability of enterprises.

At the same time, the analysis shows the need for industrial enterprises to more widely introduce digitalization, automation, integration of renewable energy, and production technologies that meet environmental standards. Although there are differences in development by region, the general trend confirms the consistent continuation of the “green transformation” of the economy.

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