Greening the Economy in Uzbekistan: the state of play in 2023

Monitoring progress based on the OECD Green Growth Indicators

July 2023

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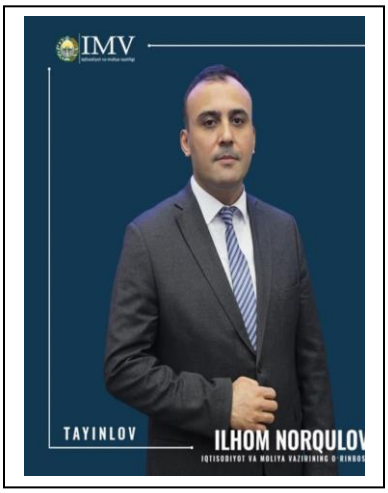

The Ministry of Economy and Finance is pleased to present this first monitoring report on progress towards Uzbekistan's green economy transition using OECD's Green Growth Indicators framework.

In December 2022, the President of Uzbekistan approved a green growth strategic framework program and action plan for a transition to a green economy by 2030. The action plan has eight national green growth indicators and targets, which progress will be monitored by our Ministry- MoEF. In this context, this report helps to answer four essential questions:

- Is Uzbekistan becoming more efficient in using natural resources and environmental services?
- Is the natural asset base of Uzbekistan's economy being maintained?
- Does greening economic growth generate quality of life for people in Uzbekistan?
- How does greening growth generate economic opportunities in Uzbekistan?

As supported by the findings in this report, Uzbekistan has made several positive trends towards green growth:

- carbon, energy, material, and water productivity are rising, meaning less emissions and efficient energy and resource use while the economy is growing.
- the share of forest area is increasing while agricultural land is decreasing as a proportion of the total land area.

Despite progress, several challenges remain:

- non-renewable fossil fuels dominate the energy supply mix (99% in 2021).
- the water stress level is as high as 68%, and
- only 26% of municipal solid waste produced annually is recycled (in 2021).

The Government of Uzbekistan affirms its commitment to a greener economy. The Ministry expresses its gratitude to the donor- the German government, the continuous support from the Organization for Economic Cooperation and Development, and the technical collaboration with the Westminster International University in Tashkent.

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ACKNOWLEDGEMENT AND BACKGROUND

This green growth monitoring report is the outcome of joint efforts from Westminster International University in Tashkent (WIUT), the Ministry of Economy and Finance (MoEF), and the Statistics Agency (SA), working together to establish a reliable monitoring system towards a green economy. The report is prepared by a team of experts from the WIUT, under the leadership of Bakhrom Mirkasimov (Rector) and Etenesh B. Asfaw (Senior Research Fellow at the Centre for Policy Research and Outreach). The research team includes Etenesh Asfaw, Nargiza Alimukhamedova, Omonjon Ganiev, Zohid Askarov, Akhtem Useinov, Angelo Battaglia, Kamilla Sultanova and Abdulaziz Dusbabaev.

This work is supervised by Krzysztof Michalak, Isabella Neuweg and Irina Belkahia from the Organization for Economic Cooperation and Development (OECD) Environment Directorate. The report is developed in the framework of the OECD project 'Improving the Incentive Frameworks and Capacity for Green Climate-Related Investment in Eastern Partnership Countries and Central Asia'. For the WIUT, the work is a continuation of the OECD-supported project that started as part of Uzbekistan's COVID-19 green recovery efforts in 2021 and paved the way for contributing to the transition to a green economy.

The WIUT team is grateful for the insights and contributions from the MoEF and the national statistical data provided by the Statistics Agency under the President of the Republic of Uzbekistan (SA). The authors are thankful for the inputs from various national stakeholders, including the former Institute for Forecasting and Macroeconomic Reforms (IFMR) now xxxx and the former Ministry of Natural Resources (MoNR) now xxxx, during the project kick-off event on 16th February 2023. The authors also acknowledge the valuable contributions of language translators, editors, proof-readers, and designers.

The report is divided into two parts. The first is "Monitoring green growth in Uzbekistan using the OECD green growth indicators". The second (special) part is "Monitoring the implementation of the national Green Growth Strategic Framework by 2030", using eight national indicators. The first part is structured into six chapters as follows:

- Chapter one describes the methodology and OECD GGIs framework.
- Chapter two provides the socio-economic context and characteristics of the growth of Uzbekistan.
- Chapter three discusses the efficiency with which economic activities use energy, other natural resources, and environmental services.
- Chapter four reflects on whether the natural asset base is being kept intact.
- Chapter five presents the environmental dimension of quality of life and shows how environmental conditions and risks interact with the well-being of people.
- Chapter six captures the economic opportunities and policy responses associated with green growth.

The analytical work encountered limitations related to open access to national data sets and inconsistency of information with regards to definition and measurement units when available. The report attempts to analyse available national data; and, in its absence, uses international datasets for Uzbekistan. The work is translated into the local language and is available on the web sites of the WIUT,

the MoEF and the OECD.

ACRONYMS AND ABBREVIATIONS

AFD	French Development Agency	**MoEF**	Ministry of Economy and Finance
AQG	Air Quality Guideline	**MoNR**	Ministry of Natural Resources
bln	Billion	**MSW**	Municipal Solid Waste
CO_2	Carbon Dioxide	**mln**	million
°C	degree Celsius	**m^3**	Cubic meter
CPI	Consumer Price Index	**µg**	microgramme
CA	Central Asia		
CPRO	Centre for Policy Research and Outreach	**OECD**	Organization for Economic Cooperation and Development
DP	Development Partner	**OWD**	Our World in Data
DMC	Domestic Material Consumption	**PM**	Particulate Matter
e.g.	for example	**SA**	Statistics Agency
EBRD	European Bank for Reconstruction and Development	**SDGs**	Sustainable Development Goals
EECCA	Eastern Europe, Caucasus, and Central Asia	**SCEEP**	State Committee for Ecology and Environmental Protection
FAO	Food and Agriculture Organization	**SWM**	Solid Waste Management
GDP	Gross Domestic Product	**TPES**	Total Primary Energy Supply
GG	Green Growth	**toe**	Tonnes of oil equivalent
GGI	Green Growth Indicators	**t**	Tonnes
GGGI	Global Green Growth Institution	**UN**	United Nations
GGSF	Green Growth Strategic Framework	**UNDP**	United Nations Development Program
GHGs	Green House Gases	**UNECE**	United Nations Economic Commission for Europe
ha	Hectares	**UNEP**	United Nations Environment Program
IEA	International Energy Agency	**USD**	United States Dollars
IFI	International Financial Institutions	**UZS**	Uzbekistan Soums
IFMR	Institute of Forecasting and Macroeconomic Research	**WB**	World Bank
IRENA	International Renewable Energy Agency	**WDI**	World Development Indicators
ILO	International Labor Organization	**WHO**	World Health Organization
IMF	International Monetary Fund	**WIUT**	Westminster International University in Tashkent
kg	Kilograms	**WRI**	World Resources Institute
km^2	Square Kilometre		
kWh	Kilowatt-hour		

Main Findings of the Uzbekistan Report on Greening the Economy in Uzbekistan: the state of Play in 2023

The report assesses the trends in Uzbekistan's progress in greening its economy using the internationally recognised Green Growth Indicators (GGIs) developed by the Organization for Economic Cooperation and Development (OECD). It also covers eight indicators proposed for monitoring the national Green Economy Strategy 2030 implementation and its Action Plan.The study builds on the national statistics, complemented with international data sets.

The key messages are:

Uzbekistan is becoming efficient in using natural resources and environmental services, but the pressure on natural capital remains.

- Generally, the GGIs that measured carbon, energy, and water productivity increased. Consequently, economic growth partially decoupled from carbon dioxide (CO_2) emissions, and the use of energy and water and the economy grew faster than the use of natural resources. Despite this progress, the level of environmental resource productivity is lower than in the Eastern Europe, Caucasus, and Central Asia (ECCA) region and Central Asia (CA) average. Thus, the intensity of environmental resource use is relatively high, which implies pressures on natural capital.

- Carbon emissions between 1990-2020 remained below 125 mln tonnes with slight annual variation. Uzbekistan accounts for only 0.3% of world carbon emissions and is 20 times less emitter than the Eastern Europe, Caucasus, and Central Asia (ECCA) region. It is, however, above the average emission in Central Asia. The relative stability of CO_2 emissions combined with growth in the gross domestic product (GDP) resulted in increased carbon productivity to USD 2.39 per kg of CO_2 emitted in 2020 Vs USD 0.6 in 1990. The higher carbon productivity shows that economic growth decoupled from CO_2 emissions. Despite this progress, Uzbekistan's CO_2 productivity remains lower than the ECCA region average (USD 2.5) and CA average (USD 2.9) in 2020.

- The country total primary energy supply (TPES) increased very slightly in the last three decades, and in 2021, the energy supply reached 49.2 mln tonnes of oil equivalent (toe). Though the supply is higher than the average for CA, it is 280 times less than the world average in 2020. Although generally increasing since 2016, renewables play a minor role (below 2%) in the energy mix of Uzbekistan and is significantly lower than the CA average (15%). The share of renewables in electricity generation increased to 9% (over 90% hydroelectric) in 2022. The development of renewables is slow, despite the high potential for solar energy.

- The energy productivity (economic benefit per toe energy used) increased to USD 5,798 in 2020, vs USD 1,643 per toe in 1990, showing that Uzbekistan is improving its energy efficiency, higher than the ECCA region. Nonetheless, Uzbekistan's energy productivity is less than the CA average (USD 6,744), the lowest next to Turkmenistan in 2020.

- The energy intensity of GDP is declining, despite being one of the world's highest energy intense countries (8th in 2022). In 2021 the energy intensity was 0.14 koe per USD, declining from 1.03 koe per USD in 2000. About 45% of the energy is consumed by buildings (residential and commercial), while industry consumes 21% and transport 18%.
- Water productivity in the economy increased to 2 USD per m^3 of water used in 2020, compared to 0.48 USD in 1994. Despite this progress, the level of productivity remains one of the lowest compared to the European and Central Asia (ECA) region (43 USD/m^3) and the world (21 USD/m^3).

- The material productivity in the economy (output generated from using a given amount of metal, non-metal, and biomass material) increased to USD 0.9/kg in 2019 from USD 0.4 in 1992, showing a slight increase in material use efficiency. The value is the third largest in CA.

- Waste generation is rising. In 2021, Uzbekistan generated around six mln tonnes of household solid waste, amounting to 165 kg per capita, but less than the world's 290 kg per capita. Regular waste collection services cover only half of the population (2018). Although the rate of solid waste recycling improved from 1.4 mln in 2019 to 1.7 mln tonnes in 2021, it is only 26%.

- Fertiliser consumption (chemical fertiliser used per hectare of cropland) increased in Uzbekistan, leading to a rise in excess fertiliser per hectare (ha) of cropland. It increased from 163kg/ ha in 1992 to 254.5kg/ha in 2020 and was 75% higher than the world average (146 kg/ ha).

The natural asset base of Uzbekistan's economy needs more maintenance.

- Despite that the share of agricultural land declined to 58% of land area in 2020, from 65% of land area in 1990, Uzbekistan's land area is predominantly agricultural. The arable/cultivated land declined from 3.4 mln ha in 2000 to 3.2 mln ha (12.5% of the agricultural land in 2020). However, land degradation due to inappropriate irrigation and poor pastureland and manure management is a major problem in agriculture, costing 4.6% of GDP equivalent in 2022. The cost includes the loss of agriculture productivity, increased soil erosion, reduced water availability, and loss of carbon sequestration and ecosystem services.
- Though organic farming areas in Uzbekistan have increased since 2010, it offers only a modest contribution to the sector. The land coverage of certified organic farming areas is negligible- 200 000 ha (5%) in 2019. Nevertheless, Uzbekistan is one of Central Asia's leading organic farming countries.

- Uzbekistan has limited water resources from Amu Darya and Syr Darya, which originate outside the country and are shared with neighbouring CA countries. The amount of water withdrawn annually increased to 59 bln m^3 in 2019 from 54 bln m^3 in 1995, making the country one of the most water-stressed countries globally. The water stress level (the ratio of water uses relative to water availability) significantly increased in the last two decades (69% in 2021 Vs 51 in 2000). The agriculture sector uses over 90% of the freshwater withdrawn. Despite the water stress, 40% of agricultural water is lost due to outdated irrigation infrastructure. Uzbekistan is implementing various measures to mitigate water stress, such as improving water management practices, implementing more efficient irrigation systems, and investing in water conservation efforts.

- The share of forest area slightly increased to 8.4% (12 mln ha) of the land area in 2020, compared to 8% of land in 2014 and was the second largest in CA. Despite the increase, it is four times lower than the share in ECA (38.5%). The recent available data on the volume of forest tree stocks also increased to 76 mln m^3 in 2015 from 72 mln m^3 in 1990.

- Protected areas increased to 3.5 mln ha (8% of the land area) in 2021, Vs 0.8 mln ha in 2011. Despite the expansion of biodiversity in protected areas, 52 species of all known animal and plant species in the country were threatened with extinction by 2018 due to climate change, overgrazing, hunting, and poaching.

- Uzbekistan ranks 11th in natural gas production and 14th in reserves globally. The natural gas reserves are forecasted to last for 20-30 years. The gap between production and demand for natural gas has increased yearly despite increased natural gas production reaching 54 bln m^3 in 2021. Natural gas losses pose a significant challenge in Uzbekistan due to outdated infrastructure.

Some GGIs in quality of life for people are improving, while challenges remain.

- Air pollution is declining as of 2014, reaching 909 thousand tonnes of pollutants in 2021, making Uzbekistan one of the most polluted countries in the world. Major pollutants are dust particles, vehicle emissions, and industrial emissions. Though the particulate matter (PM2.5) concentration in the air is less than the world's 43μg/m^3 and is on a declining trend, it is still above the WHO unhealthy level of 35μg/m^3.

- Exposure of the population to $PM_{2.5}$ exceeding 35 μg/m^3 declined to 56% in 2019 Vs 81% of the population in 2011. Nonetheless, the exposure level is five times higher than the World 10% of the population.

- Mortality and welfare costs due to air pollution show an increasing trend. Annually, over 750 people per mln inhabitants are estimated to die prematurely due to exposure to outdoor air pollution,

positioning the country above the world average of 645 people in 2019. The annual welfare cost due to exposure to air pollution represents 8.7% of the GDP equivalent vs 6.4% for the ECCA region in 2019. Deaths related to outdoor air pollution are the third highest globally.

- The public safe drinking water supply declined to 72% of houses in 2022 Vs 82% in 2010. The outdated water supply infrastructure, increased population growth and housing are the reasons for the declining access. There is high inequality between cities and rural areas. Although over 97% of Tashkent houses have access to safe drinking water, it is still a challenge in rural areas.

- Uzbekistan had some progress in expanding public sewerage systems. Nevertheless, less than half (48%) of households are connected to a sewerage system in 2022, and there is inequality between regions. While all residents in Tashkent are connected to sewerage, only 16% of households are connected in the Karakalpakstan region.

More economic opportunities need to be tapped in the transition to the green economy.

- Though no recent data is available (in the last five years) on environmentally friendly technologies, the previous trend shows that Uzbekistan started investing in environmental technologies in the early 1990s. Over 15% of the innovations in Uzbekistan in 2018 were environment-related (higher than the world's 10%); contributing to 0.01% of world environment-related inventions. Technologies per capita were 0.02 and lower than the world average of 4.9 per person.

- Environmental expenditures are generally showing an upward trend but are small. On average, environmental expenditure accounted for only 0.06% of total government expenditures or 0.02% of GDP in 2012–2019. The value can be underestimated as Uzbekistan lacks systematic budget tagging for 'green' expenditures and revenues and thus making it hard to assess all the green investments. Expenditure, however, dropped and was only 0.1% of the total in 2022, mainly due to increased post-COVID recovery expenditures, showing that environmental expenditures are sacrificed for other policy priorities.

- Environmental revenues in the state budget increased from 0.01% in 2015 to 1% in 2018, with the lion's share (44%) generated from solid waste fees. The revenues from pollution fees have increased, amounting to UZS 14.1 bln in 2018, compared to UZS 3.2 bln in 2010. The revenue increase reflects the cumulative effect of speeding economic activity, consequently increasing emissions and discharges of pollutants, and a doubling of tax rates/fees in 2017, when revenues increased by 56% compared to 2016. The report cannot assess the recent trends due to a lack of access to up-to-date data.
- Energy subsidies are gradually declining. Energy subsidies take the form of tax relief on gas, oil and electricity production for households. Subsidies for fossil fuels amounted to USD 3.8 bln (6.6% of the GDP) in 2020 and were reduced by 60% of the 2010 level.

- Tariffs for energy resources do not represent the production cost and are debated constantly due to social protection policies for low-income populations. Though water tariff levels have increased, it is still subsidised and does not cover the operational cost. The price of water is higher in regions compared to Tashkent city, and the rates vary by region, the consumer residence type, as well as the

availability of water. Similarly, electric tariffs increased, but Uzbekistan set various tariff schemes as of 2019 for different categories of consumers. Thus, the tariff for commercial consumers was 30% to 50% more than residential use tariffs.

Main socio-economic characteristics in Uzbekistan are promising.

- The economy has steadily increased by 6% annually in the last decade. Despite double-digit inflation at an average rate of 11% in the last three years, Uzbekistan's real GDP per capita increased to UZS 4.6 million in 2022 (1 USD= 11,000 UZS), from UZS 2.8 million in 2010 (1 USD=1700 UZS).

- Uzbekistan's trade openness increased. It is a net importer of goods and services as of 2016. The total import value increased by USD 25 billion in 2021, while the export value was USD 16 billion.

- The population is growing annually at 1.6% despite negative net external migration. The population was over 35 million in 2022, with 54% of the population below 30, with increasing demographic dividend opportunities. The share of the employed labour force increased and was about 70% of the labour force in 2021. The primary employers are the service (51%), followed by the industry (25%) and the agriculture (24%) sectors.

- Enrolment in tertiary institutions increased to only 21% in 2021, despite achieving 100% gross enrolment rates in primary and secondary education.

Uzbekistan did well in terms of achieving some of the strategic targets set for 2022 in the green growth strategic framework for 2030

- Uzbekistan exceeded its target of reducing energy intensity by 5% in 2022, set in the national Programme on the green economy transition. Also, energy intensity declined by 12.6% compared to 2021; overachieved the 2022 target of 8% share of renewable sources in total electricity generation by 0.8 percentage points; exceeded the construction of new solar panel capacity targets (10 MW) for 2022 by five times more. In addition, the proportion of houses that access drinking water was 27% higher than the target (69.7%) set for 2022.

Part I. Monitoring greening the economy in Uzbekistan with the OECD-based green growth indicators

CHAPTER 1: OECD Green Growth Indicators Framework and country context

This chapter introduces the OECD measurement framework, developed to monitor progress towards a green economy, and its pilot application in Uzbekistan. It also gives an overview of the country's context and existing national processes relevant to a green economy.

1.1 Introduction to the OECD Green Growth Indicators framework

In 2011, the OECD developed a green growth monitoring framework to support the implementation of the Green Growth Strategy in its member countries. Since then, it has been widely applied among OECD members and beyond, including in Central Asia (Kyrgyz Republic, Kazakhstan). The approach is kept flexible to allow adaptation to the national context. It helps countries to track and communicate progress in greening economic growth, take informed decisions, demonstrate accountability to national and international stakeholders, raise public awareness about the links between economic growth and the environment and compare progress between countries.

The green growth indicators (GGIs) framework comprises 26 main indicators grouped around four areas of green growth:

i. The environmental and resource productivity of the economy.
ii. The natural asset base.
iii. The environmental dimension of Quality of Life.
iv. Economic opportunities and policy responses.

The GGIs framework also captures information on the socio-economic context of a country to complement the four green growth dimensions.

Table 1.1 below shows the list of OECD GGIs and those among them included in this report. The indicators included in the report are mainly based on available data provided by the national statistical office - Statistics Agency under the President of Uzbekistan (hereafter the Statistics Agency), complemented by international sources, including the OECD and WB databases. The proposed set of indicators for Uzbekistan in this report can be extended further as data becomes available and as the green growth concept evolves.

Table 1.1 OECD green growth indicators and those among them proposed for Uzbekistan

Group	Sub-group	OECD indicators	Included in this report (identical or similar)
The environmental and resource productivity of the economy	Carbon and energy productivity	Production-based CO_2 productivity	✓
		Demand-based CO_2 productivity	x
		Energy productivity	✓
		Energy intensity by sector	✓
		Share of renewable energy sources (and electricity)	✓
	Resource productivity	Production-based material productivity	✓
		Demand-based material productivity	x
		Solid waste generation intensityand recycling ratio	✓
		Nutrient flows and balances in agriculture (Nitrogen, Phosphorus)	✓
		Water productivity	✓
	Multifactor productivity	Environmentally adjusted multifactor productivity	x
The natural asset base	Natural resources stocks	Natural resources Index	x
	Renewable stocks	Freshwater resources	✓
		Forest resources	✓
		Fish resources	x
	Non-renewable stocks	Mineral resources	x
	Biodiversity and ecosystems	Land resources	✓
		Soil resources	x
		Wildlife resources	✓
Environmental dimension of quality of life	Environmental healthand risks	Population exposure to health risks	✓
		Environmentally induced health problems and related costs	✓
		Exposure to natural or industrial risks and related economic losses	✓

	Environmental services and amenities	Population connected to sewage treatment	✓
		Population with sustainable access to safe drinking water	✓
Economic opportunities and policy responses	Technology and innovation	Research & Development expenditure in green growth	✓
		Patents of importance to green growth	✓
		Environment-related innovation	✓
	Environmental goods and services	Production of environmental goods and services (EGS)	x
	International financial flows	International financial flows to green growth	✓
	Prices and transfers	Environment- related taxation and subsidies	✓
		Energy pricing	✓
		Water pricing and cost recovery	✓
	Education, training & skills development	No indicator yet	x
The socio-economic context and characteristics of growth	Economic growth, productivity and competitiveness	Economic growth and structure	✓
		Productivity and trade	✓
		Inflation and commodity prices	✓
	Labour market & Socio-demographic patterns	Labour force participation & unemployment	✓
		Population growth, structure and density	✓
		Life expectancy	✓
		Inequality GINI index, N	✓
		Educational attainment: level of and access to education	✓

Source: adopted from OECD 2017 (Pages 135-137).

1.2 Country context and national processes with relevance to a green economy

Uzbekistan is the world's 42nd largest Green House Gas (GHG) emitter, with a share of 0.37% in 2019, and the second in Central Asia, after Kazakhstan [2]. In 2019, the government adopted the transition to Green Economy Strategy by 2030 to reverse this trend, framing the country's strategic vision to decouple economic growth from environmental degradation [3]. The Strategy sets six core and the last three cross-cutting priorities:

1. ensuring efficient use of natural resources
2. strengthening the resilience of the economy to natural disasters and climate change
3. ensuring low-carbon emissions of the economy, in particular, the industry sector
4. introducing innovations and attracting green investments
5. developing sustainable urbanization, with expanding urban green spaces
6. supporting the population most affected during the transition to a green economy
7. human capacity building on the green economy; enhancing green thinking
8. enabling policy environment (institutions, data collection and monitoring), and
9. increased flows of green financing.

Priorities of the COVID-19 pandemic jeopardized the implementation of the Strategy, shifting attention and resources from green measures to the urgent socio-economic response. Thus, the government's COVID-19 response measures did not have explicit green elements and were not vigilant against environmental impacts (Amirova et al., 2021). The trade-off between speeding up the green transition, e.g., with a cut of energy subsidies, and consequently raise of electricity tariffs and keeping strong social policies, including low energy tariffs, also poses a barrier to Uzbekistan's green transition reforms. Another challenge is the high transition cost, including investments in sustainable and renewable technology (Mirkasimov et al., 2023).

The national green priorities couple with Uzbekistan's ambitious international commitments. In 2018, the government adopted the 2030 Agenda, including commitments to environmental indicators to ensure access to clean water, sustainable consumption, adoption and mitigation to climate change, and conservation of land and forest (SDG 6, 12,13,15). In 2021 the government committed at the 26th session of the UN Convention on Climate Change (COP26) to reduce by 35% GHG emissions per unit of Gross Domestic Product (GDP) by 2030, compared to 2010 [4]. In 2022 the country joined the Global Methane Pledge to achieve the collective goal of reducing methane emissions by 30% by 2030, compared to the 2020 level [4].

Implementing national targets towards building a green economy in Uzbekistan and reaching international commitments requires proper monitoring. There are a few existing national processes to be mentioned in this regard. The major one is monitoring the 16 national Sustainable Development Goals (SDGs) and 125 related, adopted in 2018 and recalibrated in 2022[5]. The national SDGs include environmental indicators and targets to protect the planet, ensure access to clean water, and sustainable consumption, adoption and mitigation to climate change, and conservation of land and forest (SDG 6, 12,13,15). The SDG monitoring is vested to the Statistics Agency, which publishes annual progress reports on its implementation dating back to 2016 as a base year [6]. In addition, since 2011, the Statistics Agency regularly collects and publishes open data on selected environment and ecology indicators, including on protected areas,pollutants emitted, forest areas, and access to drinking water and sewage treatment [7].

Another national process at the core of green transition is the GG monitoring framework, consisting of eight indicators as in Table 1.2. was introduced on December 03, 2022, as part of the 'Decree of the president on measures to improve the effectiveness of reforms aimed at the transition of Uzbekistan to a "green" economy until 2030'; hereafter referred as the national Green Growth Strategic Framework (GGSF). The GGSF program and action plan envisions establishing a modern Monitoring, Reporting, and Validation (**MRV**) system on emissions that the MoEF will implement from 1 January 2024. The national monitoring indicators and processes are further discussed in chapter seven of the report, dedicated to the national Green Growth Strategy monitoring.

The national SDG indicators, the eight GGSF program and action plan indicators by 2030, and the OECD GGIs partially overlap. It is vital to ensure the complementarity of these three monitoring streams, and eliminate duplication, thus maximizing the value-added of each monitoring exercise. Table 1.2 presents a comparative analysis of indicators used by the three monitoring streams.

Table 1.2. Comparative table of OECD-based green growth indicators, national SDGs, and eight indicators for the GGSF program and action plan monitoring until 2030

OECD-based green growth indicators	***National SDGs***	***National indicators for monitoring the transition to green economy by 2030***
Environmental and resources productivity of the economy		
-Production-based CO_2 productivity - Energy productivity - Energy intensity by sector - Share of renewable energy sources (& electricity) - Production-based material productivity - Solid waste generation intensity and recycling ratio - Nutrient flows and balances in agriculture (N, P) - Water productivity	SDG 7: Clean energy SDG 11: Sustainablecities and communities SDG 13: Climate action	- energy intensity per unit of GDP - share of energy from solar power plants -share of renewable energy sources in total electricity generation - energy consumption in the industry - solid waste recycled
Natural asset base		
-Freshwater resources - Forest resources - Land resources - Wildlife resources & protected area	SDG 6: Clean water SDG 15: Life on land	- Urban green(forest) areas - stocks of trees and shrubs on forest lands
Environmental dimension of quality of life		
- Environmentally induced health problems and related costs - Exposure to natural or industrial risks and related economic losses - Population connected to sewage treatment - Population with sustainable access to safe drinking water	SDG 3: Health SDG 6: Clean water and sanitation	- population access to improved sources ofdrinking water
Economic opportunities and policy responses		
-Research & Development expenditure in green growth - Environment-related innovation -International financial flows in green growth	SDG 9: Innovations & Infrastructure SDG 13: Climate action	No indicator

- Environment- related taxation and subsidies - Energy pricing - Water pricing	SDG 16: Partnership	
Socio-economic context		
- Economic growth and structure - Trade - Inflation and commodity prices -Labour force participation & unemployment -Population growth and structure, -Life expectancy -Inequality GINI index, N -Educational attainment: access to education	SDG 1: No poverty SDG 10: Reduced inequalities SDG 8: Decent work & Economic Growth SDG 4: Quality education	No indicators

Source: Authors compilation

Developing a national OECD-based set of green growth indicators for Uzbekistan will complement the existing national monitoring processes. The peculiarity of the monitoring processes of the SDGs and the national 2030 GGSF is having a set of target values established by policymakers, while the OECD-based GGIs do not necessitate the existence of established targets, showing a trend over time for supporting policymakers to take informed decisions. The OECD GGIs also provide an opportunity to compare the situation in Uzbekistan with that in other countries.

This report is the first attempt to assess Uzbekistan's progress towards a green economy using a set of OECD-based green growth indicators adapted to the national context. The report unveils historical green growth trends between 1991 and 2022 (or the latest data available). Establishing a regular GGIs collection and reporting by Uzbekistan's mandated public authority (the MoEF and the Statistics Agency) may be envisaged.

Notes

[1] See GGI indicators at OECD Statistics and http://www.oecd.org/greengrowth/green-growth-indicators/

[2] See Uzbekistan's emission data at https://www.climatewatchdata.org/countries/UZB?end_year=2019&start_year=1990

[3] See https://lex.uz/ru/docs/4539506 Decree of the President of the republic of Uzbekistan on approval of the strategy for the transition of the republic of Uzbekistan to the 'green' economy for the period 2019-2030.

[4] See the GGSF Action plan in the Decree of the President of the Republic of Uzbekistan, dated December 2, 2022, No. PP-436 03.12.2022 See https://lex.uz/docs/6303233

[5] See the national SDGs in the resolution of the CM No. 841: https://lex.uz/docs/4013358

[6] See the monitoring of SDG targets at https://nsdg.stat.uz/en

[7] See statistical data from state statistics at: https://stat.uz/en/official-statistics/ecology & https://stat.uz/en/official-statistics/environment

Reference:

Amirova,I., Asfaw, E., and Sultanova, K. (2021). Assessment of Potential Environment, Social and Economic Impacts of Uzbekistan's COVID-19 Response. Report prepared under the Project for a Green and Inclusive COVID-19 recovery in Uzbekistan supported by the OECD. Westminster International University in Tashkent, Tashkent.

Mirkasimov, B., Asfaw, E., Askarov, Z., and Mukhammedova, A. (2023). Determinants Of Carbon Emission and The Potential Economic Impact Of 'Green' Economy Strategies In Central Asia: Kazakhstan and Uzbekistan. Book chapter five, CAREC Institute. Available at: Chapter-5.pdf (carecinstitute.org)

Organization for Economic Cooperation and Development (OECD) (2011). Towards Green Growth, OECD Green Growth Studies, OECD Publishing, Paris. http:// dx.doi.org/10.1787/9789264111318-en

OECD (2017). Green Growth Indicators 2017, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264268586-en

CHAPTER 2: Socio-Economic Context

This chapter looks at indicators describing Uzbekistan's socio-economic context and growth characteristics. The indicators complement the four main GGIs groups introduced in the previous chapter and a r e grouped into two themes:

- Economic growth, productivity, and competitiveness
- Labour market and socio-demographic patterns

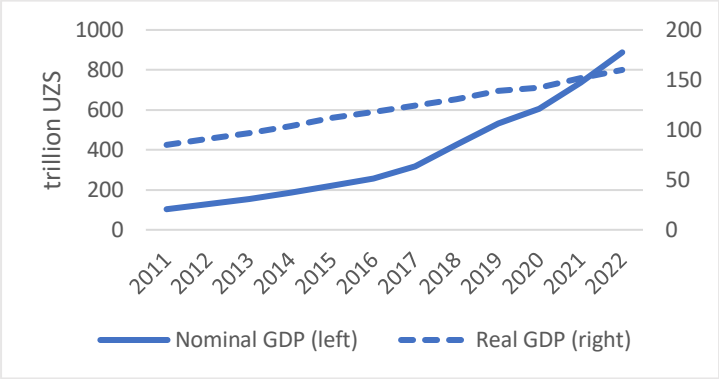
The definition of the indicators, how they are measured in this report and the sources of data are provided at the end of the chapter. The Statistics Agency publishes most of the socio-economic indicators.

2.1 Economic Growth, Productivity and Competitiveness

Indicators:

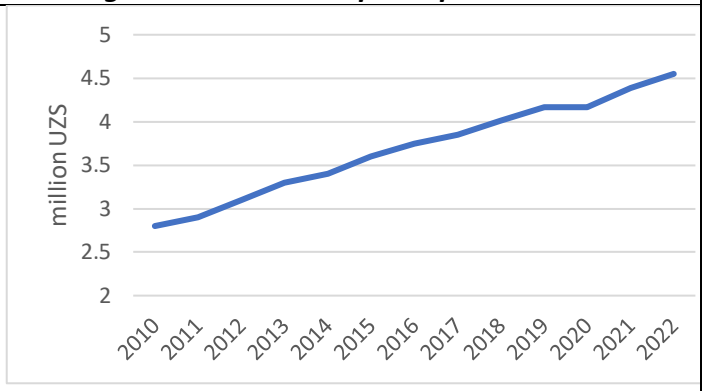
- Nominal and real Gross Domestic Product (GDP)
- GDP per capita
- GDP growth
- Share of main sectors by value-added
- CPI (inflation)
- Foreign trade

Figure 2.1: Gross Domestic Product (GDP)



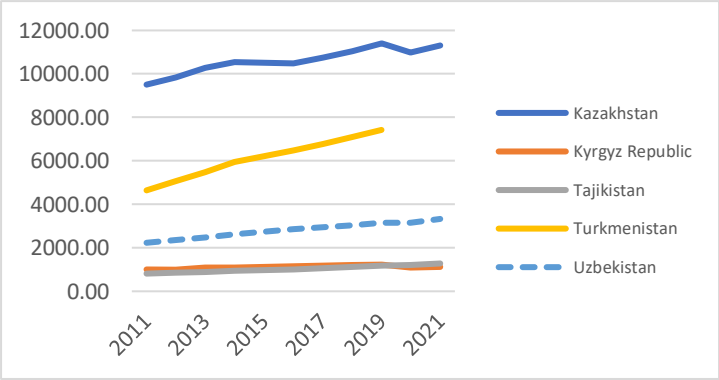
Source: Authors` calculation using Statistics Agency data, 2023.

Figure 2.2: Real GDP per capita



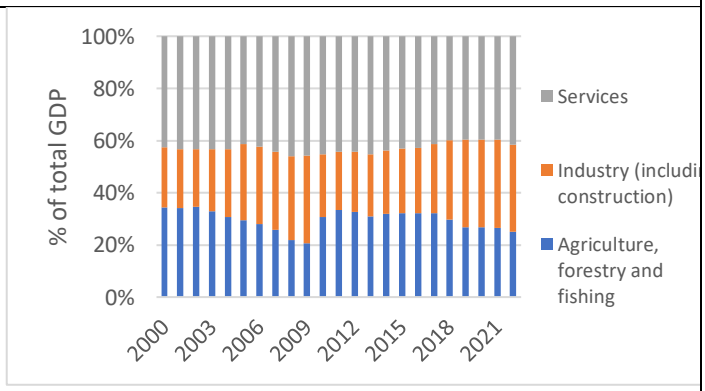
Source: Authors` calculation using Statistics Agency data, 2023

Figure 2.2.1 GDP per capita (constant 2015 US$), regional



Source: World Bank, 2023

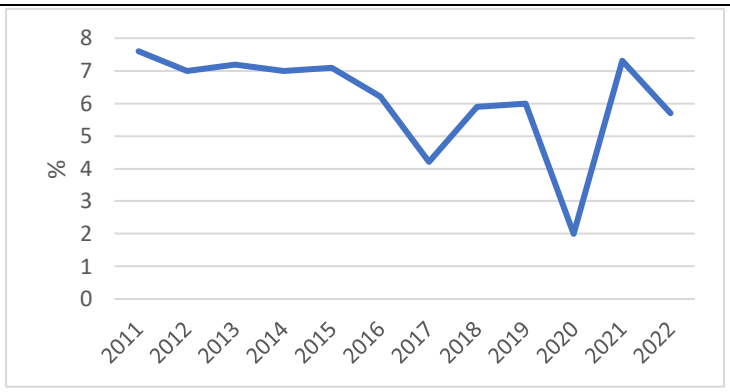
Figure 2.3: Share of main sectors by value-added



Source: Statistics Agency, 2023

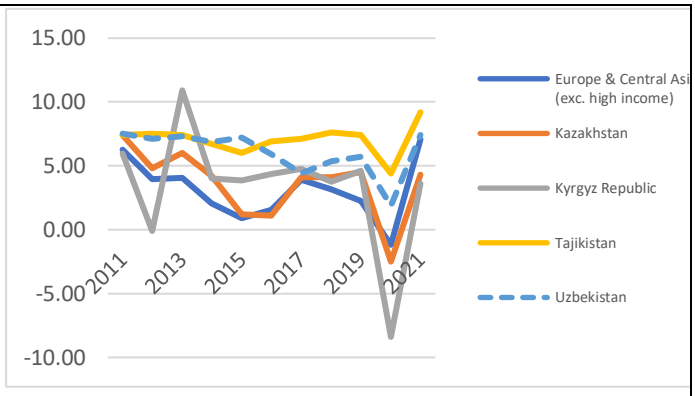
Figure 2.4: Real GDP growth rate

Figure 2.4.1 GDP growth (annual %), regional



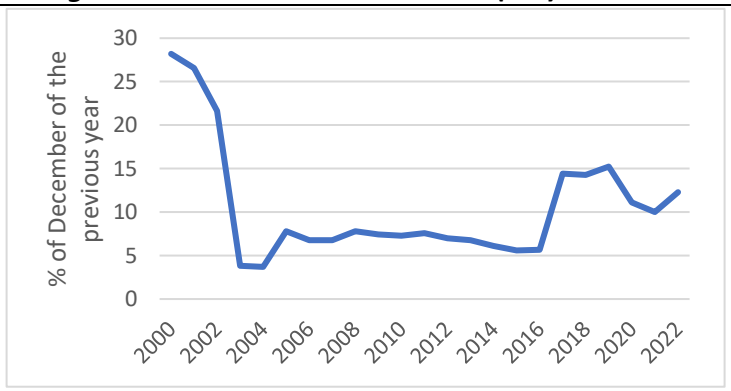
Source: Authors` calculation using Statistics Agency data, 2023

Figure 2.5: Consumers Price Index (CPI)

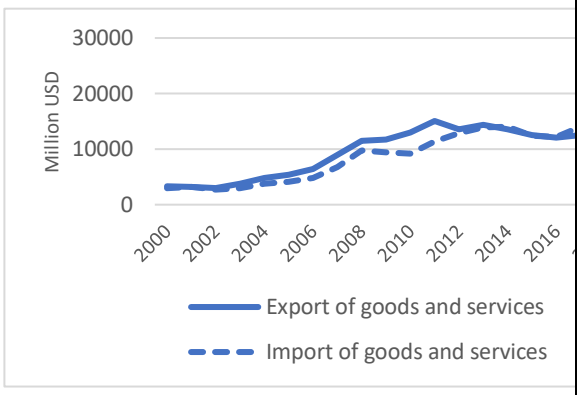


Source: World Bank, 2023

Figure 2.6: Foreign Trade

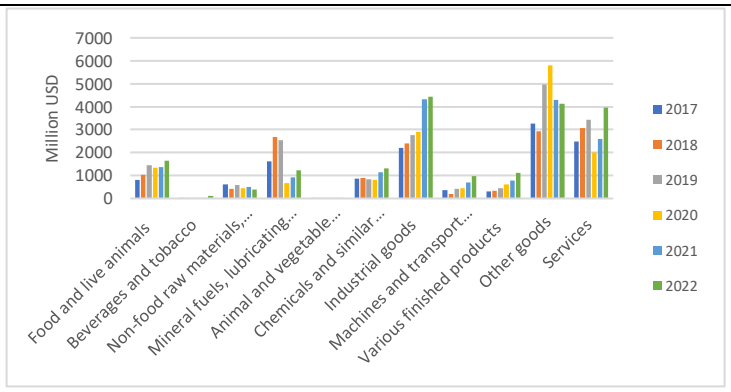


Source: Statistics Agency, 2023



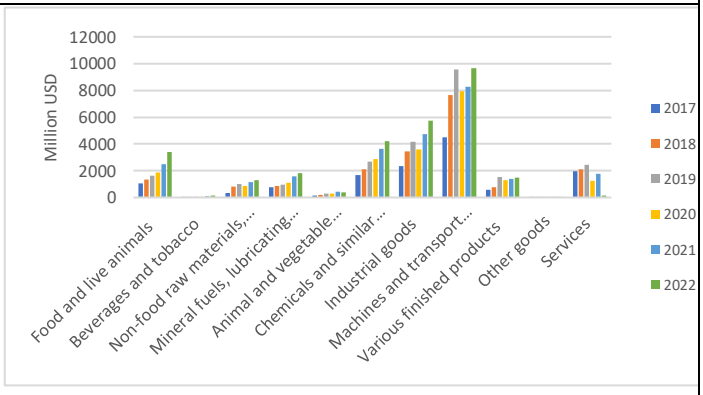
Source: Statistics Agency, 2023

Figure 2.6.1: Export composition for Uzbekistan



Source: Statistics Agency, 2023

Figure 2.6.2: Import composition for Uzbekistan



Source: Statistics Agency, 2023

Main Trends:

GDP: The economy of Uzbekistan has been steadily growing, reaching in 2022 UZS 888 trillion (compared to 103 trillion in 2011, in nominal GDP values) and UZS 160 trillion (compared to UZS 91 trillion in 2011, in real value) (figure 2.1).

GDP per capita: The real GDP per capita increased by 60%, reaching UZS 4.6 mln in 2022, compared to UZS 2.8 mln in 2010 (figure 2.2). This shows that the economic growth in Uzbekistan is accompanied by the increasing prosperity of citizens. Also affected by COVID-19 pandemic, it bounced back in 2021 to above pre-COVID values.

Comparing the Central Asian countries, real per capita GDP is the highest in Kazakhstan (11298.36 USD in 2021), followed by Turkmenistan (7422.36 USD in 2019[1]), Uzbekistan (3327.78 USD in 2021), and Kyrgyz Republic and Tajikistan, both around 1200 USD in 2021 (figure 2.2.1).

GDP growth: Uzbekistan's GDP grew on average by 6% annually between 2011 and 2022. The economic growth has slowed down since 2015, with around 4% growth in 2017 and around 6% in 2018 and 2019 (figure 2.4). The slowed down GDP growth rate in 2017 likely reflects more accurate accounting rather than a sharp contraction (EBRD, 2017). GDP growth declined sharply to 2% in 2020 due to the COVID-19 pandemic. Yet, the economy returned on track, with, 7.3% and5.3% growth in 2021 and 2022, respectively. The economic growth in Uzbekistan is supported by a centrally planned and investment-led economic strategy. Most of the growth since 2010 has been generated through increases in capital stock and the value of natural resource exports, such as gold and natural gas (World Bank, 2022).

In general, GDP growth of Uzbekistan has followed the regional trend (figure 2.4.1). During COVID-19 in 2020, the average GDP growth rate of Europe and Central Asia (excluding high-income countries) region was negative 1.18%, while in Uzbekistan, the growth rate equalled 1.89%.

Share of main sectors by their added value in GDP: In 2022, the service sector dominated Uzbekistan`s production, contributing 41.4% of the total value added (figure 2.3). The industry sector (including construction) contributed to 33.4%, while the share of agriculture decreased and equalled 25.1% of the GDP.

CPI (Inflation): The inflation rate in Uzbekistan, expressed in Consumer Price Index (CPI) has beendouble digits since 2016 (figure 2.5). It reached its pic of 15.2% in 2019, with an average of 11% over the past three years. The high inflation rates are due to the steady depreciation of the exchange rate, price deregulation, price increases,and, more recently, global trends, including supply chain challenges and commodity price increases (International Monetary Fund, 2022).

Foreign Trade: Uzbekistan is a net importer as of 2016. Both import and export volumes significantly increased over a decade, reaching USD 25 bln in 2021 (vs USD 3 bln in 2000) and USD 16 bln (vs USD 3.2 bln), respectively (figure 2.6).

[1] Data on GDP per capita in constant US$ is missing for 2020 and 2021 for Turkmenistan.

Based on the Standard International Trade Classification (SITC - 2008), the composition of exports from Uzbekistan during the last five years was mainly dominated by industrial commodities, services and other goods. Industrial commodities were exported for more than 4 bln USD in 2021. More detailed commodities data based on the Harmonised System (HS) codes, shows “Natural or cultured pearls precious or semi-precious stones precious metals clad with precious metal and articles thereof; imitation jewellery; coin” as the highest part of exports (figure 2.6.1).

Machines and transport equipment have dominated the import composition for Uzbekistan. Chemicals and similar products, and industrial goods were imported for around 4 billion USD in 2021. Based on the export composition and direction figures, Uzbekistan is relatively abundant in precious metals & natural resources, unskilled labor – which is attributed to services of migrants working abroad, crop land and agricultural workers (figure 2.6.2).

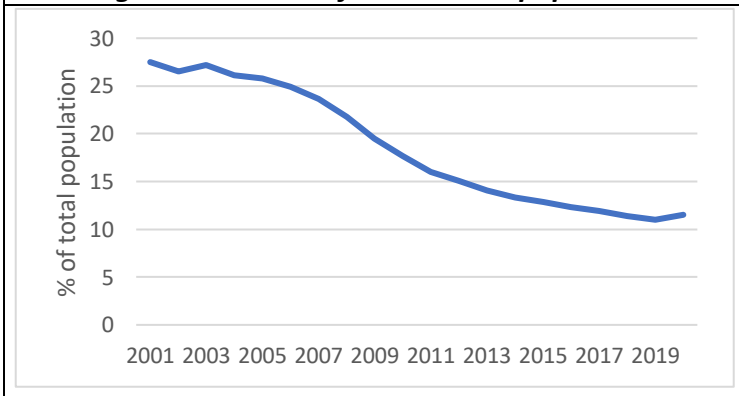
The main trade partners of Uzbekistan for 2021 were Russia (17,9% out of total trade), China (17,7% out of total trade), Kazakhstan (9,3% out of total trade), Turkey (8,1% out of total trade) and South Korea (4,5% out of total trade) (Gazeta.uz, 2022).

2.2 Labor Market and Socio-Demographic Patterns

Indicators:

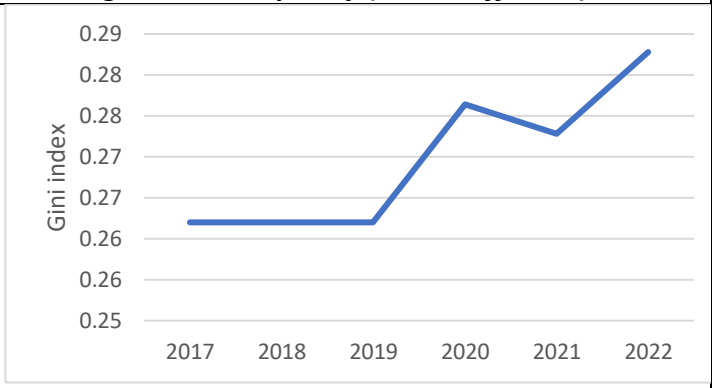
- Share of the low-income population
- Inequality (Gini coefficient)
- Economically active population
- Employment rate
- Employment by sector
- School enrolment
- Total population and structure
- Life expectancy
- Net migration

Figure 2.7: Share of low-income population



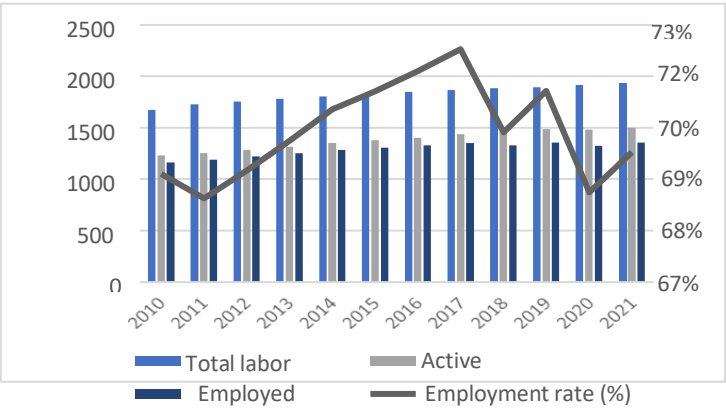
Source: Statistics Agency, 2023

Figure 2.8: Inequality (Gini Coefficient)



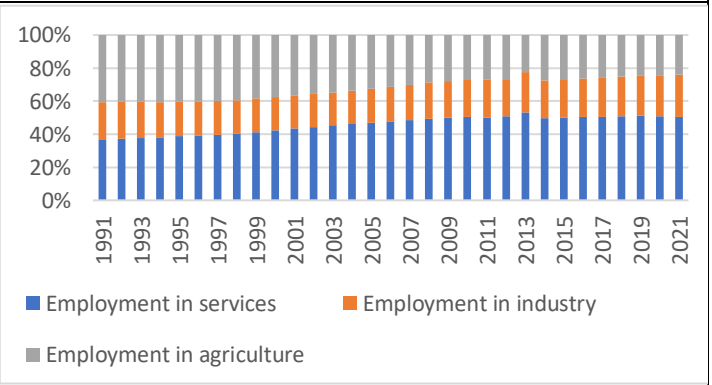
Source: Statistics Agency, 2023

Figure 2.9: Economically active population and employment



Source: Statistics Agency, 2023

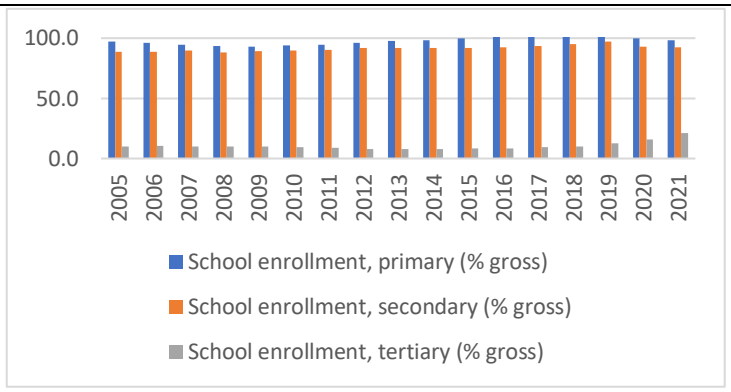
Figure 2.10: Employment by sector



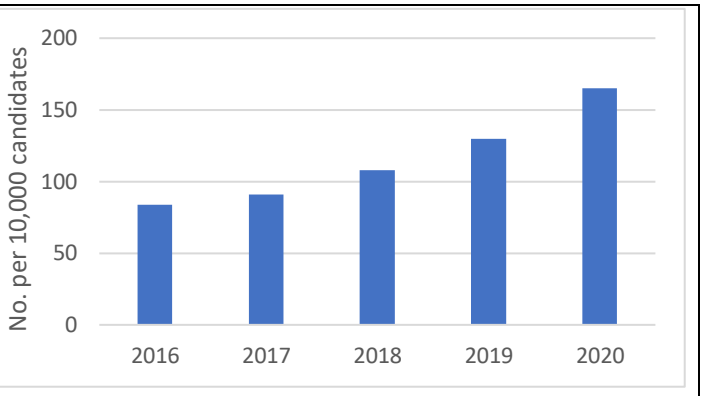
Source: World Bank, 2023

Figure 2.11: Gross School enrolment

Figure 2.12: Number of students in higher education institutions per 10,000 candidates

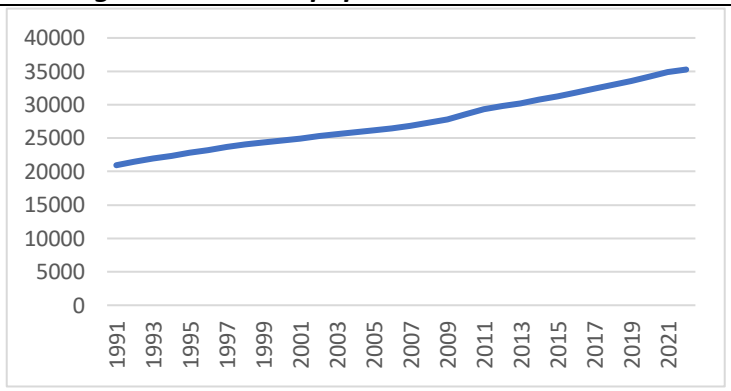


Source: World Bank, 2023



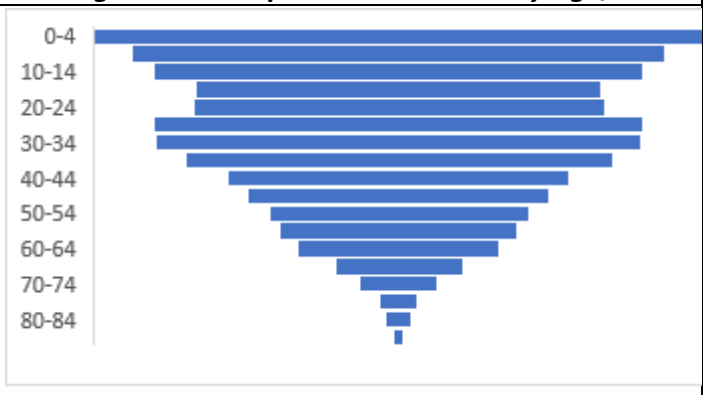
Source: Statistics Agency, 2023

Figure 2.13: Total population number



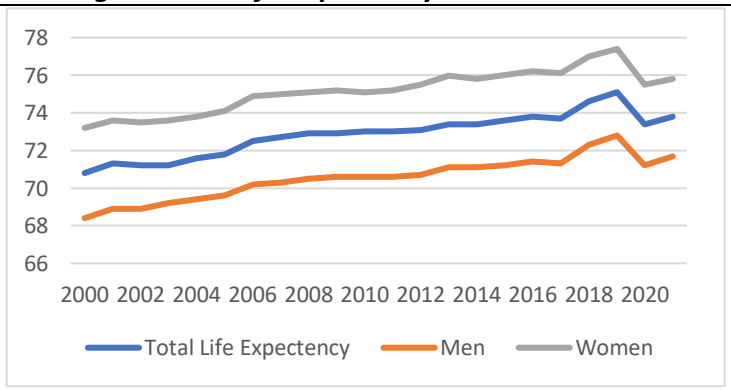
Source: Statistics Agency, 2023

Figure 2.14: Population structure by age, 2022



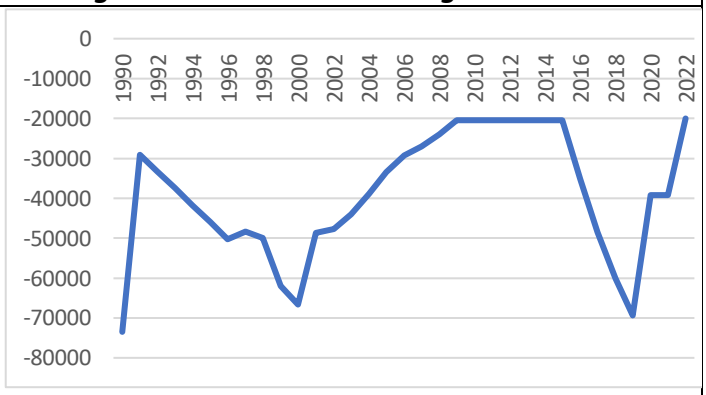
Source: Statistics Agency, 2023

Figure 2.15: Life Expectancy



Source: Statistics Agency, 2023

Figure 2.16: Net external migration



Source: World Bank, 2023

Main Trends:

Share of low-income population: The share of the low-income population is was halved between 2002 and 2019 (26% and 11%, respectively (figure 2.7), with a 0.5% increase in 2020, resulting from the COVID-19 pandemic. The poverty rate in 2021 was 17% (Statistics Agency, 2023).

Gini Coefficient: Uzbekistan has a relative income equality with a Gini index below 0.3 (figure 2.8), jeopardized as of 2019 by the COVID-19 pandemic. The government holds in check income inequality through policy and public transfersto keep the income gap relatively reasonable (World Bank, 2022).

Economically active population and employment: Uzbekistan had over 19 thousand labour force (half of the total population) in 2021, out of which 15 thousand were economically active. The rate of the employed labour force increased until 2017 and declined to 70% in 2021 (figure 2.9). On average, the employment rate per labour force was 71% in the last two decades.

Uzbekistan has a high youth-to-population ratio, creating a need for youth employment and active labourmarket policies (Honorati and Marguerie, 2021). Approximately 300 thousand new jobs are required between 2020 and 2030 (International Labor Organization, 2021). Most new jobs are created in the informal sector (ILO, 2021), and many people are engaged in irregular employment(Dugarova, 2019). Young people, predominantly female, rural youth, and youth from low-income households face difficulties entering the labour market.

Employment by sector: The employment structure in Uzbekistan, dominated by the agriculture sector in 1991, shifted to the service sector (figure 2.10). The primary employment sector in 2021 is the service sector (51%), followed by the industry (25%) andagriculture (24%).

School gross enrolment: Although Uzbekistan has achieved high enrolment rates in primary and secondary education, the enrolment in tertiary institutions remains low, despite an increase to 21.2% in 2021, compared to 8.5% in 2016, with the creation of new local universities and branches of foreign institutions. The number of students attending higher education institutions per 10,000 candidates was only 165 in 2020 (figure 2.12).More so, there is a need to improve the quality and relevance of education to the labour marketneeds (ILO, 2021).

Population growth and structure: On average, the population grows at 1.6% annually, reaching over 35 million in 2022 (figure 2.13). The male and female population is proportional, and over half of the population lives in urban areasas of 2009 (Statistics Agency). Most of the Uzbekistan population is young, with 54% below 30 in2022 (figure 2.14).

Life expectancy: Life expectancy in Uzbekistan increased for both men and women and was 75 years in 2019 (figure 2.15). It declined to 73 years in 2020 during the pandemic.

Net external migration: The net migration was negative during the last three decades, illustrating that more people were leaving the country (figure 2.16). Market-oriented reforms and economic uncertainties in the early 1990s caused internal and external migration. That was mainly due to a lack of decent employment opportunities, which led to external labour migration and large

remittance inflows. Uzbekistan was the sixth among the top Asian recipient countries of international remittances by share of their GDP in 2020 (International Organization for Migration, 2022). In 2021, the share of received personal remittances to GDP equalled 13.3%.

Technical comments on measurability and interpretation

Table 2.1 provides comments on the measurability, interpretation, and source of data for theindicators included in the Chapter.

Table 2.1: Indicators measurability, interpretation, and source of data on socio-economic context

Indicators	***Measurability and Unit of Measurement***	***Source of data***
GDP	nominal and real GDP in trillion Uzbekistan Soums (UZS). Real GDP is calculated by dividing the nominal GDP value by the GDP deflator index provided by the Statistics Agency as of 2011.	Statistics Agency Authors' calculation
GDP growth rate	annual % change of real GDP values. The growth rate is calculated as GDP in the current period - GDP in the previous period / GDP in the previous period × 100.	Statistics Agency Authors' calculation
Real GDP per capita	Real GDP per population in UZS the ratio of real GDP to the annual permanent population, UZS/person.	Authors` calculation
Share of sectors value addition in GDP	% of total value added in GDP by the main sectors (in agriculture, industry, and services).	Statistics Agency
Consumer Price Index (CPI)	annual % change in the price of a basket of commodities based on statistics agency calculation of price data in the consumer market. This report uses the percentage change as of December of the previous year	Statistics Agency
Foreign Trade	Export and import values of goods and services in a million USD	Statistics Agency
Share of the low-income population	% of the population with income less than a given amount. The SA collects data on the indicator through household surveys. However, the SA calculates the poverty rate as of 2021 using different measurement methods.	Statistics Agency

Gini coefficient	index number. The coefficient ranges between 0 in the case of perfect income equality and 1 in the case of perfect income inequality	Statistics Agency
Economically active population & employment	% of the total labour force that is actively searching for jobs. The employment rate here is a proportion (%) of the labour force employed	Statistics Agency
Employment by sector	% of total employment by main sectors of the economy	World Bank
School enrolment	% of total candidates enrolled in schools at primary, secondary and tertiary levels	World Bank Statistics Agency
Total Population & structure	Number of people permanently living in Uzbekistan at the beginning of the year	Statistics Agency
Life expectancy	Average number of years. It shows premature death.	Statistics Agency
Net external Migration	Net external migration in numbers. It is the number of immigrants minus the number of emigrants.	World Bank

Definitions

GDP: is the gross domestic product of a country calculated at current prices (Nominal GDP) and at constant prices (real GDP).

GDP structure: these are percentage shares of value added in GDP by categories of main economic sectors in Uzbekistan: agriculture, industry, and services.

GDP per capita: the average annual income of the people in a country. Here the annual real GDP is divided by the annual population number.

CPI: is an indicator that shows changes in prices of goods and services over time consumed by the population. It shows the changes in the value of inflation in the economy for a fixed set of consumer goods and services.

Export: transaction of goods and services from Uzbekistan to a foreign state in monetary value.

Import: transaction of goods and services from a foreign state to Uzbekistan in monetary value.

Share of low-income population: This is the share of the population below income estimates of 2,100 kilocalories per day, as recommended by the World Bank.

GINI coefficient: is an index between 0 and 1. It is calculated based on the comparison of cumulative proportions of the population against cumulative proportions of income they receive.

Economically active population: the proportion of the population ages 15 and older that is economically active and seeking employment during a specified period.

Employment: persons of working age who were engaged in any activity to produce goods or provide services for pay or profit, whether at work during the reference period or not at work due to temporary absence from a job, or to working-time arrangement.

School gross enrolment ratio: the ratio of total enrolment, regardless of age, to the populationof the age group that officially corresponds to the level of education shown.

Total population: Number of people permanently living in the country at the beginning of the year, regardless of legal status or citizenship.

Life expectancy: the average number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

Net external migration: is the net total of migrants during the period, that is, the number of immigrants minus the number of emigrants, including citizens and noncitizens.

References

Dugarova, E. (2019). 'Poverty Reduction through Social Protection and Labor Policies in the Former Soviet Union', in Social Policy, Poverty, and Inequality in Central and Eastern Europe andthe Former Soviet Union, p. 45. Available at: https://www.crop.org/social-policy-poverty-and-inequality-in-central-and-eastern-europe-and-the-former-soviet-union.aspx.

EBRD (2017). Transition Report 2017-18, Country Assessments: Uzbekistan. Available at: https://www.ebrd.com/documents/oce/pdf-transition-report-201718-uzbekistan.pdf

Honorati, M., and Marguerie, A. (2021). Youth Employment in Uzbekistan: Opportunities and Challenges. World Bank. Available from: https://documents.worldbank.org/pt/publication/documents-reports/documentdetail/666311634704762319/youth-employment-in-uzbekistan-opportunities-and-challenges.

International Labor Organization, (ILO) (2021) Towards Full and Productive Employment in Uzbekistan: Achievements and Challenges. Available at: https://www.ilo.org/moscow/information-resources/publications/WCMS_782059/lang--en/index.htm.

International Monetary Fund (IMF). (2022). Uzbekistan's Transition to Inflation Targeting. IMF Working Paper. Retrieved from https://www.imf.org/en/Publications/WP/Issues/2022/11/18/Uzbekistan-s-Transition-to-Inflation-Targeting-525745.

International Organization for Migration. (2022). World Migration Report 2022. Available from:

https://worldmigrationreport.iom.int/wmr-2022-interactive/.

World Bank. (2022). Toward a Prosperous and Inclusive Future : The Second Systematic Country Diagnostic for Uzbekistan (English). Available at: https://documents1.worldbank.org/curated/en/933471650320792872/pdf/Toward-a-Prosperous-and-Inclusive-Future-The-Second-Systematic-Country-Diagnostic-for-Uzbekistan.pdf.

Gazeta.uz. (2022). Внешнеторговый оборот Узбекистана в 2021 году увеличился на 16%. Available at: https://www.gazeta.uz/ru/2022/01/21/trade/

List of Reference for data source in Charts

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Economically Active Population. Available from https://stat.uz/en/official-statistics/labor-market.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2021). Life Expectancy. Available from https://stat.uz/en/official-statistics/demography.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2021). Population Density. Available from https://stat.uz/en/official-statistics/demography.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2021). Share of low-income population. *Stat.uz*. Available from https://stat.uz/en/official-statistics/living-standards.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2021). Students enrolled in higher educational organizations. Available from https://stat.uz/en/official-statistics/social-protection.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2021). Total Population Number. Available from https://stat.uz/en/official-statistics/demography.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Consumer Price Index. Available from https://stat.uz/en/official-statistics/prices-and-indexes

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Employment rate. Available from https://stat.uz/en/official-statistics/labor-market.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Exports of goods and services. Available from https://stat.uz/en/official-statistics/merchandise-trade

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Import of goods and services. Available from https://stat.uz/en/official-statistics/merchandise-trade

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). National

Accounts Deflator. Available from https://stat.uz/en/official-statistics/national-accounts.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Volume of gross domestic product. Available from https://stat.uz/en/official-statistics/national-accounts.

World Bank. (2023). GDP per capita (constant 2015 US$). *World Bank Open Data.* Available from https://data.worldbank.org/indicator/NY.GDP.PCAP.KD?locations=UZ

World Bank. (2023). GDP growth (annual %). *World Bank Open Data.* Available from https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=UZ

World Bank. (2023). Employment in agriculture. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=UZ

World Bank. (2023). Employment in industry. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/SL.IND.EMPL.ZS?locations=UZ.

World Bank. (2023). Employment in services. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/SL.SRV.EMPL.ZS?locations=UZ.

World Bank. (2023). School enrolment, secondary (% gross). *World Bank Open Data*. Available from https://data.worldbank.org/indicator/SE.SEC.ENRR?locations=UZ.

World Bank. (2023). School enrolment, tertiary (% gross). *data.worldbank.org*. Available from https://data.worldbank.org/indicator/SE.TER.ENRR?locations=UZ.

World Bank. (2023). School enrolment, tertiary (% gross). *data.worldbank.org*. Available from https://data.worldbank.org/indicator/SE.TER.ENRR?locations=UZ.

World Bank. (2023). School enrolment, primary (% gross). *World Bank Open Data*. Available from https://data.worldbank.org/indicator/SE.PRM.ENRR?locations=UZ.

CHAPTER 3: Environmental and Resource Productivity of the Economy

This chapter looks at indicators that capture the efficiency with which economic activities use energy, other natural resources, and materials. These group of indicators are essential for decoupling economic growth from environmental pressures. Understanding the trends in carbon and energy productivity indicators is key for tracking Uzbekistan's green growth transition. The chapter explores if the economic growth in Uzbekistan is becoming greener with less carbon and efficient use of energy and resources. The indicators are grouped into two themes:

- Carbon and energy productivity
- Resource productivity

The report does not assess demand-based CO_2 productivity (adjusted for trade) and environmentally adjusted multifactor productivity indicators to monitor the progress in green growth due to the lack of data required to measure the indicators. The monitoring report could not get national statistical data for most of the indicators in this chapter. Thus, the data is complemented by the stats.oecd.org database. The Statistics Agency does not collect nor compile data on emissions which is an important variable in calculating carbon intensity, productivity, and emissions per capita. On the other hand, the SA avails some national energy-related statistics.

Uzbekistan can benefit from capturing harmonized and standardized up- to- date data on emission and energy indicators by adopting international methodologies. Open access to statistics on emissions and sources; and energy consumption is valuable for monitoring the trend in decarbonizing the economy and measuring energy efficiency in the economy. Quality information on emissions and energy is also valuable for evaluating the impact of policies on carbon-neutral and energy-efficient interventions. For this, improving the data infrastructure at national and subnational levels is essential. Capacity building and training support for the Statistics Agency and the MoEF could be targeted in measurement, evaluation, and statistical analysis. An understanding of how the line Ministries like the Min. of energy, and Min. of ecology, environment and climate change, and Min. of water resources measure and collect data for respective indicators is also useful.

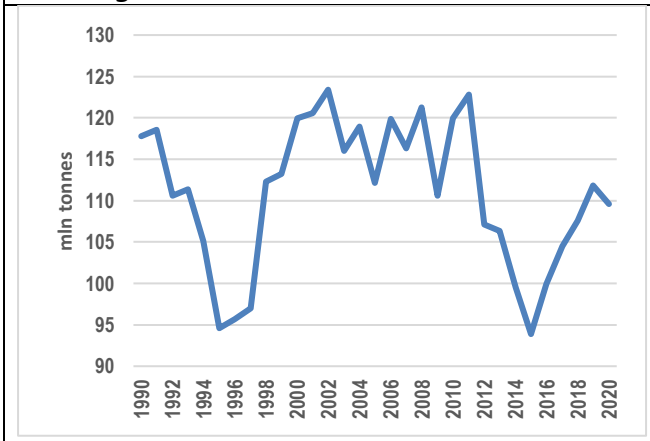
The definition of the indicators, how they are measured in this report, and the sources of data used are provided at the end of the chapter.

3.1 Carbon and Energy Productivity of the economy

Indicators:

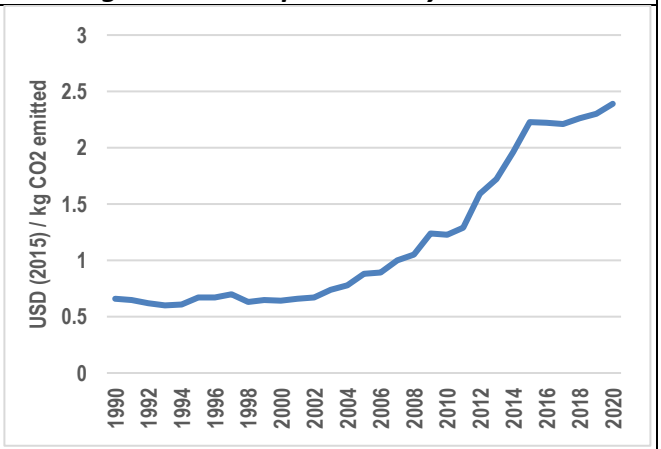
- CO_2 emissions
- Production-based CO_2 productivity
- Total Primary Energy supply (TPES)
- Share of renewable energy in TPES
- Share of renewables in electricity generation
- Energy productivity
- Energy consumption by sectors
- Energy intensity of GDP

Figure. 3.1. Production-based CO_2 emissions



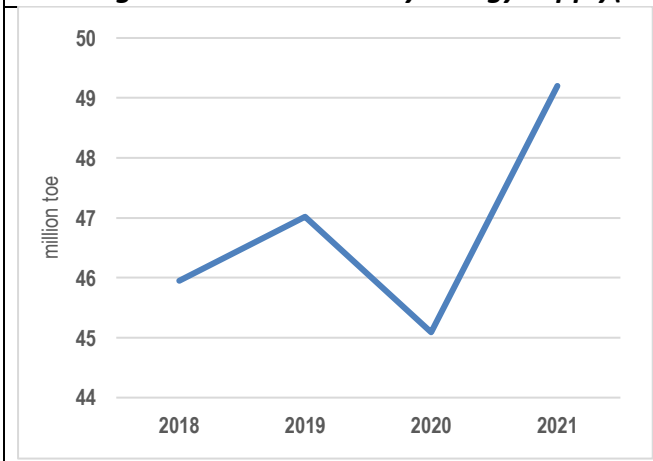
Source: OECD, 2023.

Figure 3.2. CO_2 productivity



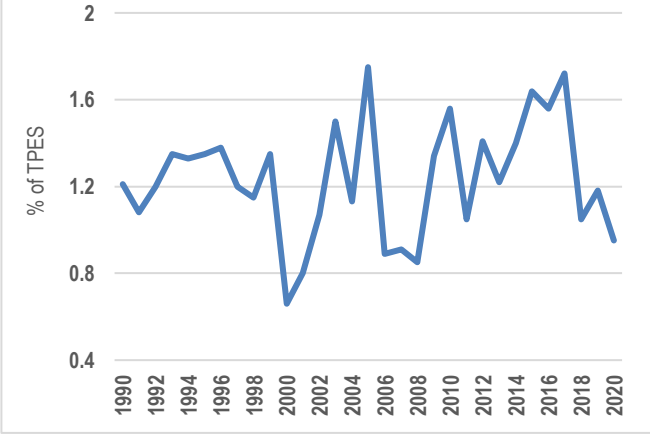
Source: OECD, 2023.

Figure 3.3. Total Primary Energy Supply(TPES)



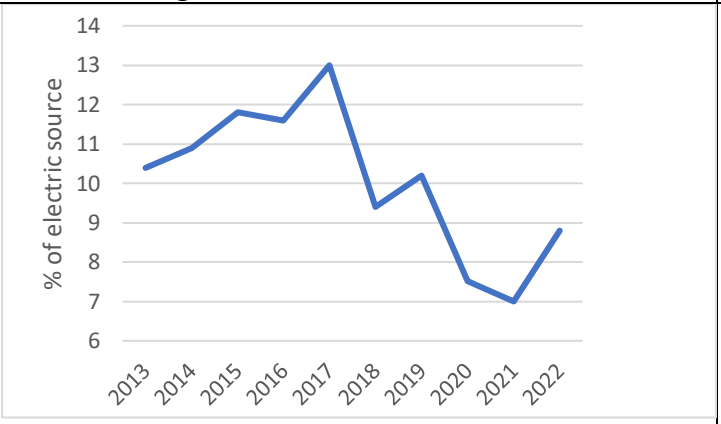
Source: Statistics Agency, 2023.

Figure. 3.4. Share of renewable energy supply



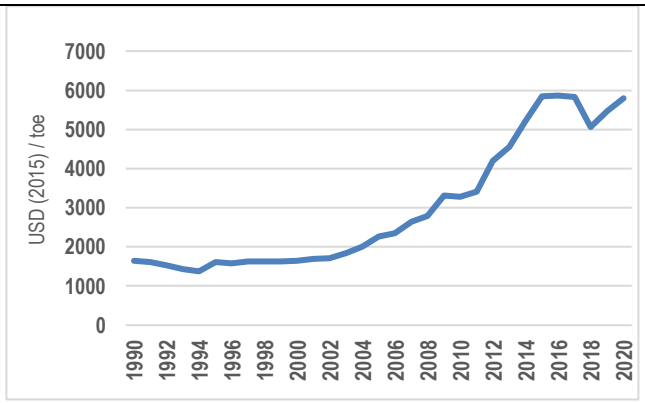
Source: OECD, 2023.

Figure 3.5: Share of renewables in electricity generation



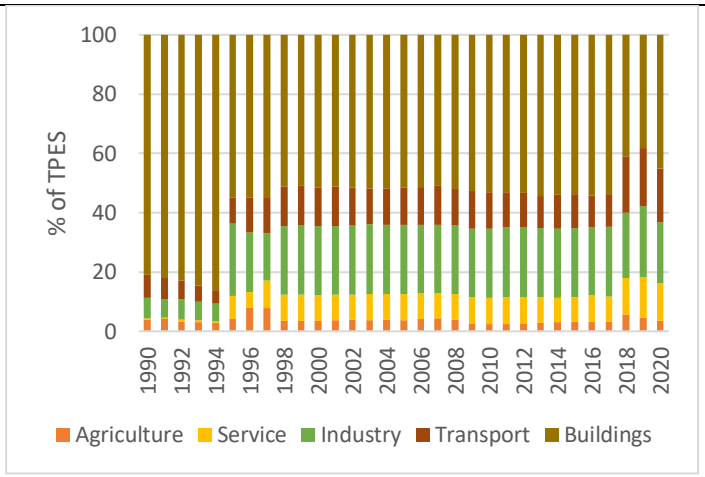
Source: Statistics Agency, 2023.

Figure 3.6. Energy productivity



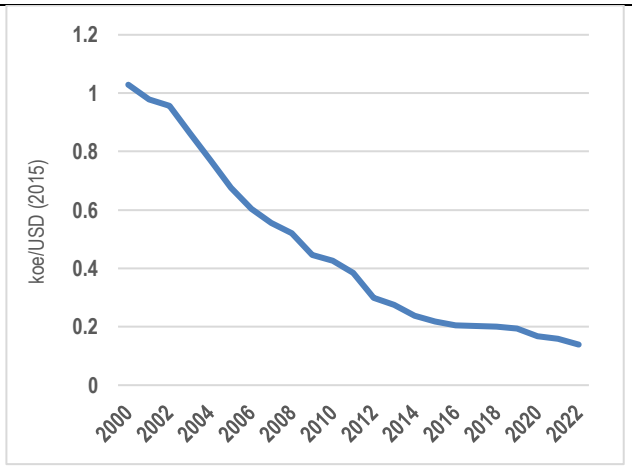
Source: OECD, 2023.

Figure 3.7: Share of energy consumption by sector



Source: OECD, 2023. (OECD refers buildings as other)

Figure 3.8. Energy intensity of GDP



Source: Statistics Agency, 2023.

Main trends:

Production based Carbon (CO_2) emissions: Between 1990-2020, Uzbekistan had increasing levels of CO_2 emissions with slight variations as in Figure 3.2. Emissions dropped until 1995 and increased in early 2000. It again dropped between 2011-2016 and steadily increased thereafter. Carbon emissions dropped in 2020. The average emission was 109 mln tonnes per year over the observed 30 years, and the highest record of 123 mln tonnes in 2002. The CO_2 emissions per capita for the 30 years is around 0.005 units with a slightly decreasing pattern, owing to the higher population growth rate. The energy(power) sector is the major CO_2 emitter, with 79% of emissions coming from burning of natural gas fuel. Uzbekistan is a small contributor to global carbon emissions. In 2020, its emission was 20 times less than the average of Eastern Europe, Caucasus, and Central Asia (ECCA) and contributed 5% of the region's emissions (OECD dataset, 2023). Uzbekistan's global emissions share was 0.33% in 2021 (Our World in Data, 2023).

CO_2 productivity: Despite increasing emissions, a positive trend to acknowledge is the gradual increase in CO_2 productivity, meaning less CO_2 emitted per value of output produced as in Figure 3.2. Thus, in 2020 USD 2.39 per kg of CO_2 emitted was generated, versus USD 1 before 2007. The carbon productivity value is however less than the average value of USD 2.46 in the ECCA region.

Total Primary Energy Supply (TPES): Uzbekistan's TPES (including non-renewables and renewables) is increasing as in figure 3.3. On average,Uzbekistan supplied 46.8 mln toe primary energy annually between 2018 – 2021. The energy supply dropped in 2020 and in 2021 it increased sharply to 49.2 mln tonnes of oil equivalent (toe). Despite the population growth, the annual TPES has not changed much from the 1990s value and has remained below 50 mln toe (OECD) and thus energy per capita is declining. Uzbekistan's energy supply is 20 times less than the ECCA region average and 280 times less than the world average in 2020. However, the total supply is higher than the average for CA. The international renewable energy agency (IRENA, 2022) indicates that Uzbekistan is energy self-sufficient (114% in 2019) and the country exported 20% of its produced energy and imported 5% of the supply in 2019.

Share of renewable energy sources in TPES: the share of renewables in the energy mix is very low, under 1% in 2020, as in Figure 3.4. On average, it remained at about 1.2% over the last three decades, with a maximum recorded level of 1.75% in 2005. The value is also less compared to the ECCA region average of 3.3% in 2020. The energy sector heavily relied on traditional energy sources such as natural gas and coal for its energy supply. The existing outdated infrastructure, power plants, and grid systems have been predominantly designed to accommodate these conventional sources, creating a barrier to the integration of additional and renewable energy technologies.

Almost all (99%) of the renewable energy comes from hydropower, followed by solar. Solar energy generation is a relatively recent (as of 2015) but growing energy source (SA, 2023). In 2021, of the total non-renewable fossil fuels, 85% was from natural gas, 9% from oil and 4% from coal (OWD). This shows that gas fossil fuels dominate the energy mix in the country. The use of natural gas increased over time from 63 mln tonnes in 1990 to 96.18 mln in 2021 (OWD, 2023).

Despite the high potential, the contribution of renewables to the energy mix remains low, and its production takes slow paths. There are no industrial-scale solar power plants or wind farms. Limited public awareness and understanding of the benefits and potential of renewable energy, including solar power, may hinder the integration of renewables into the energy supply. The International Energy Agency (IEA, 2020; 2022) indicate that there has been less urgency and incentive in diversifying the country's energy mix due to abundant fossil fuel resources and reserves, high initial investment costs for renewable energy technologies and limited expertise and experience. Nevertheless, in recent years Uzbekistan aims to increase the share of renewables in its energy mix and electric generation.

Share of renewables in electricity generation: The share of renewable electricity generation was 8.8% in 2022, showing that non-renewables dominate the electric power generation. The share of renewables in electric generation for Uzbekistan is three times less than the world average (OECD). The renewable electricity share was as high as 13% in 2017, but the value declined in the last five years, as in figure 3.5. Natural gas is the source of 74% of electricity production, followed by hydroelectricity with a 21% share.

Energy productivity: Uzbekistan is becoming more efficient in using energy, evidenced by a gradual increase in energy productivity, which tripled from 2005 to 2020 (Figure 3.6). This means less energy consumed per unit of value produced. Thus, in 2020 Uzbekistan generated USD 5,798 per toe energy used, higher than the average value for the EECCA region (USD 5,231).

Energy consumption by sector: The electric, cooking and heating in residential and commercial buildings is the most significant final energy consumer, with a share of 43%, followed by the industry (27%) and transport (18%) sectors as in Figure 3.7. The service and agriculture sectors consume the least energy (12%). Since 1995 there has been a drastic increase in energy consumption in the industry and service sectors.

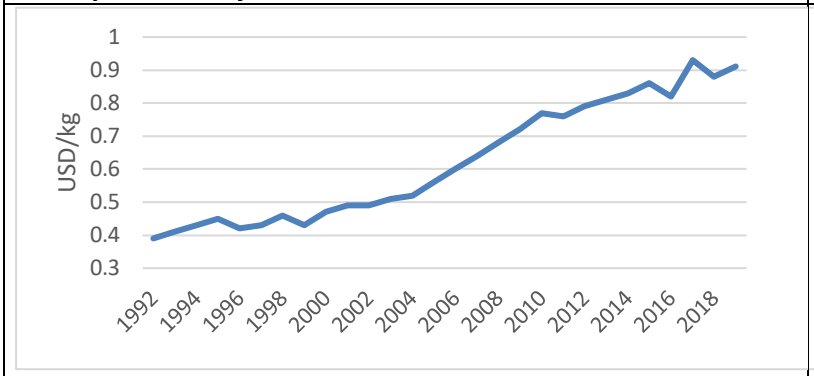
Energy intensity of GDP: Uzbekistan is a highly energy-intense country, taking seventh place worldwide. Yet, energy intensity is rapidly decreasing (-86% since the 2000 average) and amounts to 0.14 koe/USD (Figure 3.8), vs the global average of 0.11 koe/ USD [1]. This means Uzbekistan uses more energy to produce the same product. Although the country has been implementing reforms in recent years to strengthen its energy industry, problems associated with high wear and tear on equipment as well as with the slow pace of infrastructure updates, faulty equipment operations, inadequate installations, and both gas pipelines and power lines that have exceeded their service life- exist leading to wastage of energy.

3.2 Material Productivity (biomass, metallic, non-metallic)

Indicators:

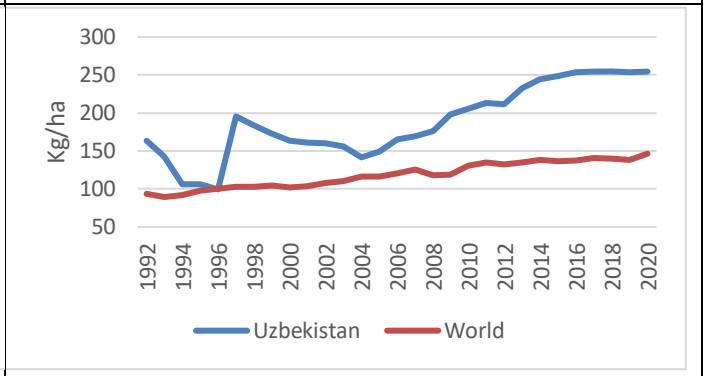
- Domestic Material Consumption (DMC) Productivity
- Fertilizer used on cropland
- Solid waste generated and proportion recycled

Figure 3.9: Domestic Material Consumption productivity



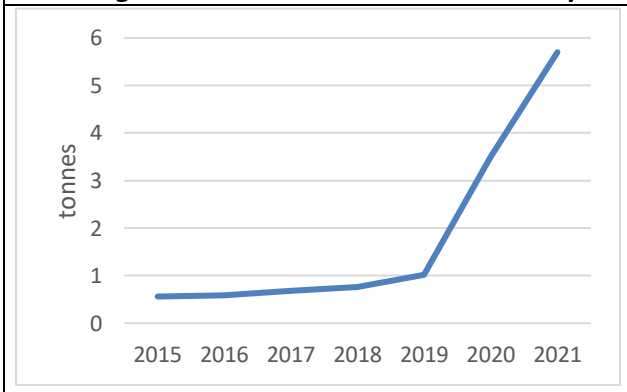
Source: OECD, 2023

Figure 3.10: Fertilizer use



Source: World Bank, 2023

Figure 3.11: Household Solid Waste produced



Source: Statistics Agency, 2023

Main Trends

Domestic Material Consumption Productivity: Uzbekistan is becoming more efficient in using materials like metals and non-metals in the production process, meaning less materials used per unit of value produced. Thus, in 2019, the OECD estimates that Uzbekistan generated USD 0.9 perkg of materials consumed vs USD 0.4 in 1992. Uzbekistan's material productivity is the 3rd largest in Central Asia, after Turkmenistan (USD 1.98) and Kazakhstan (USD 1.02).

Nutrient flows in agriculture: Uzbekistan croplands consume high (above 255 kg/ha) amounts of fertilizer, 75% higher than the world average (146 kg/ha). The heavy use of chemical fertilizers in agriculture contaminates the soil and pollutes rivers and lakes with agricultural chemicals.

Uzbekistan is one of the countries having high 'excess nitrogen' per ha of cropland. In 2009, Uzbekistan had 94 kgs of excess nitrogen, contributing to 0.6% of the global excess nitrogen or fertilizer pollution (Roser et al., 2021).

Household solid waste generated and recycled: Uzbekistan generates about 165 kg of household solid waste per capita annually, amounting to 5.7 mln tonnes in 2021, as in Figure 3.11. The government projects an increase to 7 million tonnes of household solid waste by 2030, in addition to 1.4 million tonnes produced by commercial and government entities. About 25% of the solid waste is food, 10% paper, 50% polymers, and the rest is metal, textiles, rubber, glass and more [2].

The high volume of waste couples with poorly developed national solid waste management (SWM) systems, leading to the lion's portion of waste being untreated. The existing SWM system is poorly equipped to meet growing demands. Only 48% of the total population is covered by regular solid waste collection services (in 2018) vs 6% in 2016, though the proportion is 100 % in cities [3]. Rudimentary SWM operates outside of Tashkent. The collected garbage is thrown into open landfills without processing or separating into fractions and valuable components (International Energy Agency, 2022). Despite improvement in solid waste recycling level, according to the Statistics Agency- SDG report, from 1.4 mln tonnes in 2019(9%) to 1.7 mln tonnes in 2021, only 26% of waste is recycled in the 220 waste processing enterprises. A Decree of the President of the Republic of Uzbekistan No. PP-4291 "On approval of the Strategy for solid waste management in the Republic of Uzbekistan for 2019-2028" was approved in 2019 to strengthen the legal framework in SWM [2].

Technical comments on measurability and interpretation

Table 3.1 provides comments on the measurability, interpretation, and source of data for the indicators included in the Chapter.

Table 3.1: Measurability, interpretation and data source on CO2, energy, and material productivity

Indicators	Measurability & Measurement unit	Data source
Production-based CO_2 productivity	USD/kg of CO_2 emissions. The indicator provides an overview of how Uzbekistan is progressing in reducing CO_2 emissions from production and it reflects the trends in the transition to a low-carbon economy. The authors could not access any national data on this indicator. Alternatively, the report uses OECD datasets.	OECD
Total Primary Energy Supply	Is the amount of energy supplied in the country in toe	Statistics Agency
Share of renewable energy supply in Total Primary	% of renewable energy out of total primary energy supplied TPES (in tonnes of oil equivalent (toe), Millions	OECD

Energy Supply (TPES)	The indicator helps to measure the share of low-carbon renewable energy sources in the total energy mix supplied/consumed in Uzbekistan.	
Share of renewables in electricity generation	% of renewable electricity out of total electricity generation It helps us to answer if Uzbekistan is progressing towards a low-carbon electric system.	Statistics Agency
Energy productivity	GDP (in USD 2015) per toe energy use. The indicator measures the amount of economic benefit from using a unit of primary energy. The indicator reflects if Uzbekistan is becoming more energy efficient and is generating more output from the consumption of a unit of energy.	OECD
Energy consumption by sectors	% share of TPES consumed by the main sectors of the economy. This indicator shows the trends in the total energy use by sectors of the economy. It shows which sector uses most of the energy supply.	OECD
Energy intensity of GDP	Total energy consumed per unit of GDP. This is the inverse of energy productivity and shows the rate of efficient use of energy	Statistics Agency
Material productivity	GDP per unit of DMC. The indicator measures how much income is generated per unit of domestic material consumption (biomass, metal, and non-metal materials) in the economy. Uzbekistan does not consolidate data on this indicator.	OECD
Household Solid Waste generated	Total solid waste generated by households in a year. The statistics agency started collecting such data on SW generated and recycled since 2016 as part of the SDG monitoring.	Statistics Agency
Share of solid waste recycled	% recycled out of solid waste generated.	Statistics Agency
Nutrient flows in agriculture (N, P)	Amount of fertilizer applied per hectare of agriculture land (kg/ha) This GGI aims to measure the nutrient balances in agriculture for the two main fertilizers applied on farms (Nitrogen(N) and Phosphorus (P). However, mapping the annual nutrient balance for Uzbekistan is not possible due to the absence of data to calculate the value. Alternately, this report shows the total fertilizer use in Uzbekistan compared to the world average[4]. It also shows 'excess nitrogen' – nitrogen lost to the environment.	World Bank (substitute with fertilizer use)

Definition:

Production-based carbon emissions: are emissions related to the production process in the economy. This is carbon emitted from the burning of fossil fuels like coal and oil, and gas, for energy production and industrial production of materials (such as cement, steel, and other industrial processes in the country.

Carbon productivity of the economy: is the amount of output (in Gross Domestic Product (GDP) produced per unit of CO_2 emitted in the production process of the country.

Total primary energy supply (TPES): is energy input found in nature before the transformation to final forms of energy for end-use (such as electricity or petrol for transport). It includes non-renewables (coal, oil natural gas), minerals and renewables (Ourworldindata).

Renewable energy: energy derived from natural processes that are replenished constantly. It includes energy from hydro, geothermal, solar, wind, combustible renewables (solid biomass, liquid biomass, biogas), and waste (renewable municipal waste).

Share of renewable energy supply: is the proportion of primary energy generated from hydropower, solar, wind, biomass, waste, geothermal, wave and tidal sources. With this indicator, we look at the data on renewable energy technologies, their share of energy supply, and how quickly the proportion changes.

Share of renewables in electricity generation: the share of electricity generated from renewable sources of energy including hydropower, solar, wind, biomass, geothermal sources.

Energy productivity: Income (in GDP) generated per unit of TPES in the process of production.

Energy consumption by sector: Energy consumption by sectors: % of the total energy used by sectors (agric., services, transport, industry).

Energy intensity: is the ratio of primary energy consumption over GDP measured in constantUSD. Energy intensity measures the amount of energy consumed per unit of gross domestic product. It measures how efficiently a country uses energy to produce a given amount of economic benefit.

Domestic material consumption (DMC): refers to the sum of the amount of materials biomass, non-metal, and metal material resources (in terms of weight) used in an economy, that is, materials extracted or harvested in the country, plus materials and products imported, minus material and products exported (OECD definition). It measures the amount of material used in an economy.

DMC productivity: is the output USD in the economy generated from using a unit of material.

Household Solid Waste (HSW): is waste originating from households and collected by municipalities.

Recycling MSW: is any reprocessing of material in a production process that diverts it from the waste stream.

Fertilizer Use: the quantity of plant nutrients used per unit of arable land. Fertilizer products cover nitrogenous, potash, and phosphate fertilizers.

Notes:

[1] See trends in global energy intensity of https://yearbook.enerdata.net/total-energy/world-energy-intensity-gdp-data.html

[2] See SDG progress report: https://nsdg.stat.uz/en/goal/15 and Min. of ecology report on July 12, 2019.

[3] See Government of Uzbekistan (2019). Resolution of the President of the Republic of Uzbekistan "On the approval of the Strategy on Solid Waste Management in the Republic of Uzbekistan for the period 2019-2028" strategy for the management of solid household waste Available at: https://lex.uz/docs/4291733?query=%D0%BF%D0%BB%D0%B0%D1%81%D1%82%D0%B8%D0%BA

[4] See fertilizer use at: https://data.worldbank.org/indicator/ag.con.fert.zs.

Reference:

International Energy Agency (IEA) (2020). Uzbekistan Energy Profile country report

IER (2022). Energy policy review: Uzbekistan. Retrieved on March11, 2023, from https://iea.blob.core.windows.net/assets/0d00581c-dc3c-466f-b0c8-97d25112a6e0/Uzbekistan2022.pdf

International Renewable Energy Agency (IRENA) (2022). Energy Profile: Uzbekistan. Available at: https://www.irena.org/media/Files/IRENA/Agency/Statistics/Statistical_Profiles/Asia/Uzbekistan_Asia_RE_SP.pdf

Mirkasimov, B., Asfaw, E., Askarov, Z., and Mukhammedova, A. (2023). Determinants Of Carbon Emission and The Potential Economic Impact Of 'Green' Economy Strategies In Central Asia: Kazakhstan and Uzbekistan. Book chapter five, CAREC Institute. Available at: Chapter-5.pdf (carecinstitute.org)

Roser, M., Ritchie, H., and Ortiz-Ospina, E. (2021). Excess fertilizer: How over-fertilization harms the environment and food security. Our World in Data. Retrieved from https://ourworldindata.org/excess-fertilizer.

Our World in Data (OWD) (2023). Available at https://ourworldindata.org/co2-emissions

List of references for data sources for charts

OECD. (2023). Stats.oecd.org. CO_2 emissions-related, energy-related, and DMC-related indicators Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Energy indicators of the Republic of Uzbekistan. *stat.uz*. Available from https://stat.uz/en/official-statistics/industry.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Municipal Solid Waste Generation. *Stat.uz*. Available from ЦУР (stat.uz)

World Bank. (2023). Fertilizer consumption – Uzbekistan *World Bank Open Data*. Available from https://data.worldbank.org/indicator/AG.CON.FERT.PT.ZS?locations=UZ

World Bank. (2023). Fertilizer consumption - World. *data.worldbank.org*. Available from https://data.worldbank.org/indicator/AG.CON.FERT.PT.ZS.

CHAPTER 4: The Natural Asset Base

This Chapter looks at the group of indicators that reflect whether the natural asset base is being kept intact and within sustainable thresholds in terms of quantity, quality, or value.

Uzbekistan is rich in natural resources that support its economy and the livelihoods of its people. The indicators in the chapter help answer if the natural asset base of Uzbekistan is maintained while the economy grows. Progress in the natural asset base can be monitored by tracking the changes in resource stocks and biodiversity. The indicators measure changes in:

- Renewable resources stocks
- Non-renewables stocks
- Biodiversity and ecosystem services

Although the Statistics Agency avails some national statistics on forest and protected areas, it does not avail data on freshwater withdrawn and consumed annually, except the SDG reporting section on Indicator 6.4.2. that has data on level of water stress: freshwater withdrawal as a proportion of available freshwater resources. https://nsdg.stat.uz/en/goal/9. The total freshwater withdrawal and use indicators are vital to calculate the trends in water productivity, and efficiency. Here, the data is complemented by the World Bank data sets.

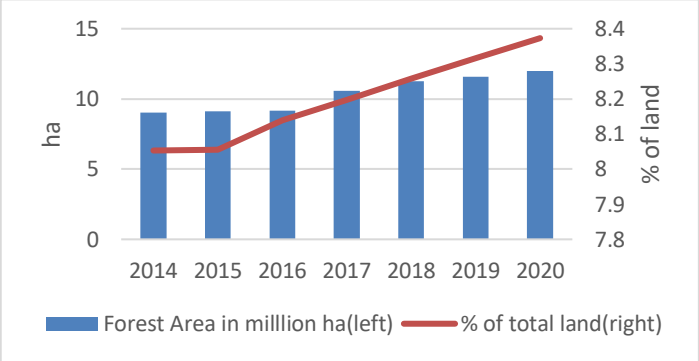
The definition of the indicators, how they are measured in this report, and the sources of data used are provided at the end of the chapter.

4.1 Renewable Resource Stocks

Indicators:

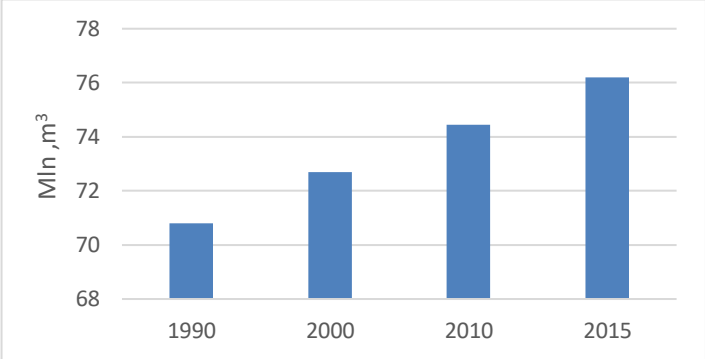
- Forest area
- Forest stock
- Freshwater withdrawal
- Freshwater use by sector
- Water productivity

Figure 4.1: Forest area



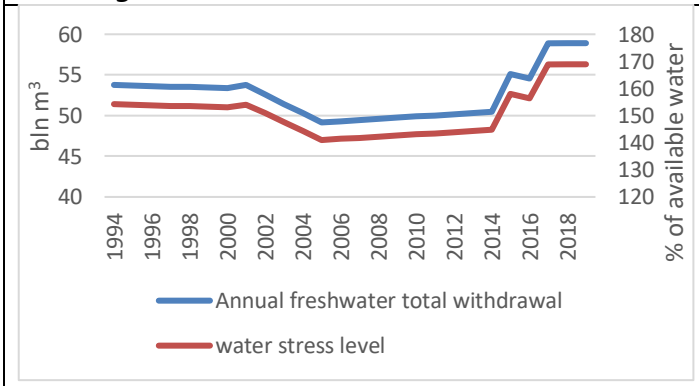
Source: Statistics Agency, 2023

Figure 4.2: Forest stock



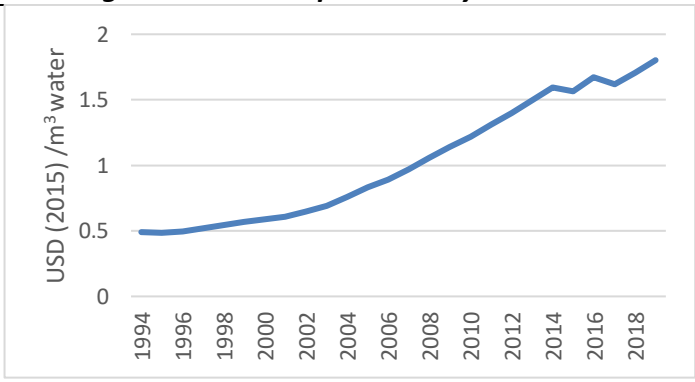
Source: OECD, 2023

Figure 4.3: Freshwater withdrawal



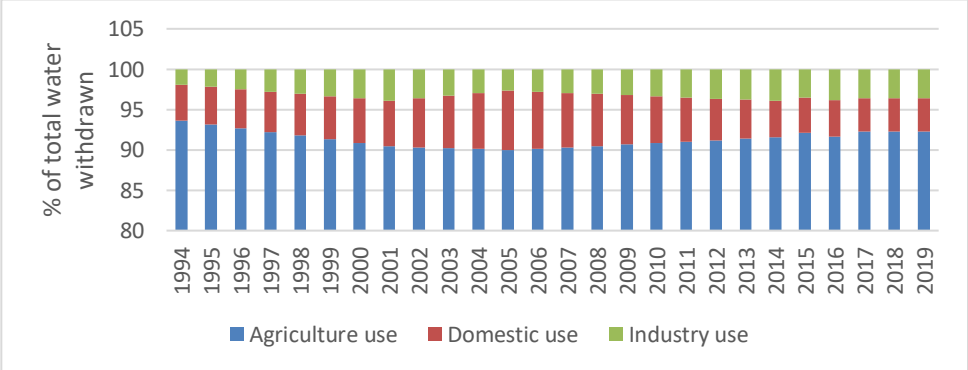
Source: World Bank, 2023; Statistics Agency 2023

Figure 4.5: Water productivity



Source: World Bank, 2023

Figure. 4.4: Freshwater use by sector



Source: World Bank, 2023

Main trends:

Forest area and stock: The forest coverage increased by 35% in 2020, compared to 1992, representing 8.4% (12 mln ha) of the land area in 2020. (Figure 4.1). The forest stock has also increased over time. The forest's volume of trees and shrubs was 76 million m^3 in 2015, Vs 70.8 million m^3 in 1990, as in figure 4.2.

Freshwater withdrawal and consumption: On average, Uzbekistan has been withdrawing 52.6 bln m^3 of freshwater per year in the last three decades to meet the country's water demand, with a sharp increase as of 2014. The increase is attributed to agriculture sector reforms in the cotton and wheat sectors that heavily rely on irrigation, accounting for a significant portion of water consumption (over 90%). The residential and industry sectors use the remaining 10%. Uzbekistan depends on two major rivers for its freshwater demand- the Amu Darya and Syr Darya, which originate from outside the country and are shared with all other Central Asian countries. Disputes often arise regarding the fair allocation of water resources among these countries, and Uzbekistan's water supply, as the downstream country, is highly affected by the water flow changes (water quantity or quality) due to climate changes and interventions in the upstream countries.

Water stress: Uzbekistan exhibits an increasing pressure on water resources illustrated by the stress level increase to 68% in 2019, compared to 53% in 1995 (Figure 4.3). The level of water withdrawals largely exceeds the renewable freshwater resource level of 16 bln m^3 per year (World Bank, 2023). The World Resource Institute (WRI) projects that Uzbekistan's water stress will remain constant through 2040 under a business-as-usual scenario [1]. The stress level is exacerbated by water loss. Up to 40% of agricultural water is lost due to outdated irrigation infrastructure [2]. Uzbekistan is implementing various measures to mitigate water stress, such as improving water management practices, implementing more efficient irrigation systems, and investing in water conservation efforts.

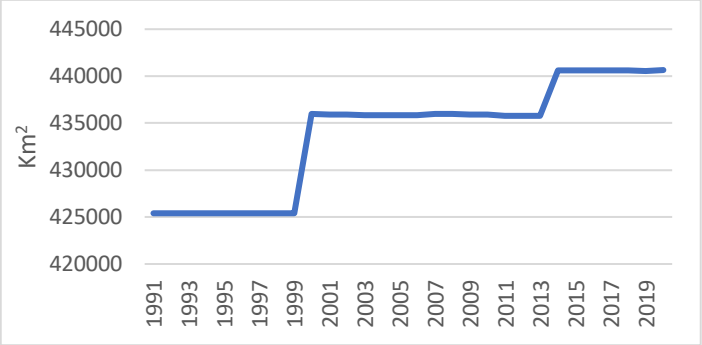
Water productivity: Water productivity improved, meaning less water consumed per unit of value produced (USD 1.8 per m^3 of water in 2019 USD vs USD 0.48 in 1994), as in Figure 4.5. The improvements can be attributed to recent policy measures implemented to strengthen water management through water associations, practice crop diversification to less water-demanding crops (like vegetables and fruits) and promote water-saving technologies and water efficiency in irrigation.

4.2 Non-renewable Resources

Indicators:

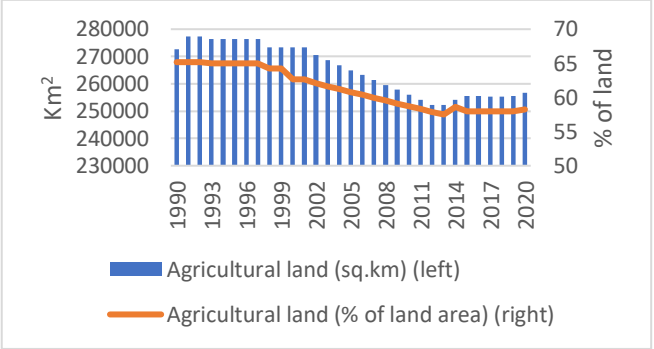
- Land area
- Agricultural land
- Cultivated land
- Natural gas and mineral resources

Figure 4.6: Land area



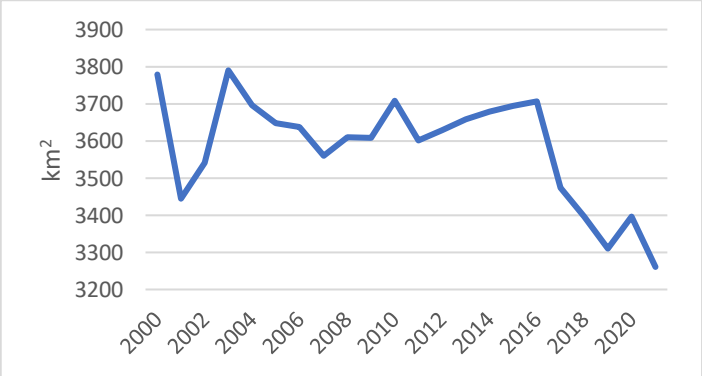
Source: Statistics Agency, 2023.

Figure 4.7: Agriculture land



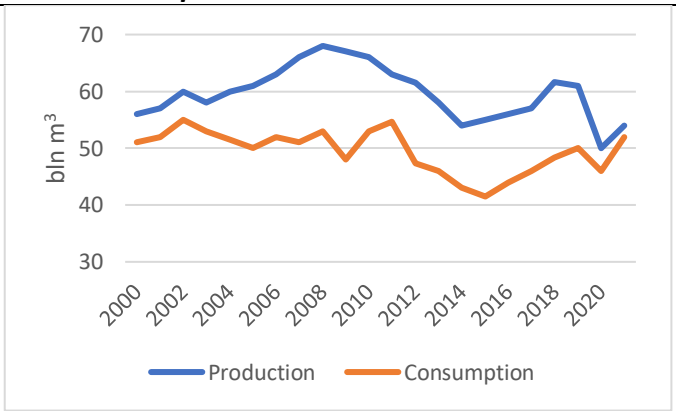
Source: World Bank, 2023.

Figure 4.8: Cultivated land area



Source: Statistics Agency, 2023 (1km^2= 100ha)

Figure 4.9: Natural gas production and consumption



Source: Statistics Agency, 2023.

Main trends:

Land area: Uzbekistan has a land area of 440,650 km^2 (44 mln ha), with an increase possibly due to the conversion of water bodies like the Aral Sea into land. The sea area, which was the fourth largest inland water in the world, declined by 85% to 10,200 km^2 in 2018, compared to 68,000 Km^2 in 1960) (Fangdi and Ronghua, 2019).

Some 30% (13 mln ha) of the country's land is severely degraded. Half of this is natural pasturelands, while 40% is land not used for agriculture, pasture, or forest (World Bank, forthcoming). A combination of water stress, soil degradation, and salinization are the leading causes of land degradation.

Agricultural land: Agricultural land (land that can be used for temporary crops, permanent crops and pastures) accounts for 58% 256 000km^2 (25.6 mln ha) of the total land area. However, its proportion declined by 11per cent points in 2020 compared to its 1991 value. The annually cultivated land (arable land for temporary crops) has declined, representing over 32,000 km^2 (3.2 mln ha) of total land in 2020, compared to 34,000 km^2 (3.4 mln ha) in 2000. The reduction aligns with the government's strategy as of 2017 to reduce irrigated cotton and wheat farms [2].

Agricultural land faces significant degradation due to unsustainable practices like inappropriate irrigation leading to salt accumulation in the surface soil. Poor pastureland and manure management and overgrazing contribute to agricultural land degradation. The World Bank Uzbekistan- Country Climate Development Report (forthcoming) estimates that the current severe land degradation cost equals 4.6% of GDP. The cost includes the loss of agriculture productivity, increased soil erosion, reduced water availability, and loss of carbon sequestration and ecosystem services.

Though organic farming areas in Uzbekistan have increased since 2010, the land coverage is negligible(Kodirkhonov et al. 2022). Uzbekistan farmers traditionally practice organic agriculture, including crop rotation, intercropping, and natural fertilizers, which help maintain soil fertility and reduce the need for synthetic pesticides. To scale up the practice, the government has initiated pilot projects in certain regions, and non-governmental organizations and international entities have provided support and assistance in promoting organic farming practices. While there is some interest and potential for organic farming practices in the country, it is not widely adopted or implemented on a large scale. In 2019, Uzbekistan had (2000 km^2) or 200 000 ha of certified organic farming areas. Yet, it is one of Central Asia's leading organic farming countries (FAO, 2020).

Natural gas and mineral resources: Uzbekistan is rich in oil, gas, coal, and uranium. It is also among the world leaders in the production and reserves of gold and copper minerals (IEA, 2020). Natural gas production declined between 2008 and 2014 and increased recently, reaching 54 bln m^3 in 2021, and the gap between production and demand increased yearly (Figure 4.9). Uzbekistan ranks 11^{th} in natural gas production and 14^{th} in reserves globally. Over 80% of the natural gas produced is domestically consumed. The WB (forthcoming) indicates that Uzbekistan

increasingly imports more natural gas during the winter, while since the early 2000s, Uzbekistan has been exporting natural gas mainly to China, Russia, and Kazakhstan. The natural gas reserves are forecasted to last for 20-30 years. Nevertheless, the government plans to ban natural gas exports by 2025 to reserve its limited gas for domestic use (WB, forthcoming).

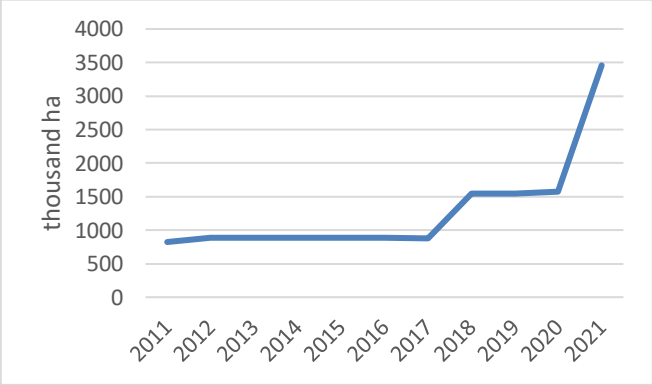
Losses in the gas sector are common, where losses arise from the difference between the volume of gas entering the transmission and distribution system and the volume sold to end-users. IEA (2022) indicates that natural gas losses (including theft) pose a significant challenge in Uzbekistan- at 2.4% of total consumption (WB, forthcoming). National statistics on gas losses are, however, not publicly available.

4.3 Biodiversity

List of indicators:

- Protected area
- Biodiversity and threatened wildlife
- Surface temperature change

Figure 4.10: Protected area



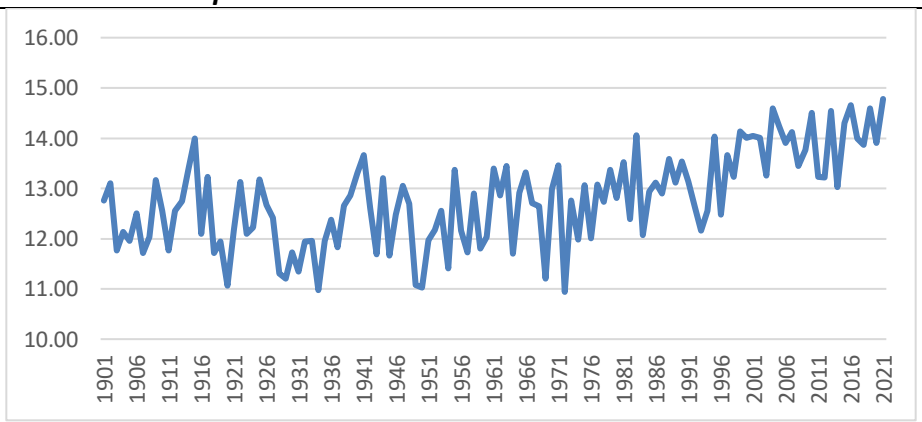
Source: Statistics Agency, 2023

Table 4.1 Threatened species

Species types	***Number of threatened species in 2018***
Bird species	19
Fish species	7
Mammal species	10
Plant species (higher)	16
Total	**52**

Source: World Bank, 2023

Figure 4.11: Annual mean temperature C°



Source: OECD, 2023

Main Trends

Protected natural areas: Uzbekistan has several protected natural areas essential for preserving biodiversity and ecosystems. As of 2021, Uzbekistan has established protected areas in eight regions, covering an area of 3,457,800 hectares (7.8% of land area) (Figure 4.10). The protected area increased as of 2017. About 75% of the protected area is in the Republic of Karakalpakstan region (Statistics Agency). The State Committee for Ecology and Environment Protection (recently named the Ministry of Natural Resources) manages the protected areas and enforces regulations.

Biodiversity and threatened species: The flora and fauna in Uzbekistan include 3 700 species of plants, 123 species of mammals, 604 species of birds, 58 species of reptiles, 20 species of amphibians, and 143 species of fish, of which 140 are endemic, and several migratory bird species, making it a popular place for birdwatchers. Some of these species are endangered (52 in total, including 29 bird species and 16 plants), as in Table 4.1, due to climate change, overgrazing, hunting, and poaching. For example, hunting and poaching have led to the decline of several mammal species, including the Bukhara deer and the Turkestan lynx (Min. of Agriculture, 2019).

Annual surface temperature changes: The surface temperature in Uzbekistan has increased by 35% (3.5 ^{o}C points) over 50 years (Figure 4.11), with an annual mean temperature of 14.8 ^{o}C in 2021, compared to 11^{o}C in 1972**.** The temperature rise has altered ecosystems, resulting in the loss of natural habitat and biodiversity- like in the Aral Sea area.

Technical comments on measurability and interpretation

Table 4.2 provides comments on the measurability, interpretation, and source of data for the indicators included in the Chapter.

Table 4.2: Measurability, interpretation, and data source on natural assets base

Indicator	Measurability and Unit of measurement	Data Source
Forest area	- Forest area (million hectares) - % forest area as a share of total land area. The indicator shows if Uzbekistan has experienced afforestation or massive deforestation over the years.	Statistics Agency
Forest stock	in millions of cubic meters (m^3). The indicator provides information about existing wood resources. The indicator also provides the basis for estimating the amount of CO_2 the forest contains. OECD has data with five years intervals	OECD
Freshwater abstraction	in billion m^3 shows the amount of freshwater Uzbekistan withdraws annually for different purposes.	World Bank
Water intensity (stress)	Water withdrawal as % of available water resources. The indicator measures Uzbekistan's water stress. The SA also reports on this indicator as part of the clean water goal.	Statistics Agency & World Bank
Water consumption by sector	% of the total freshwater withdrawal. The indicator shows which sectors of the economy consume much of the freshwater.	World Bank
Water productivity	Value added in GDP (2015 US dollar) per m^3 of abstracted water. It shows if the country is efficiently using its water resources.	World Bank
Land area	Area in Km^2. The indicator measures the inhabitable area of the country, including the agriculture and forest area.	Statistics Agency
Agriculture land	% of land area in Km^2, it measures the land area that can be used for agricultural purposes (both crop & pasture)	WB & FAO
Protected area	Area (ha) and % land area protected from open access	Statistics Agency
Threatened wildlife	Species (mammal, bird, fish, plant) threat status, in the number of species assessed or known	World Bank
Annual surface temperature change	Changes in annual mean surface temperature (°C)	OECD

Definition

Land area: the FAO and WB databases define a land area as a country's area, excluding area under inland water bodies (rivers and lakes). Uzbekistan follows a similar definition as the WB. Land resources are critical for food production, biodiversity conservation, and carbon sequestration. Land includes natural and semi-natural vegetated land, bare land, cropland and artificial(built-up) surfaces.

Agriculture land: refers to the share of land area that is arable (temporary crops), under permanent crops and permanent pastures (WB).

Cultivated(arable) land: part of the agricultural land that is cultivated annually (arable land) for growingfood and feed.

Forest area: is the total land area covered by forest. Forest resources are essential in regulating climate, protecting biodiversity, and providing ecosystem services.

Forest stock: this is a stock of standing trees in forest areas with a certain diameter at breast height, measured in cubic meters (m^3) (FAO). It is the volume over the bark of all living trees with a minimumdiameter of 10 cm at breast height, including the stem from ground level up to a top diameter of0 cm (excluding branches) (OECD). Here the report used OECD definition.

Renewable freshwater resources flow: refers to internal river flows and groundwater from rainfall in the country. These are permanent and seasonal surface water, including inflows from neighbouring countries.

Water consumption: measures freshwater withdrawal by all major sectors (agriculture, domestic use, and industry) as a proportion of available freshwater resources.

Water stress: also known as water withdrawal intensity. The level of water stress can show the degree to which the country exploits its water resources to meet the water demand.

Water productivity: measures how much output is produced per unit of freshwater withdrawn.

Protected areas: include national parks, nature reserves, and wildlife sanctuaries designated by national authorities as scientific reserves with limited public access.

Threatened species: are critically endangered and vulnerable species. i.e. those plants and animals in danger of extinction or soon likely to be.

Notes

[1] World Resources Institute (WRI) Water Stress by Country. See https://www.wri.org/data/water-stress-country

[2] Decree of the President of the Republic of Uzbekistan, 23.10.2019 no. up-5853 on approval of the strategy for the development of agriculture of the Republic of Uzbekistan for 2020-2030. See https://lex.uz/ru/docs/4567337

References

Fangdi Sun & Ronghua Ma (2019) Hydrologic changes of Aral Sea: A reveal by the combination of radar altimeter data and optical images, Annals of GIS, 25:3, 247-261, DOI: 10.1080/19475683.2019.1626909

Food and Agriculture Organization of the United Nations (2020). FAOSTAT: Organic Agriculture. Retrieved from http://www.fao.org/faostat/en/#data/OG

Kodirkhonov, B., Uljabaev, J, & Kholdorov, S. 2022. Organic agriculture in Uzbekistan: SWOT analysis B M IOP Conf. Ser.: Earth Environ. Sci. 979 012140. doi:10.1088/1755-1315/979/1/012140

Ministry of Agriculture of Uzbekistan (2019). Protected Natural Areas of Uzbekistan. See: https://uzbekistanembassy.in/docs/Protected_Natural_Areas_of_Uzbekistan.pdf

World Bank (WB) (2011). Policy dialogues Session 8, 09.12.2021. Building climate resilience through cross-cutting measures: sustainable and efficient use of natural resources. Tashkent.

WB (forthcoming). Uzbekistan Country Climate Development Report. Tashkent

List of reference for charts

OECD. (2023). Annual mean temperature. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Forest Stock. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Information on the land area of the Republic of Uzbekistan. *Stat.uz*. Available from https://stat.uz/en/official-statistics/demography.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Natural gas production and consumption. Available at: https://stat.uz/en/official-statistics/industry.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Forestry area. *Stat.uz*. Available from https://stat.uz/en/official-statistics/environment.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Water stress . *Stat.uz*. Available from https://nsdg.stat.uz/en/goal/9

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Protected natural areas. *Stat.uz*. Available from https://stat.uz/en/official-statistics/ecology .

World Bank. (2023). Agricultural land (% of land area) - Uzbekistan | Data. *data.worldbank.org*. Available from https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?locations=UZ.

World Bank. (2023). Agricultural land (sq. km) - Uzbekistan. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/AG.LND.AGRI.K2?locations=UZ.

World Bank. (2023). Annual freshwater withdrawals, agriculture (% of total freshwater withdrawal) - Uzbekistan. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/ER.H2O.FWAG.ZS?locations=UZ.

World Bank. (2023). Annual freshwater withdrawals, domestic (% of total freshwater withdrawal) - Uzbekistan. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/ER.H2O.FWDM.ZS?locations=UZ.

World Bank. (2023). Annual freshwater withdrawals, industry (% of total freshwater withdrawal) - Uzbekistan. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/ER.H2O.FWIN.ZS?locations=UZ.

World Bank. (2023). Annual freshwater withdrawals, total (billion cubic meters) - Uzbekistan. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/ER.H2O.FWTL.K3?locations=UZ.

World Bank. (2023). Forest area (% of land area) - Uzbekistan | Data. *data.worldbank.org*. Available from https://data.worldbank.org/indicator/AG.LND.FRST.ZS?locations=UZ.

World Bank. (2023). Level of water stress: freshwater withdrawal as a proportion of available freshwater resources - Uzbekistan. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/ER.H2O.FWST.ZS?locations=UZ.

World Bank. (2023). Water productivity, total (constant 2015 US$ GDP per cubic meter of total freshwater withdrawal) - Uzbekistan. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/ER.GDP.FWTL.M3.KD?locations=UZ.

World Bank. (2023). Fertilizer Consumption Fertilizer consumption (kilograms per hectare of arable land) - Uzbekistan, World | Data (worldbank.org)

CHAPTER 5: The Environmental Dimension of Quality of Life

The environmental dimension of quality of life is essential to the green economy transition in Uzbekistan. This chapter covers the indicators that reflect how environmental conditions and risks interact with people's quality of life and well-being. The chapter explores whether green growth generates improved quality of life for people in Uzbekistan. The indicators are grouped into two themes:

- Environmental health risks and economic cost
- Environmental services

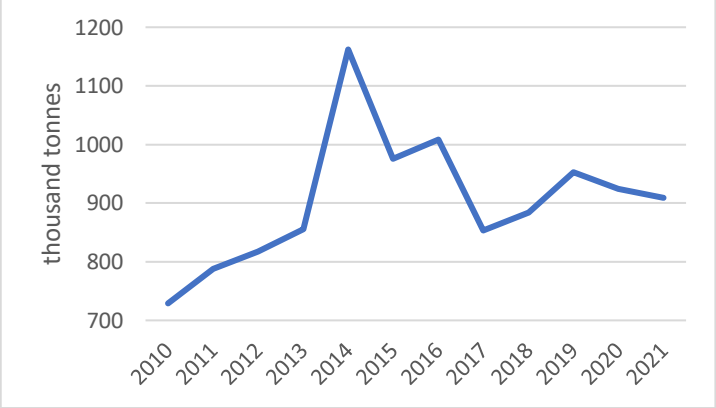
The Statistics Agency publishes statistics on the volume of air pollution and causes of death, including respiratory problems. As part of the SDG monitoring, it also provides data on environmental services, including access to safe drinking water and sewerage services. However, the Agency does not disaggregate pollutant types, measure PM concentration, or estimate the welfare and economic costs of population exposure to environmental risks. Monitoring PM is crucial as it is proven to contribute to health problems and thus to issue health advisories to the population when PM levels are unhealthy. The chapter complements the quality-of-life indicators with statistics from the OECD dataset.

5.1 Environmental Health Risks and Costs

List of indicators:

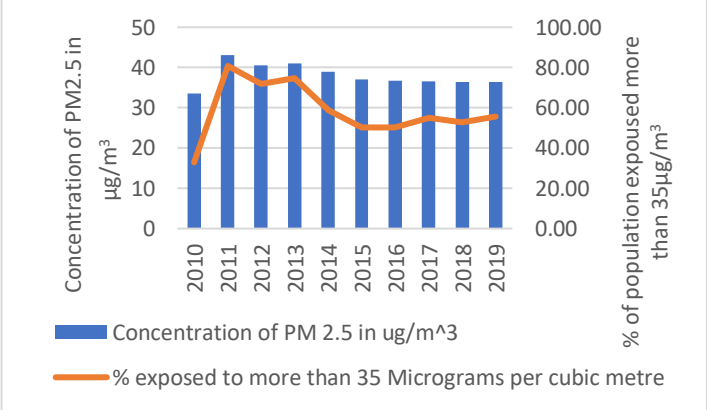
- Air pollution
- Annual mean concentration of particulate matter (PM)
- Population exposure to $PM_{2.5}$
- Death due to respiratory diseases
- Mortality and costs of exposure to $PM_{2.5}$
- Mortality and costs of exposure to Ozone gas
- Mortality and cost of exposure to lead gas

Figure 5.1: Air pollution



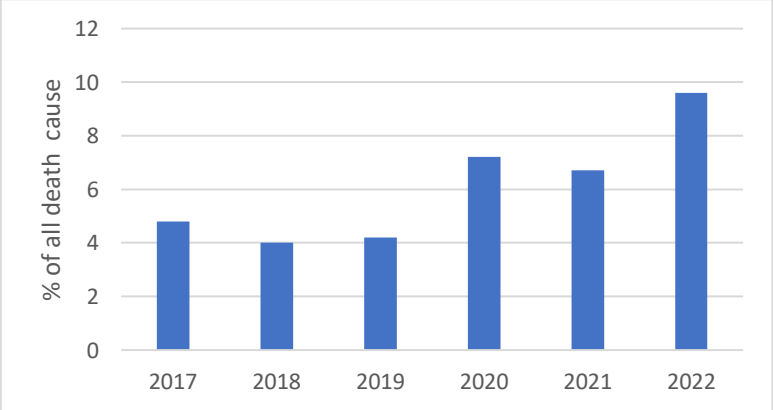
Source: Statistics Agency, 2023.

Figure 5.2: Annual mean concentration of PM (left), and population exposure to PM 2.5(right)



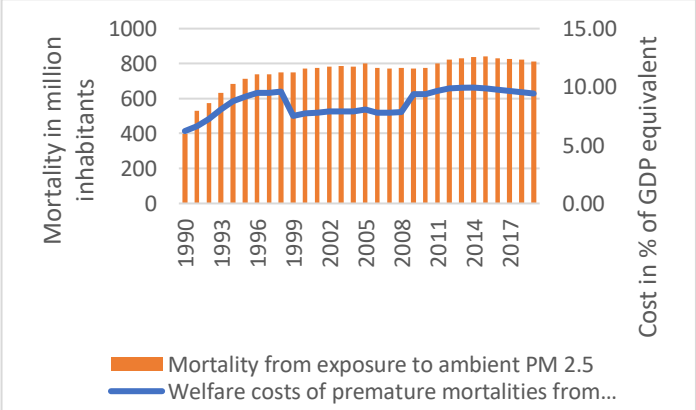
Source: OECD, 2023.

Figure 5.3: Death due to respiratory disease



Source: Statistics Agency, 2023.

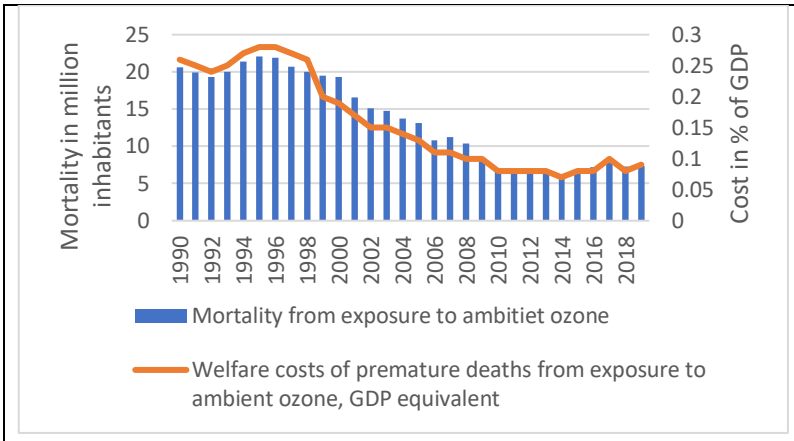
Figure 5.4: Mortality (left) and costs of exposure to $PM_{2.5}$ (right)



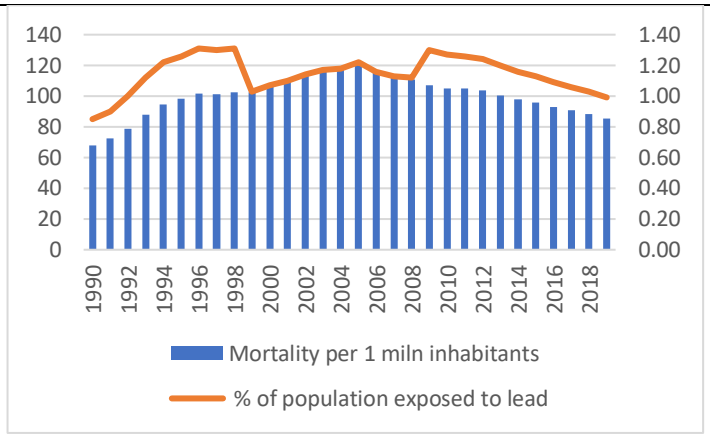
Source: OECD, 2023.

Figure 5.5: Mortality (left) and cost (right) of exposure to Ozone (O3)

Figure 5.6: Mortality (left) and cost (right) of exposure to lead gas



Source: OECD, 2023.



Source: OECD, 2023.

Main trends

Air pollution & $PM_{2.5}$ concentration: Air pollution is increasing in Uzbekistan making it one of the most polluted countries in the world. The air pollution in terms of volume of pollutants reached its annual maximum in 2014 and is declining (Figure 5.1). It had 909 thousand tonnes of air pollutants in the air in 2021. Nevertheless, the concentration of fine particulate matter ($PM_{2.5}$), which is a health concern, exceeded and stabilized above the 35 µg/m^3 level considered unhealthy by the World Health Organization (WHO) over the past decade (in Figure 5.2). The major components of PM are sulphates, nitrates, ammonia, sodium chloride, black carbon, mineral dust, and water.

The WHO global Air Quality Guidelines (AQG) provide interim targets to promote a gradual shift from high to lower concentrations. According to the AQG, the level of $PM_{2.5}$ concentration in the air is ranged to four interim targets for reaching a healthy level: 35 µg/m^3 (target level 1), 25 µg/m^3 (target level 2), 15 µg/m^3 (target level 3), 10 µg/m^3 (target level 4). The ultimate target level of $PM_{2.5}$ concentration in the air is 5, according to WHO AQG [1].

Daily measures of air quality are published by the xxxx

In 2021, Tashkent City had the 10th worst air quality worldwide in average annual PM2.5 concentrations, while Uzbekistan was ranked 12th worst (Green World Future, 2021). Uzbekistan was the second most polluted Central Asian country in 2019, next to Kyrgyzstan [2]. Most air pollution issues in the country are attributed to the Aral Sea desertification and dust storms carrying iron oxide and other toxic particulate matter. The Ministry of Ecology, Environment Protection and Climate Change attributes the air pollution in Tashkent primarily due to vehicle use which constituted around 60% in 2021 (Eurasianet, 2022).

Population exposure to air pollution by $PM_{2.5}$, mortality, and economic cost: Although declining, over half of the Uzbekistan population has been exposed daily to unhealthy $PM_{2.5}$ concentrations above 35µg/m^3 since 2011 (Figure 5.2). This is five times higher than the world average 10% of the population (OECD). Over 750 people in one million inhabitants died annually in Uzbekistan over the

last 30 years due to exposure to $PM_{2.5}$ (Figure 5.4), compared to 645 for the world average in 2019. Economic cost due to exposure to $PM_{2.5}$ represents, on average 8.7% of GDP equivalent for Uzbekistan vs 6.4% for EECCA region in 2019.

In 2022, official statistics show that almost 10% of deaths were caused byrespiratory diseases (Figure 5.3). Instances of chronic bronchitis in the Karakalpakstan region (an arid area near the Aral Sea) are 2.5-3 times higher than in the rest of the country (IQAIR, 2021). Deaths related to outdoor air pollution in Uzbekistan are the third highest globally (US Embassy in Uzbekistan, 2019).

Mortality due to exposure to environmental hazards and annual welfare cost: Mortality due to exposure to ozone pollution in Uzbekistan decreased during 1990 – 2019 (Figure 5.5). Exposure to ozone caused seven deaths in million inhabitants in 2019, compared to 21 in 1990. The annual welfare cost due to Ozone exposure was 0.09% of the GDP equivalent in 2019, compared to 0.26% in 1990(figure 5.5). Similarly, on average, during 1990–2019, 100 people per million inhabitants died annually in Uzbekistan due to lead poisoning (Figure 5.6). The economic loss due to lead poisoning was, on average, equivalent to 1.2% of the GDP.

Technical comments on measurability and interpretation

Table 5.1 provides comments on the measurability, interpretation, and source of data for the indicators included in the theme.

Table 5.1. Measurability, interpretation, and data source

Indicators	Measurability and Measurement unit	Data Source
Air pollution by fine PM	The SA of Uzbekistan provides measures of air pollution in tonnes of pollutants in the air.	Statistics Agency
Air pollution concentration	The standard measure of air pollution computes the mean annual concentration of fine suspended particles of less than 2.5 microns in diameter ($PM_{2.5}$). The concentration of pollutants is expressed in micrograms per cubic meter of air (µg per m^3)- a unit of air pollution measurement. The public health standard (daily average concentration) is 35µg/m^3 of air [1].	OECD
Population exposure to PM ($PM_{2.5}$)	% of the population exposed to air pollution above the daily average concentration of 35µg/m^3 of air	OECD
Death due to respiratory diseases	In % of all deaths. The SA has published this indicator since 2017.	Statistics Agency
Mortality due to exposure to PM	Mortality (in deaths per million inhabitants)	OECD

Economic loss due to exposure to PM	Welfare costs from exposure to risks expressed in GDP equivalent percentage points).	OECD
Mortality due to population exposure to Ozone gas	Mortality from exposure to Ozone (in deaths per million inhabitants). The indicator monitors the mortality induced by exposure to Ozone Exposure to Ozone gas pollution causes lung problems and premature death. Outdoor workers in areas with high ozone levels are at the most risk.	OECD
Economic losses due to population exposure to ozone gas	-Welfare costs due to exposure to Ozone (GDP equivalent % points)	OECD
Mortality due to population exposure to lead gas	-mortality from exposure (in deaths per million inhabitants). Humans may be exposed to lead by eating and drinking food or water contained with lead (mostly occurs in industry sectors).	OECD
Economic loss due to exposure to lead gas	Welfare costs from exposure (GDP equivalent % points).	OECD

Definition

Population exposure to air pollution by fine particulate matter: the proportion of the population exposed to outdoor air pollution concentration of average annual particulates smaller than 2.5 microns in diameter ($PM_{2.5}$) to which a typical resident is exposed throughout a year (derived from satellite observation or ground monitoring and measured in micrograms per cubic meter ($\mu g/m^3$). This report shows the proportion of the population living in areas with annual concentrations exceeding the value of 35 $\mu g/m^3$.

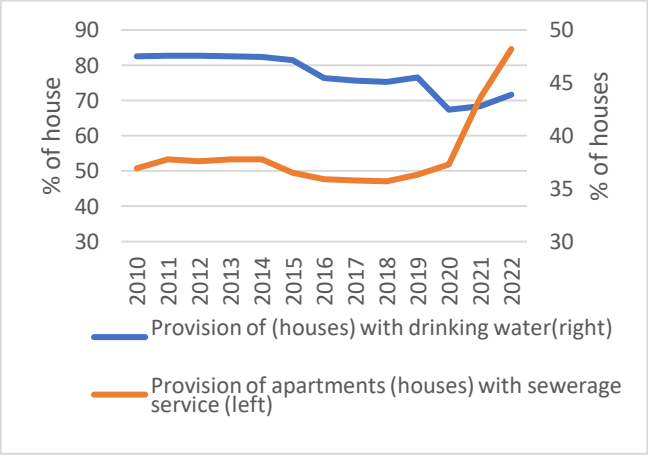
Particulate matter (PM): air pollutants that contain microscopic solids or liquid droplets that can be inhaled and cause serious health problems and premature death. Some PMs (less than 10 micrometres in diameter) can enter the human lungs and the bloodstream. The report captures data on fine particles less than 2.5 micrometres in diameter ($PM_{2.5}$) that pose the most significant health risk.

5.2 Environmental Services

Indicators

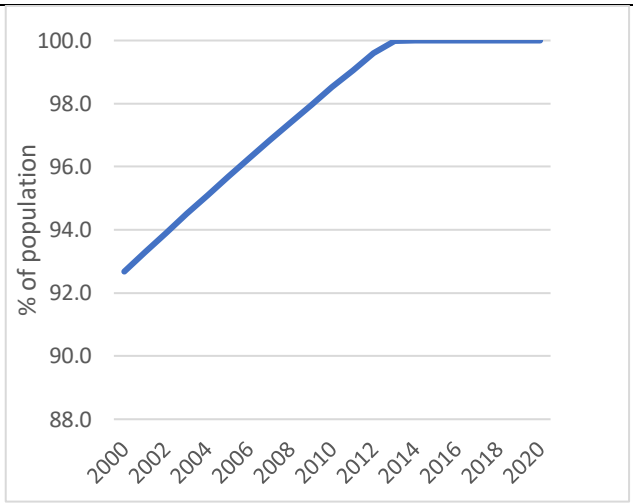
- Population with access to safe drinking water
- Population with access to a sewerage system
- Population with access to sanitation

Figure 5.7: Access to safe drinking water & sewerage service



Source: Statistics Agency, 2023.

Figure 5.8: Population with access to sanitation



Source: World Bank, 2023

Table 5.2: Access to drinking water & sewerage service (% of HHs), 2021, by region

Access by region and total	*Access to drinking water (% of houses)*	*Access to sewerage (% of houses)*
Republic of Uzbekistan	**68.3**	**43.6**
Republic of Karakalpakstan	57.5	15.6
Andijan	77.3	28.5
Bukhara	50.9	27
Jizzakh	63.2	28.5
Kashkadarya	35.8	22.5
Navoi	72.5	36.5
Namangan	85.5	40.7
Samarkand	63.7	42.2
Surkhandarya	78.4	35.4
Syrdarya	84	36.8
Tashkent	75.4	63.8
Fergana	68.7	52.7
Khorezm	40.6	29
Tashkent city	97.2	100

Source: Statistics Agency, 2023

Main trends

Access to safe drinking water: In 2022, 72% of Uzbekistan households were provided with safe drinking water (Figure 5.7). The proportion declined from 82.5% in 2010, mainly due to outdated water supply infrastructure, stagnating and declining the water services (World Bank, 2022). The proportion of people using safely managed drinking water is less than the world average and there is high inequality between cities and rural areas. While over 97% of Tashkent city houses have access to drinking water, in rural areas it is still a challenge (Table 5.2)[2]. Access to safe water is defined as the share of the population/houses using drinking water from an improved source that is accessible on premises, available when needed and which is free from faecal and other chemicals [3].

Access to sanitation: As early as 2014, all (100%) of Uzbekistan's population had access to improved sanitation, showing progress from 93% in 2000 (Figure 5.9). Thus, the country has achieved the 2030 SDG towards universal access to safe sanitation. By the end of 2020, 58.83% of Uzbekistan's population had access to clean water, which is 0.01% decline compared to 2019[4].

Access to sewerage system: According to the Statistics Agency (2021) [5], about 44% of the residential sector (apartments and houses, mostly in cities) have access to sewerage systems (Table 5.2). There is inequality between cities/regions in this regard. While all residents in Tashkent City are connected to a sewerage treatment system, in Karakalpakstan, only 16% of households are connected to it. The World Bank report (2022) indicates that most households in rural areas have self-built on-site sanitation - dry pit latrines or septic tanks with onsite disposal. Moreover, collected wastewater is not treated according to international standards.

Technical comments on measurability and interpretation

Table 5.3 provides comments on the measurability, interpretation, and source of data for the indicators included in the theme.

Table 5.3: Measurability, interpretation, and data source

Indicator	Measurability and Unit of measurement	Data Source
Access to drinking water	It measures the proportion (%) of households with access to safe drinking water sources. Access to safe drinking water constitutes a key component in measuring the environmental quality of life. The SA collects data on % of houses with access to safe drinking water as part of the SDG monitoring.	Statistics Agency
Access to sewerage systems	-% of the HHs connected to sewerage treatment. The SA collects data on this indicator.	Statistics Agency

Access to sanitation	-% of the population using improved sanitation facilities This indicator on sanitation measures the proportion of the population with access to basic sanitation services not shared with other households.	World Bank

Definition

Population access to sewerage treatment: the population is connected to an urban wastewater collecting system through public sewerage network). Individual private treatment facilities such as septic tanks are not covered.

Population using improved sanitation: these are households with basic handwashing facilities and toilets, including flush or pour-flush toilets to sewerage systems, septic tanks, or pit latrines, ventilated improved pit latrines, pit latrines with a slab, and composting toilets.

Population with access to safe drinking water: Households using improved drinking water sources. Improved drinking water sources include piped water into dwellings, yards or plots, publictaps or standpipes, boreholes, or tube wells, protected dug wells, protected springs, packaged water, delivered water and rainwater. Improved water sources should be located on the premises, available when needed, and contamination-free.

Notes

[1] WHO AQG available at: https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health?gclid=CjwKCAjwkeqkBhAnEiwA5U-uM8k3kA864cfPDB9gNrxaps2JNqdJyYQtWSRvZ9432VyvDf_MZ-_0zRoCKSsQAvD_BwE

[2] See on $PM_{2.5}$ and risks at www.health.ny.gov/environmental/indoors/air/pmq_a.htm
depts.washington.edu/wildfire/resources/particles.pdf

[3] See data on drinking water at Environment (stat.uz)

[4] Improved water sources include piped water, boreholes or tube , protected dug wells, protected springs, and packaged or delivered water.

[5] Source: https://www.macrotrends.net/countries/UZB/uzbekistan/clean-water-access-statistics

[6] See the SDG report on sewerage at https://w3.unece.org/SDG/en/Indicator?id=52.

Reference

Eurasianet. (2022). Uzbekistan: Tashkent bemoans worsening pollution. Retrieved from: https://eurasianet.org/uzbeki stan-tashkent-bemoans-worsening-pollution

Green World Future. (2021). «НАЦИОНАЛЬНЫЙ ПЛАН ДЕЙСТВИЙ: ПО ПРЕДУПРЕЖДЕНИЮ ИСМЯГЧЕНИЮПОСЛЕДСТВИЙ ПЕСЧАНЫХ И ПЫЛЬНЫХ БУРЬ (ППБ) В РЕСПУБЛИКЕ УЗБЕКИСТАН НА 2021–2024 годы». Tashkent.

IQAIR. (2021). World Air Quality Report: Region & City PM2.5 Ranking.

U.S. Embassy in Uzbekistan (2019). Let's take a breather: The importance of air quality for Health, the Economy, and the Environment. Retrieved from: https://uz.usembassy.gov/lets-take-a-breather-the-importance-of-air-quality-for-health-the economy-and-the-environment/

World Bank (2022). Uzbekistan Public Expenditure Review. Better Value for Money inHuman Capital and Water Infrastructure. World Bank, Washington D.C.

List of Reference for Charts

OECD. (2023). Mortality per one mln inhabitants. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Mortality from exposure to ambient ozone. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Mortality from exposure to ambient PM2.5. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Mortality from exposure to lead. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Percentage of population exposed to more than 35 micrograms/m3. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Welfare costs of premature deaths from exposure to ambient ozone, GDP equivalent. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Welfare costs of premature mortalities from exposure to ambient PM2.5, GDP equivalent. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Mean population exposure to PM2.5. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Death due to respiratory disease. *Stat.uz*. Available from https://stat.uz/en/official-statistics/demography.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Proportion of houses provided with safe drinking water services. *Stat.uz*. Available from. Environment (stat.uz)

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Pollutants emitted into the atmosphere. *Stat.uz*. Available from https://stat.uz/en/official-statistics/ecology.

STATISTICS AGENCY UNDER THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. (2023). Provision of apartments (houses) with sewerage service. *Stat.uz*. Available from https://stat.uz/en/official-statistics/environment.

World Bank. (2023). People using at least basic sanitation services (% of the population) - Uzbekistan. *World Bank Open Data*. Available from https://data.worldbank.org/indicator/SH.STA.BASS.ZS?locations=UZ.

CHAPTER 6: Economic Opportunities and Policy Responses

This chapter analyses the indicators that capture the economic opportunities associated with green growth. It explores Uzbekistan's investments in the transition to a green economy and the economic opportunities and benefits green growth generates.

The indicators in the chapter measure innovations in the green economy/environment, expenditures for environmental protection, end-user prices and energy revenues and subsidies. The chapter also shows policy effectiveness in green technology and innovation, environment investment and financing, prices, taxes, and financial transfers. The indicators are grouped into three themes:

- Technology and innovations of relevance in green growth
- Financial flows in green growth priorities of Uzbekistan
- Prices and transfers of relevance in green growth

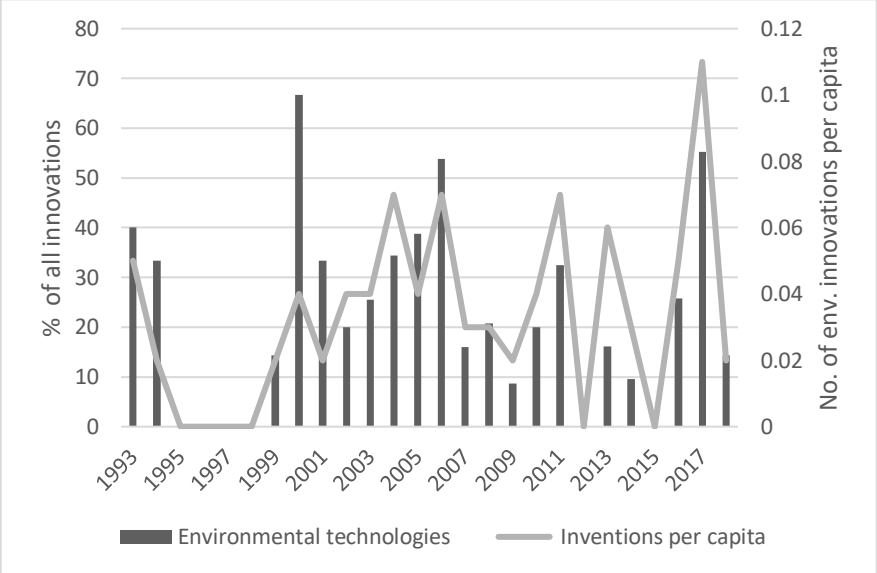
National nor international data on value-added and employment (green jobs) in environmental goods and services sectors are lacking for Uzbekistan, hence not included. The Statistics Agency does not collect data on economic opportunities from ecosystem services. It, however, provides data on expenditure on SDG 13. Different government bodies collect data on environmental revenues, energy subsidies and resource pricing; thus, data is fragmented and mostly outdated. Here, statistics on environmental innovations are complemented by the OECD.stat.

6.1 Technology and Innovations

Indicators:

- Proportion of environmental innovations out of total innovations
- Number of environmental Innovations per capita

Figure 6.1: Environment-related innovations (left) and Innovations per capita (right)



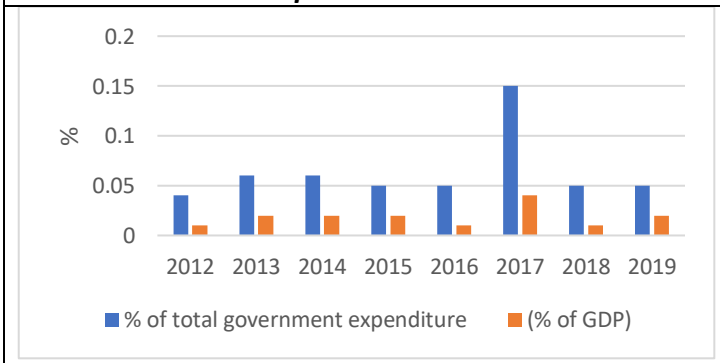
Source: OECD, 2023

6.2 Financial flows

List of indicators:

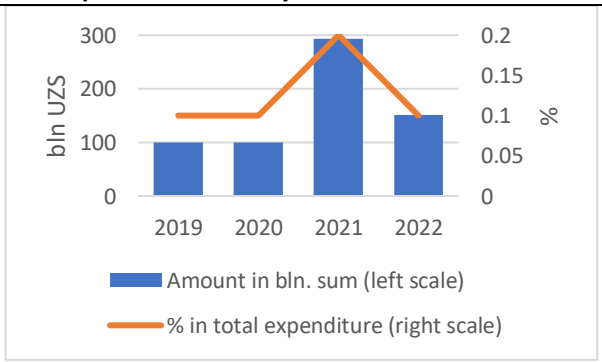
- Public expenditure in environmental protection
- Public expenditure in SDG 13 (climate action)
- International financial flow for green growth

Figure 6.2: Public expenditures in environmental protection



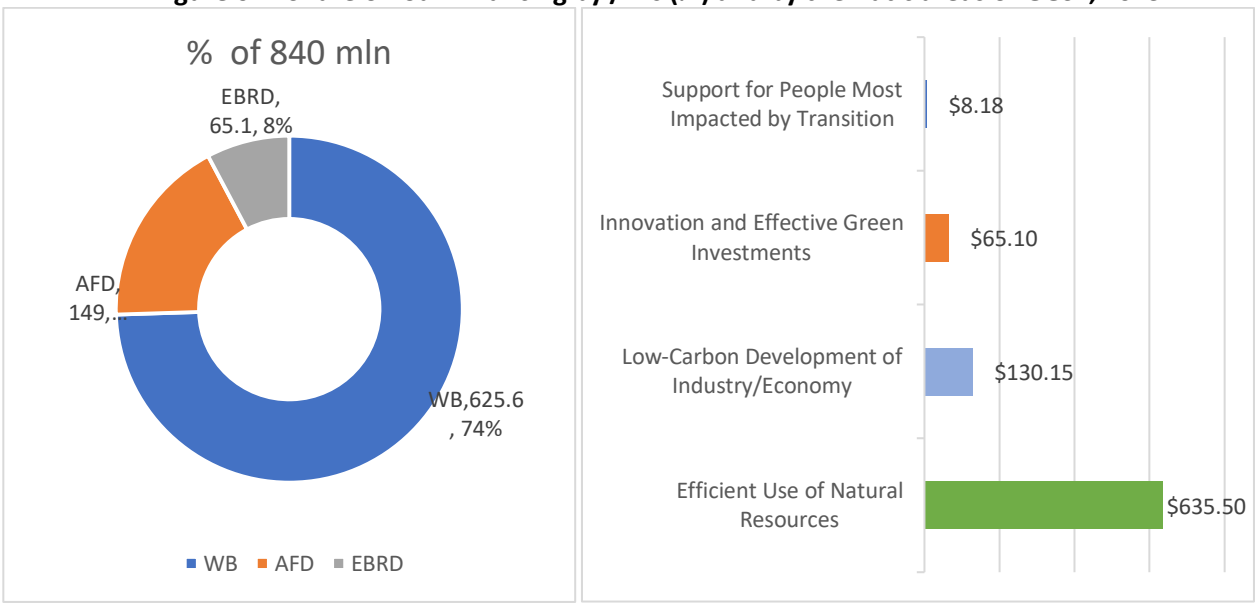
Source: State Committee for Ecology and Environmental Protection (SCEEP), 2023

Figure 6.3: Public expenditure in SDG 13 (Climate Action)



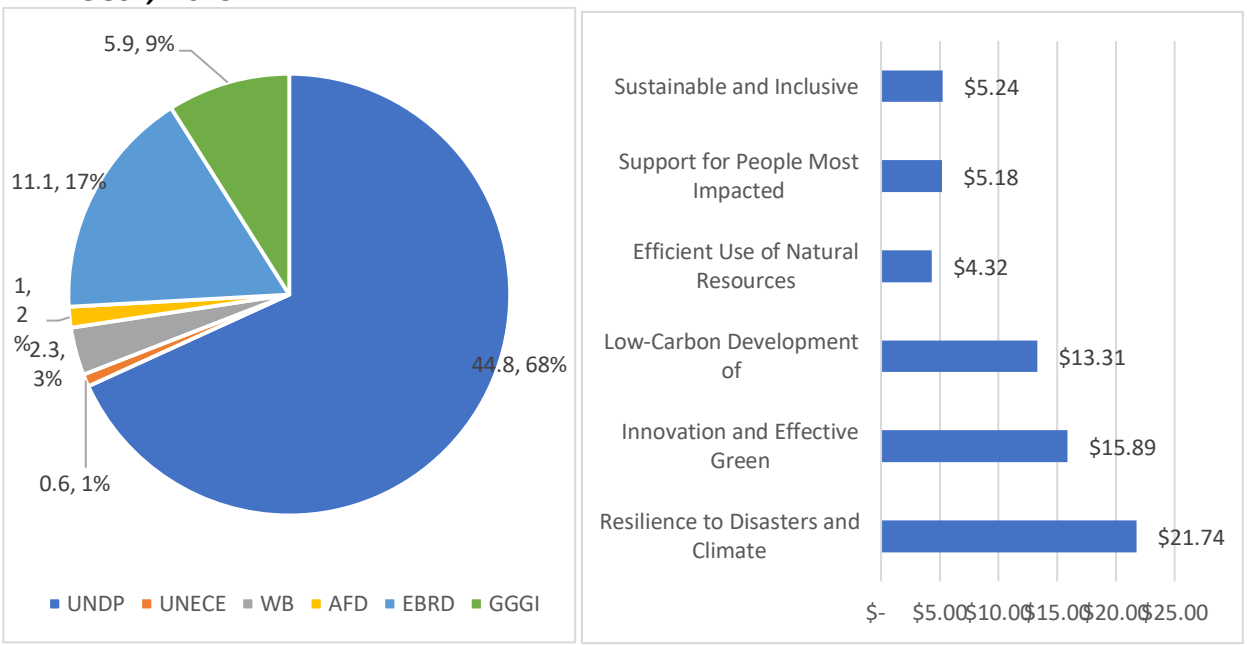
Source: MoF- Uzbekistan Citizen Budget, 2022

Figure 6.4: Share of loan financing by /IFIs (%) and by thematic areas of GGSF, 2023



Source: UNDP presentation at donor working group meeting on May 3, 2023.

Figure 6.5: Share of grant financing by DPS (in % of USD 66 mln) and by thematic areas of GGSF, 2023



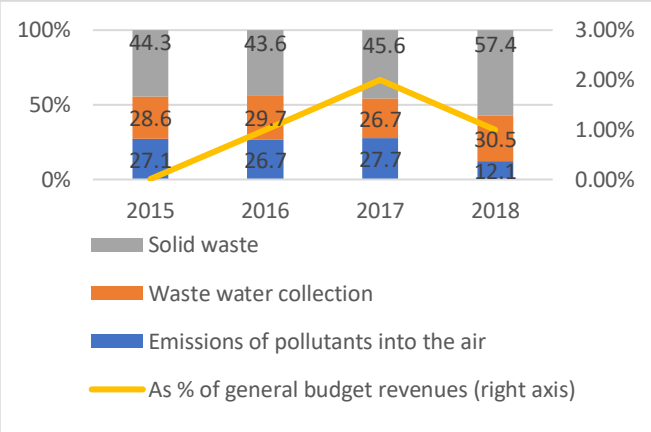
Source: UNDP presentation at donor working group meeting on May 3, 2023.

6.3 Prices and Transfers

Indicators:

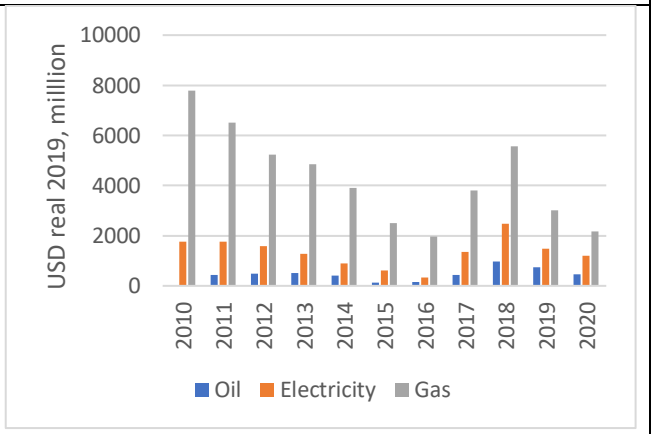
- Environmental revenues from pollution tax
- Environmental subsidies
- Energy pricing
- Water pricing

Figure 6.6: Revenues from environmental pollution tax out of total receipts



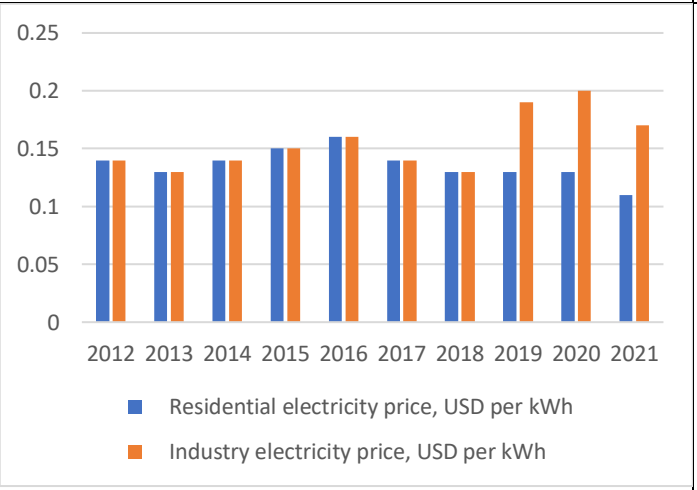
Source: SCEEP, 2023

Figure 6.7: Energy subsidies



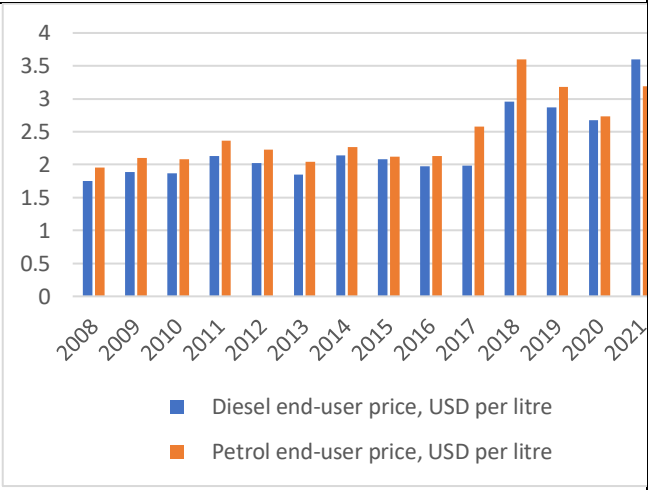
Source: International Energy Agency (2021), Fossil Fuels Subsidies Database

Figure 6.8: Price of electricity



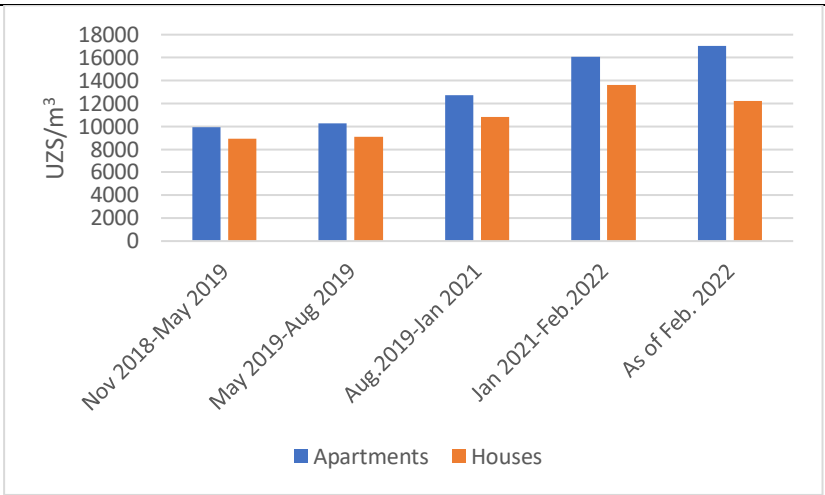
Source: OECD, 2023.

Figure 6.9: Price of diesel and petrol fuel



Source: OECD, 2023.

Figure 6.10: Water tariff per month in Tashkent



Source: Uzsuvtaminot, 2023 [1]

Main trends:

Environment-related innovations: Though no recent data is available (in the last five years) on environmentally friendly technologies (figure 6.1), the previous trend shows that Uzbekistan started investing in environmental technologies in the early 1990s. The lack of data does not allow the report to describe the current situation. Over 15% of the innovations in Uzbekistan in 2018 were environment-related (higher than the world's 10%); this was 0.02 technologies per capita (while the world average was 4.9 per capita. Uzbekistan contributed to 0.01% of world environment-related inventions/technologies in 2017 (OECD). There has been no available data since then.

Public expenditures in environmental protection: Environmental expenditure is generally increasing. On average, environmental expenditure accounted for only 0.06% of total government expenditures or 0.02% of GDP in 2012–2019 (Figure 6.2). The value can be underestimated as Uzbekistan lacks systematic budget tagging/marking for 'green' expenditures and revenues and thus makes it hard to assess all the investments in the transition to a green economy.

The government has started providing information on budget expenditures as a breakdown of SDG finance, which shows an upward trend in the budget allocated for SDG 13 (Climate Action) (Figure 6.3). However, investment dropped and was only 0.1% of the total in 2022, mainly due to increased post-COVID recovery policy expenditures [2].

International financial flows to green growth: Uzbekistan attracts modest and increasing green growth finance through grants and loans from multilateral institutions and the UN (Figures 6.4 and 6.5). By 2023, Uzbekistan mobilized USD 840 mln in loans and USD 66 mln in grants from International Financial Institutions (IFIs) and development partners to support the green growth strategic priorities. As part of the national Green Economy transition Strategy to 2030, Uzbekistan has started the implementation of blended finance to establish special funds and green bonds to unlock green investments, both from public and private sources. The country also mobilizes investment in

renewable power generation in the framework of public-private collaboration, although it does not currently participate in a competitive carbon trading market.

Environmental revenue (pollution fees): The revenues from pollution fees have increased, amounting to UZS 14.1 bln (USD 1.75 mln per person) in 2018, compared to UZS 3.2 bln in 2010. The significant increase in revenues (Figure 6.6) reflects the cumulative effect of speeding economic activity, consequently increasing emissions and discharges of pollutants, and a doubling of tax rates/fees in 2017 when revenues increased by 56% compared to 2016. The report cannot assess the recent trends due to a lack of access to up-to-date data.

The aggregate annual volume of revenues from pollutant fees averaged about 0.01% of the total general budget for 2015-2018. The fee generated from solid waste was the main source of revenue (more than 40%) over the observed years. In 2018, the share of solid waste fees in total revenue increased to about 57%, compared to 30% of revenue from taxes on polluted wastewater discharges. Since the environmental revenues are channeled to the general government budget, it is difficult to see how specifically these revenues are spent for environmental protection or other purposes.

Except for the pollution fees data recorded by the State Committee for Ecology (now named Ministry of Ecology), Uzbekistan does not aggregate all classical green tax revenues like energy tax, resource tax and transport tax in the budget revenue, nor is there data on non-tax revenues generated from license fees and administrative charges. Hence it is difficult to measure the revenues from all environmental taxes. Uzbekistan's GGSF action plan envisages preparing a regulatory legal act providing for the full implementation of the "polluter pays" principle, as well as improving the system of fees for environmental pollution by increasing the established rate of payment for pollution and expansion of the list of pollutants by 1 July 2023.

Environment-related subsidies: Energy subsidies are gradually declining. In 2020, Uzbekistan's subsidies for fossil fuels amounted to USD 3.8 bln (6.6% of the GDP) and were reduced by 60% of the 2010 level (Figure 6.7). By 2016, total subsidies for oil, gas and fossil-fuelled electricity generation declined by 75% from 2010. The value, however, roughly doubled in 2019 before declining again in 2020 [3].

Uzbekistan's energy sector aims to phase out the fossil fuel subsidies gradually. In the transition, the government introduced a large-scale implementation of an energy transition tax credit mechanism to serve as a stimulating instrument for investing in green energy by consumers. The investment incentive is expected to encourage the use of renewable energy and energy-efficient technologies.

Energy pricing: The price for electricity increased and was 0.17 USD/ kWh for commercial use, while it was 0.11 USD /kWh for residential use in 2021 as in Figure 6.8. The electricity tariff trend shows that there was a single tariff in Uzbekistan for all consumer categories before 2017. As of 2019, Uzbekistan set different tariffs for different categories of consumers. The tariff for commercial consumers was 30% to 50% more than residential use tariffs. The government policy [4] specified that a gradual transition would be made on electricity tariffs by 2023. The tariff policy also states that the profitability

should be a minimum of 10% but a maximum of 20% [5]. As of 2023 the policy indicates that the population will pay for electricity depending on the time of the day they used electricity.

In 2021, on average, the price of diesel doubled, while the price of petrol increased by 63% compared to the 2008 price, as in Figure 6.9.

Water pricing*:* The price for water use increased. Tariffs of cold water in Tashkent in Feb. 2022 was 17,000 UZS per m^3 for houses (1USD= 11,000 UZS) Vs 8933 UZS in May 2019 (Figure 6.10). The price of water is higher in regions compared to Tashkent city. The tariffs vary by region, the consumer residence type, as well as the availability of water meters [6]. Tariffs have been revised several times. Though water tariff levels and collection rates have increased, it does not cover operational costs and are still subsidized (World Bank, 2022).

Technical comments on measurability and interpretation

Table 6.1 provides comments on the measurability, interpretation, and source of data for the indicators included in the theme.

Table 6.1: Measurability, Interpretation, and Source of Data on policy responses

Indicators	Measurability and Measurement unit	Data source
Environment-related innovations	% share of environment-related inventions of all domestic technologies. The indicator measures the number of new products and technologies developed or interventions taken domestically	OECD
Public Expenditure in environment-related technology	% of total GDP, government expenditure on GG. This measures how much the government invests in green initiatives.	SCEEP
International financial flows (FDI) of importance to GG	USD investments in GG include loans and grants from international financial institutions.	UNDP office in Uzbekistan
Environment-related tax revenue	% of total tax revenue. The indicator measures a payment based on the quantity of pollutants discharged into the environment. E.g., energy-related, - transport-related	SCEEP
Environment related subsidies	% of total subsidies (for coal, gas, electric) The indicator measures benefits and privileges provided to energy production sectors	IEA
Energy pricing /tarrifs - Electricity	-Price per litre for diesel/petrol (in 2015 USD); -Price USD per kWh of electricity	OECD

- Diesel/petrol - Natural gas	The indicator measures changes in the end-user price for electricity, diesel, and petrol. The dynamics in the energy tariffs over time show policy reforms for valuing diverse energy sources.	
Water pricing	Tariffs /price for water use in UZS/m^3 water used	Uzsuvtaminot

Definition

Public expenditures in environmental protection: Public budget for environmental protection. e.g. Environmental R&D in renewable energy sources.

Environment-related innovations**:** are environment-related inventions to ensure the protection and reproduction of the environment. These are inventions for various environment-related technologies, including environmental management, water-related adaptation, and climate change mitigation technologies.

International financial flows for GG: are international loans or grants for environment-related interventions from IFIs or multilaterals.

Environment-related tax revenue: income collected by the government through environmentally related taxes. Taxes can include (i) energy products for transport purposes (petrol and diesel); (ii) motor vehicles and transport (one-off import or sales taxes, recurrent taxes on registration or road use and other transport taxes); (iii) waste management (final disposal, packaging, and other waste-related product taxes); (iv) ozone-depleting substances and (v) other.

Environment-related subsidies: government support to assist the energy sector so the price remains low. For example, coal, gas, and electricity. It measures how much the government subsidizes fossil fuels and the extent of support for renewable energy.

Notes

[1] Price for water is available at :https://www.goldenpages.uz/komunal-tarifi/

[2] Sée budget at :
https://admin.openbudget.uz/media/post_attachments/budjet_dlya_grajdan2022.pdf

[3] See energy subsidy at https://iea.blob.core.windows.net/assets/0d00581c-dc3c-466f-b0c8-97d25112a6e0/Uzbekistan2022.pdf

[4] The Decree of the Cabinet of Ministers “On the main directions of tariff policy in the electric energy industry of the Republic of Uzbekistan for the period up to 2030 See.
https://lex.uz/uz/docs/4289882

[5] the requirement is not in accordance with free market principles but set by the authority engaged in the formation of tariff policy in Uzbekistan [kun.uz/en/news/2020/05/02/uzbekistan-will-introduce-differential-electricity-tariffs-from-2022]

[6] See regional water tariffs at https://uzsuv.uz/en/tariffs-and-criteria

List of references for charts

International Energy Agency. (2021). Uzbekistan energy profile – Analysis. *IEA*. Available from https://www.iea.org/reports/uzbekistan-energy-profile.

OECD. (2023). Development of environment-related technologies, % all technologies. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Development of environment-related technologies, inventions per capita. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Diesel end-use price. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Industry electricity price. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Petrol end-user price. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

OECD. (2023). Residential electricity price. *Oecd.org*. Available from https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH.

Uzsuvtaminot. (2023). Water tariff per month in Tashkent. *uzsuv.uz*. Available from https://uzsuv.uz/en/tariffs-and-criteria.

Part II.

Monitoring National Green Economy Strategy, Program and Action Plan for 2030

Chapter 7: Monitoring Uzbekistan's Green Economy Strategy for 2030

This special part looks at the national policy framework for the transition to a green economy in Uzbekistan by 2030, focusing on the **eight indicators** proposed to monitor the implementation of the Green Growth Strategy, Programme and Action Plan in achieving its objectives.

7.1 National policy framework for a transition to a green economy

On 4 October 2019, the President of Uzbekistan approved a Decree on 'the National Strategy for the transition of the Republic of Uzbekistan to a green economy from **2019-2030'** (President Decree No. PP-4477) [1]. Hereafter called 'Strategy'. The strategy set four strategic directions, namely: 1) improving energy efficiency, 2) development of renewable energy sources, 3) climate change adaptation and mitigation, improving the efficiency of natural resource use and 4) preserving natural ecosystems and developing financial and non-financial mechanisms in support to a green economy. The Ministry of Economy and Finance was vested with the responsibilities of coordinating and implementing the Strategy through specialized working groups. The Ministry also envisages establishing an interactive web portal.

In line with the Strategy and also with the Development Strategy of New Uzbekistan for 2022-2026, in December 2022, the President of Uzbekistan adopted the national "**Programme on the transition to a green economy and ensuring green growth in the Republic of Uzbekistan until 2030**" and its **Action Plan,** hereafter called 'green growth strategic framework- GGSF'. The GGSF programme sets ambitious targets in increasing energy efficiency, the share of renewables, access to drinking water, expanding forest stocks, and greening cities, as stipulated in Table 7.1 below, with intermediate targets for 2022, 2024, 2026 and 2028.

TABLE 7.1. Targets on the transition to a "green" economy and ensuring "green" growth in Uzbekistan until 2030

No.	Indicators	Unit of measurement	**2022**	**2024**	**2026**	**2028**	**2030**
1	Decrease in energy intensity per unit of GDP	% decrease	5	14	22	27	30
2	Energy consumption in industry	% share of total energy consumption	26	25	23	21	20
3	Expanding the share of renewable energy sources	% of total electricity generation	8	9	24.3	29.0	30.5
		kWh	6.5	8.6	25.0	34.0	40.7
4.	Construction of small solar photovoltaic power plants	MW	10.0	150.0	400.0	800.0	1500.0
5.	Population with access to improved sources of drinking water	% of the total population	69.7	80.93	87.12	88.5	90.0
6.	Increase in stocks of trees and shrubs on the lands of the forest fund	million m^3	64.2	68.1	77.0	85.5	92.3
7.	Expansion of green areas in cities within the framework of the Green Land project	% of the total area of the settlement	8.3	12.4	15.8	23.8	30.0

8.	The level of processing of generated municipal solid waste	%	30.0	40.0	50.0	60.0	65.0

Source: GGSF 2022 [1].

To monitor the transition to a green economy, the Strategy stipulates the importance of establishing a **monitoring framework** to track progress and ensure regular data collection and institutionalisation of the process. More specific actions in this regard are stipulated in the Action Plan (under Activities 50-53), including improving the inter-ministerial coordination, aligning sectoral strategies, developing tools for modelling and forecasting green transition, improving data collection, and creating a system for monitoring, reporting and verification (MRV) of greenhouse gas emissions as of January 2024.

Table 7.2 presents the **eight indicators selected** for monitoring the implementation of the Green Economy transition Strategy by 2030 alongside the strategic priorities stipulated in the Strategy. Initially, 17 indicators were proposed but reduced to eight at the approval stage of the action plan. The progress is measured against 2022, 2024, 2026, 2028 and 2030 target values (Table 7.1). Yet, there is no clear indication of how these indicators should be calculated. The baseline value is also not clearly defined for each indicator. The first target value, 2022, coincides with the Programme adoption (December 2022), thus posing whether this value is a target or a baseline. There is also a lack of identifying 'information sources' for calculating the proposed indicators, raising a question of data availability in national statistics for these eight indicators. Thus, the monitoring framework might face some risks associated with the above points, jeopardising monitoring, and requires additional clarifications and methodological discussion, baseline values, methods of calculation, data availability, sources, responsible bodies, frequency of reporting and verification methods. For this report, the Ministry of Economy and Finance has provided baseline data for some indicators (Table 7.2). It is, however, not accurate and complete.

Table 7.2: National green economy strategic priorities, proposed indicators and measurability

No	Green Economy transition Strategic Priority	Eight selected Indicators and measurement unit	Data source and verification	Baseline data in 2021	Target by 2030
1	Ensuring efficient use of natural resources	Energy intensity(toe per unit of GDP)	? ?	0.01 koe/USD (actual)??	30% ↓
2	Strengthening the resilience of the economy to natural disasters and climate change	NO indicator			
3	Ensuring low-carbon emissions of the economy in the industry sector	Construction of small solar photovoltaic power plants in MW	?	49.5 mln Khw or 5.6 MW	1500 MW ↑
		Share of renewables in total electricity production (in kWh,	? SA	7.1% 5.1 bln kwh	to 31% ↑

		& % in total electricity production)			
		Energy consumption in the industry(% of total energy)	? SA	24.9%	to 20% ⇩
4	Introducing innovations and attracting green investments	NO indicator			
5	Developing sustainable urbanization	Level of recycling of solid waste (% of total solid waste generated)	Statistics Agency as SDG reporting	Share of recycled MSW (% of generated waste) 26%	to 65% ⇧
		Green spaces in cities ((in ha) in % of the total area	?	Green space in Cities % ????	30% ⇧
		Increase in stocks of trees and shrubs on the lands of the forest fund -m^3	Statistics Agency…SDG reporting	60.9 mln m^3	92.3 mln m^3 ⇧
6	Supporting the population most affected during the green economy transition	Access to safe drinking water (% of population)	Statistics Agency…SDG reporting in % of HHs	Share of population(HH) that has access, % ??	to 90% ⇧

Source: authors

7.2 Measuring the Green Economy Strategy 2030

This part attempts to calculate the proposed eight indicators in the action plan to monitor the green economy transition against the 2021 base year. The section assesses, where possible, progress in 2022 versus the established target.

- Indicator 1: Energy intensity of GDP
- Indicator 2: Energy consumption by the industry sector
- Indicator 3: Share of renewables in electricity generation
- Indicator 4: Energy from new solar PV panels
- Indicator 5: Access to drinking water
- Indicator 6: Forest stock

- Indicator 7: Green spaces in cities
- Indicator 8: Solid waste recycling
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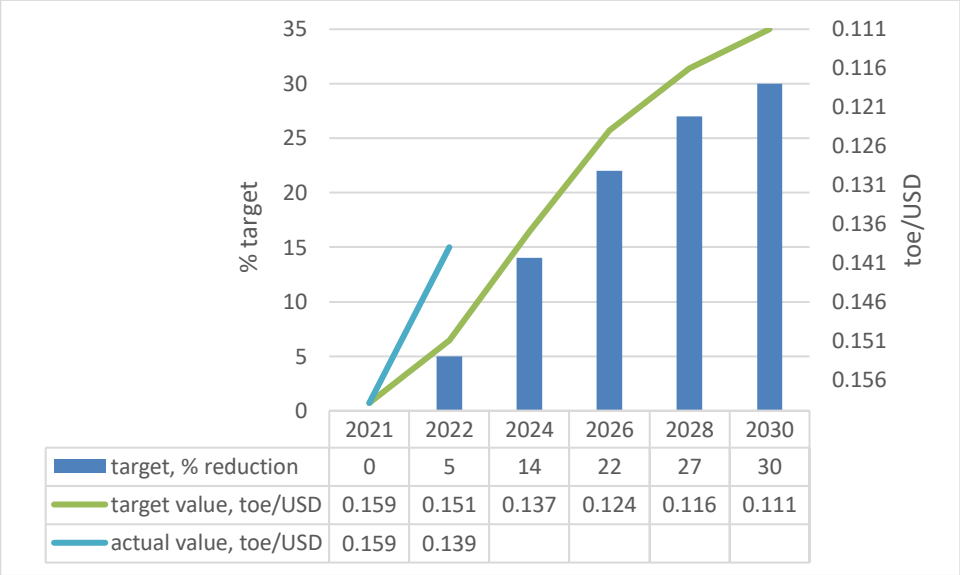
Figure 7.1: Reduction in energy intensity of GDP

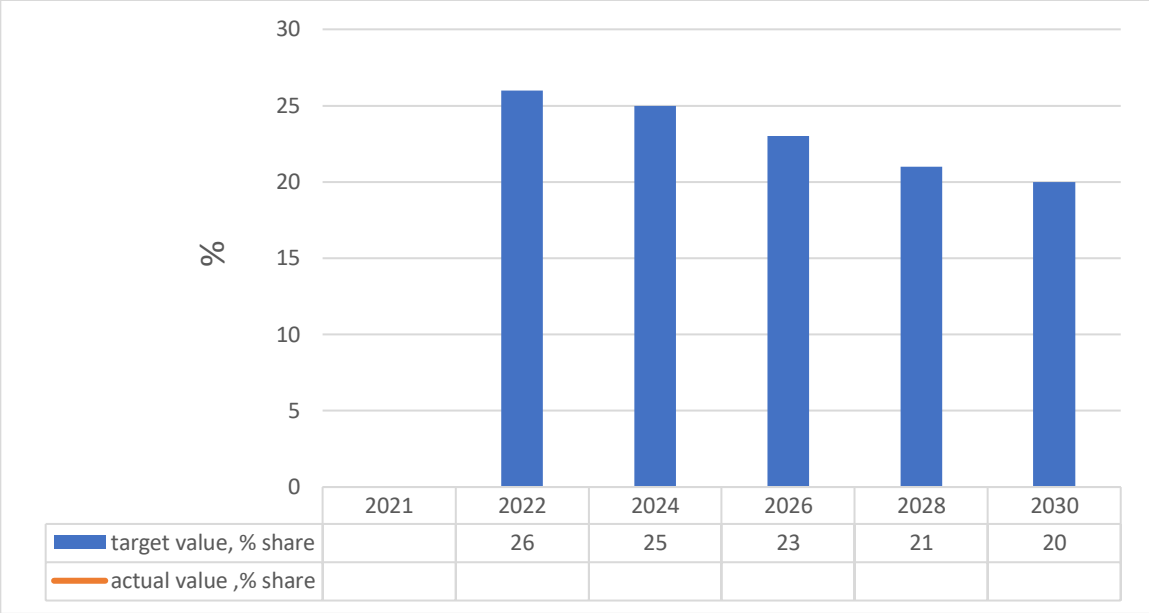


	2021	2022	2024	2026	2028	2030
target, % reduction	0	5	14	22	27	30
target value, toe/USD	0.159	0.151	0.137	0.124	0.116	0.111
actual value, toe/USD	0.159	0.139				

Source: GGSF, 2022; Figure 3.8 of the report and authors' calculations.

***Trend*: I**n 2022 Uzbekistan capped the first target of reducing energy intensity by 5%, set in the national GGSF, by reducing it by 12.6% (Figure 7.1). This illustrates that the country is already doing better in energy intensity reduction compared to the 2022 target value (0.139 toe/USD vs targeted 0.151 toe/USD). This is a good start for the country in reaching its 2030 target.

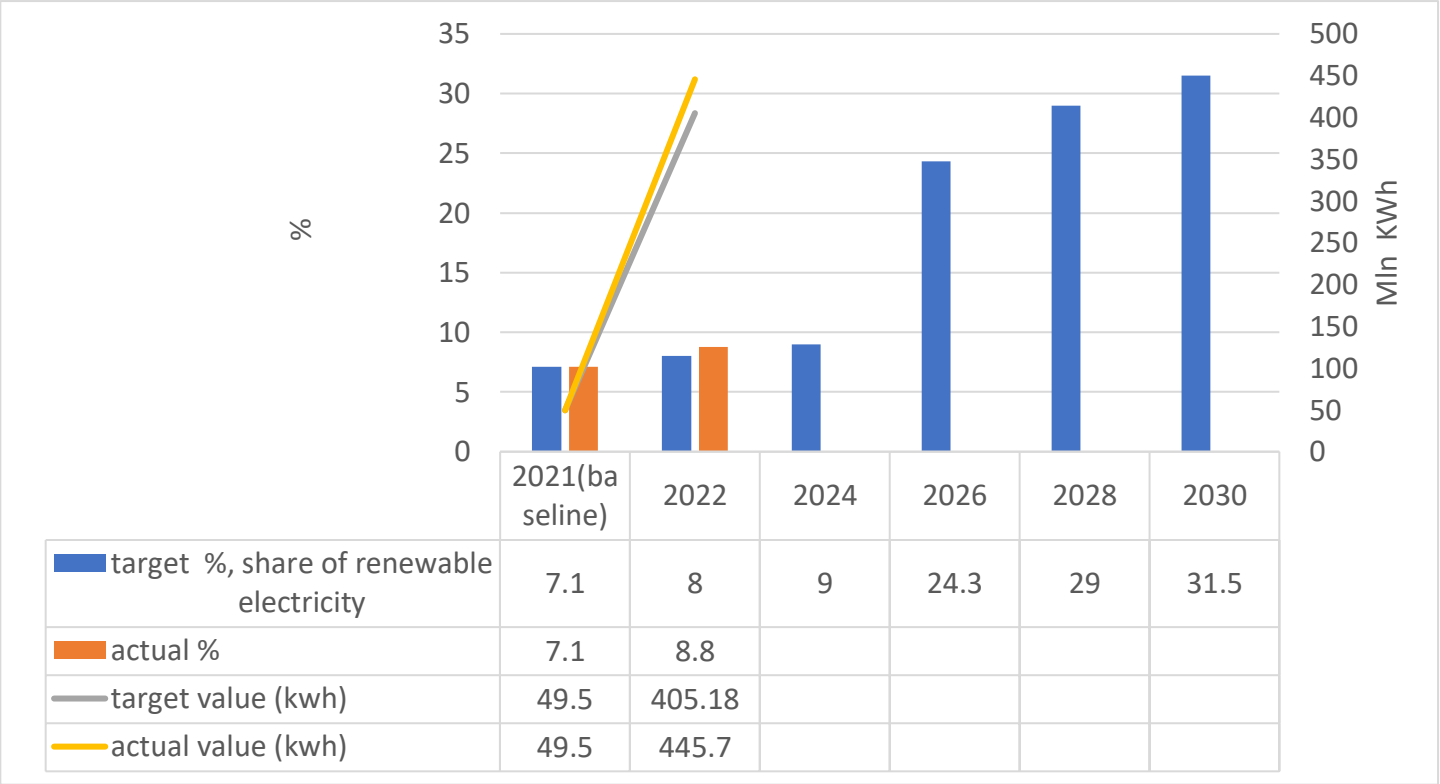
Figure 7.2: Reduction in Energy use by the industry industry)



Source: GGSF, 2022

Trend: There is no clear baseline value nor clear definition of the energy consumption by industry that can be used as reference to monitor progress. The statistics Agency has data on electric consumption by sector(Industry (stat.uz)), but the electric use by activity does not add up to the total. More so, the OECD dataset for Uzbekistan, used in figure 3.7 in this report does not have data for the 2021 base year. The value of the share of energy consumption by the industry was already 20.5% by 2020.

Figure 7.3: Share of renewables in electric generation

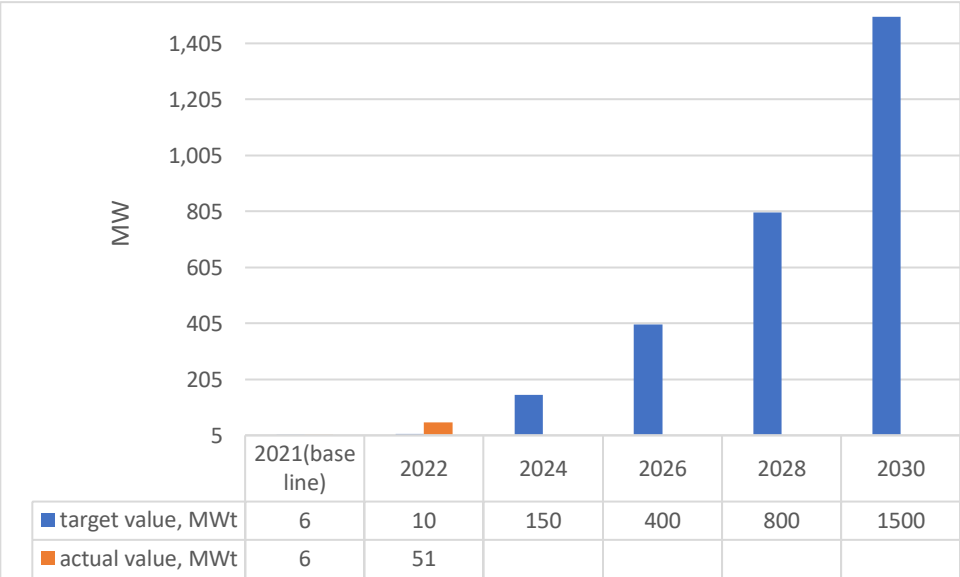


	2021(baseline)	2022	2024	2026	2028	2030
target %, share of renewable electricity	7.1	8	9	24.3	29	31.5
actual %	7.1	8.8				
target value (kwh)	49.5	405.18				
actual value (kwh)	49.5	445.7				

Source: GGSF, 2022; Figure 3.5 in the report and author's calculation

Trend: Uzbekistan has overachieved the 2022 target of 8% share of renewable sources in total electricity generation. The share of renewable electricity in 2022 was 8.8% and in actual value 445 mln KWh. The target for 2026 is three times the 2022 value; thus, Uzbekistan must gain more momentum in installing renewable energy generation plants.

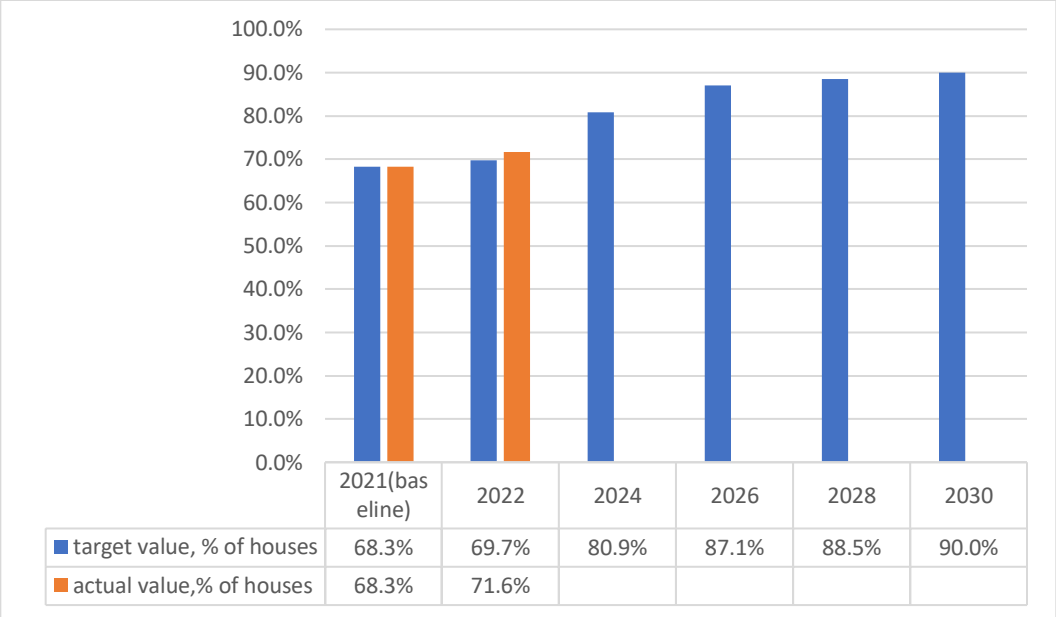
Figure 7.4: Construction of solar PV power plants capacity



Source: GGSF, 2022; SA ,2023Industry (stat.uz) and authors calculation

Trend: Figure 7.4 illustrates that Uzbekistan has overachieved in meeting the solar capacity targets for 2022 by 5 times more. Calculation was not straight forward. Here, the indicator is understood as the cumulative solar power capacity (MW) installed. Though the Statistics Agency (Industry (stat.uz) publishes the annual capacity of thermal and hydroelectric power plants, it does not account for the capacity of solar plants, as it is negligible. Nevertheless, the Statistics Agency provides data on solar energy (in million KWh) produced annually. In 2021(base year), Uzbekistan produced 49.5 million KWh of solar energy. Thus, the annual capacity of solar power plants in 2021 would be 5.6 MW (49,500,000 kWh/24x365 hrs). In 2022, the statistics agency reports that actual amount of solar energy increased to 446 min Kwh; thus the capacity has increased to 51 MWt. If Uzbekistan maintains the current momentum of installing solar power plants, it will be able to achieve its 2030 target of 1500 MWt .

Figure 7.5: Access to drinking water

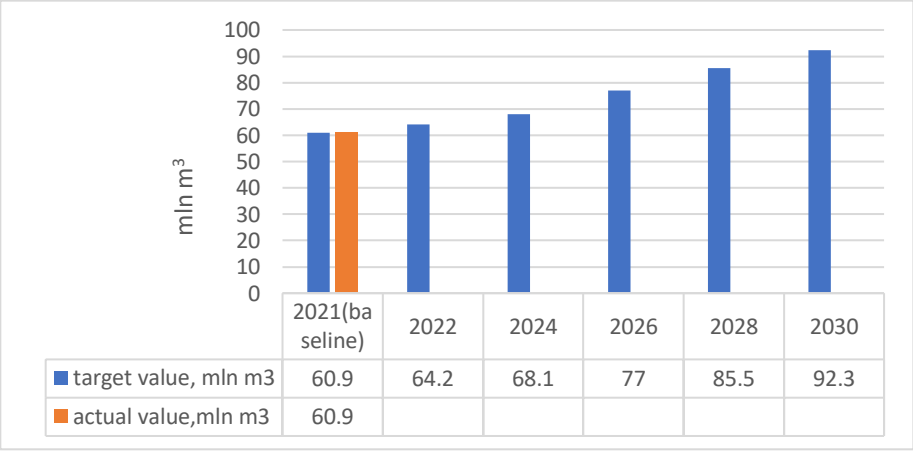


	2021(baseline)	2022	2024	2026	2028	2030
target value, % of houses	68.3%	69.7%	80.9%	87.1%	88.5%	90.0%
actual value,% of houses	68.3%	71.6%				

Source: Uzbekistan GGSF, 2022; Figure 5.7 and authors' calculation

Trend: In 2022, the proportion of the population provided with access to drinking water was slightly higher than the target (69.7%) set for the year and was 71.6%. Here, the report measures the proportion of houses with access, as reported by the Statistics Agency.

Figure 7.6: Increase in forest tree and shrub stock

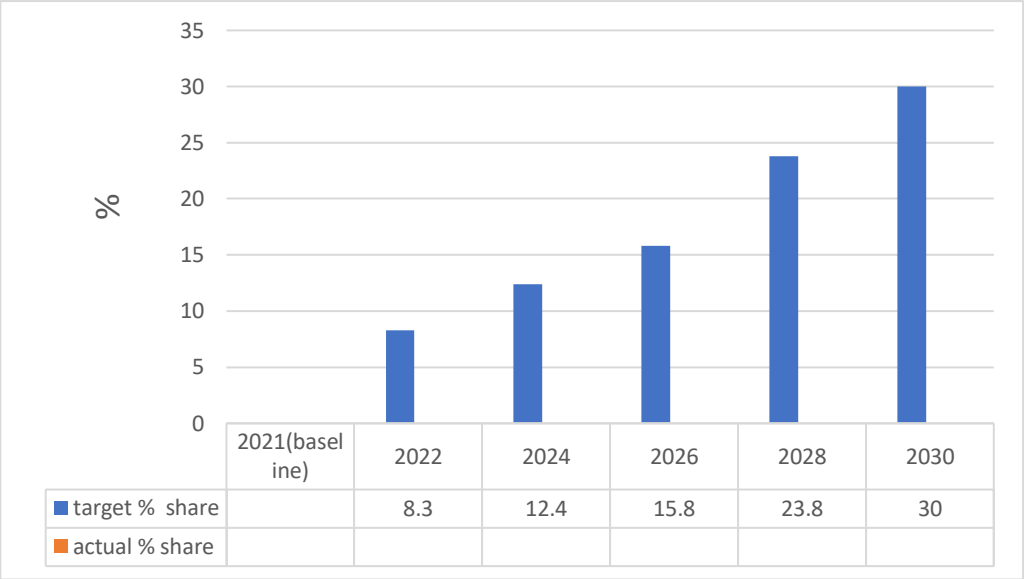


	2021(baseline)	2022	2024	2026	2028	2030
target value, mln m3	60.9	64.2	68.1	77	85.5	92.3
actual value,mln m3	60.9					

Source: GGSF 2023 and baseline value from the MoEF.

Trend: The green economy strategy aims to increase the forest stock from mln 61m^3 (based on info. from the MoEF) in 2011 to 92.3 in 2030. There is no data available for 2022. The latest data from the OECD on forest stocks of Uzbekistan date back to 2015, and reports are on a 5 years interval. The monitoring framework should clearly show the source of data to track the indicator and also provide a contextual definition of the indicator.

Figure 7.7: Share of green areas in cities

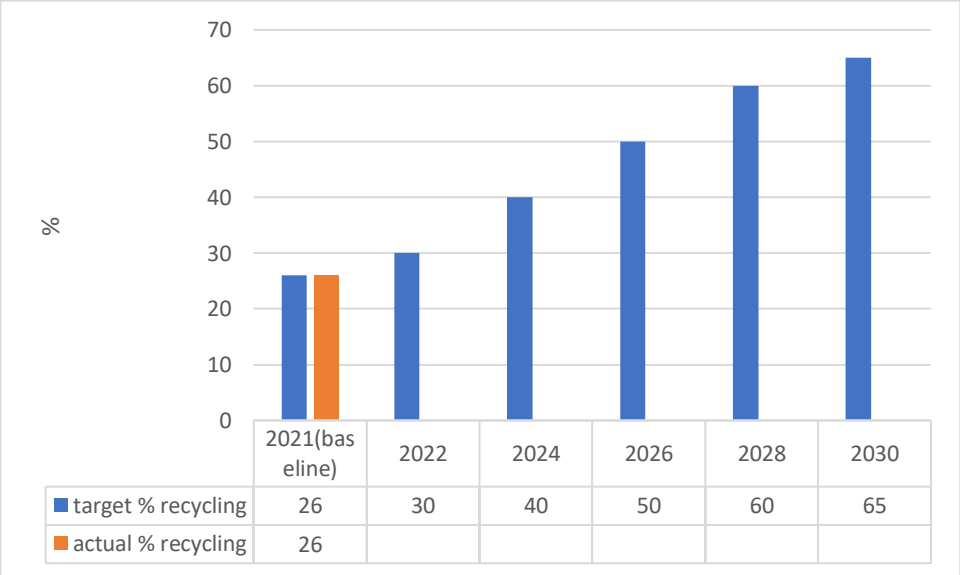


	2021(baseline)	2022	2024	2026	2028	2030
target % share		8.3	12.4	15.8	23.8	30
actual % share						

Source: GGSF2022

Trend: Uzbekistan plans to expand the proportion of green areas in Cities to 30% of the area by 2030. The action plan does not define the baseline actual green area value or share and the data source.

Figure 7.8: Solid waste recycling, % of total produced waste



	2021(baseline)	2022	2024	2026	2028	2030
target % recycling	26	30	40	50	60	65
actual % recycling	26					

Source: Uzbekistan GGSF, 2022; SDG report by the SA, authors' calculation

Trend. The strategy intends to increase the solid waste recycling capacity to 65%, compared to 26% in 2021. The SA collects data on solid waste recycling as part of the SDG 12 monitoring. No data is available for 2022. The actual value of processed solid waste in 2021 was 1.6 mln tonnes.

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Notes

[1]Decree of the President of the Republic of Uzbekistan, 23.10.2019 no. up-5853 on approval of the strategy for the development of agriculture of the Republic of Uzbekistan for 2020-2030. See https://lex.uz/ru/docs/4567337