

# Uzbekistan Wastewater Sector Performance, Problems and Opportunities

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## Abstract

Since the independence of the Republic of Uzbekistan in 1991 the Government has precisely identified the main goals of the improvement of the environment state in the country necessary to improve the living and health conditions of communities.

The activities on reforming of social infrastructure sector, show significant results in recent years: in 1990 the percentage of households with potable water supply services was only about 50% and by 2003 the coverage has been increased by one and a half times to reach 75%.

At the same time, the development of the wastewater sector has lagged far behind the development undertaken in potable water sector. The limited financing of the wastewater sector that requires high investment is one of the main reasons for a significant disproportion between the development of two mutually dependent sectors - water supply and wastewater. Currently the coverage of the urban and rural population with wastewater is only 39% and 1.5% respectively.

Lessons show that external assistance to the utility services is limited and basically is focused on the water supply and hygiene sector. Since investment in wastewater management systems is urgently needed the effective and fruitful implementation of the national wastewater management strategy could be achieved in coordination with external assistance of multilateral and bilateral funding agencies. The development of the wastewater and sanitation sector should integrate with initiated and implemented water supply projects and should be one of the objectives of the country strategy of international financial institutions.

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## Introduction

During an epoch of rapid development in science and technology, protection of the environment and the Earth as a whole, and the reduction of harmful influences on the natural systems are some of the most urgent problems facing mankind.

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As a result of an inefficient and wasteful environmental policy carried out by the former Soviet Union in the Central Asia region in the past century a number of significant environmental problems have arisen. Currently the ecological and sanitation situation in the Central Asia region is characterized as being under stress. The desiccation of the Aral Sea, pollution of the ground, air and water as result of human prodigal actions has caused enormous damage to our unique ecosystems. Negative influence on the environment has reached the level where in some regions it has become the leading factor in formation of population health.

Since the independence of the Republic of Uzbekistan in 1991 the Government has precisely identified the main goals of the improvement of the state of environment in the country necessary to improve the living and health conditions of communities. Recognizing that adequate environmental protection and pollution controls are essential for sustainable economic growth, the Government has incorporated environmental protection as a national priority in its development strategy. The large-scale program on stabilization of environmental conditions, rational use of natural sources, and maintenance of the health of the environment is conducted actively in the country. The Government has enacted environmental protection laws and implemented regulations that emphasize preventative measures; the polluter pays principle, and decentralized environmental management. In addition, the Government has undertaken numerous programs, including those for the social infrastructure sector, which is one of the major consumers of natural resources and simultaneously it has environmental protection functions.

The activities on reforming of social infrastructure sector show significant results in recent years. In particular, it is noticeable in the development of the water supply sector: in 1990 the percentage of households with potable water supply services was only about 50% and by 2003 the coverage has been increased by one and a half times to reach 75%.

At the same time, the development of the wastewater sector has lagged far behind the development undertaken in potable water sector.

### **Situation Analysis**

The Republic Uzbekistan lies at the heart of Central Asia and is a double landlocked country. The territory comprises about 448, 000 km<sup>2</sup> with a population of 25 million of which about 70 % is rural. The capital of the Republic of Uzbekistan is Tashkent with a population of 2.2 million. The six next largest cities (Andijan, Bukhara, Karshi, Namangan, Nukus and Samarkand) have populations between 200,000 and 400,000.

Wastewater management in Uzbekistan provides numerous opportunities to reduce water pollution, protect water resources, promote sustainable economic development, promote public-private partnerships in urban infrastructure, and improve the living conditions and public health of urban and rural residents.

All major cities are provided with a centralized tertiary, secondary and primary sewerage system. The systems connect all apartment buildings and a proportion of private housing. The trunk sewers discharge to the inlet pumping stations at the wastewater treatment works.

Wastewater treatment works (WWTW) generally comprise a standard arrangement of solids removal and biological, activated sludge, treatment, comprising:

- coarse screening
- centrifugal removal of inorganic matter
- primary aerobic sedimentation
- anaerobic digestion of primary sludge
- activated sludge diffused air biological treatment
- final settling
- contact or polishing settlement
- chlorination / disinfection
- sludge storage and drying.

At present there are 246 sewerage systems functioning in Uzbekistan, of which 164 are in urban areas and 82 in rural areas. The total design capacity of wastewater treatment facilities is around 4 million m<sup>3</sup> per day. The overall length of the sewers in 2003 was: 2 300 km of trunk sewer collectors; 6 100 km of sewer networks.

Where full waterborne sewerage systems have not been provided, the population either relies on ordinary WCs to cess pits which are emptied by suction tankers belonging to the water operators or they use on-plot pit latrines.

However, the above-mentioned provision for the wastewater sector differs greatly from that for water supply. There are 5204 facilities for water supply functioning in the country, of which 332 units are in urban areas and 4872 units are in rural. The total design capacity of water treatment facilities is around 9 million m<sup>3</sup> per day. The overall length in 2003 was: 13 400 thousand kilometers of water trunk mains; 53 000 kilometers of water distribution networks.

Currently the coverage of the population with potable water supplies has reached 87% of urban and 68% of rural residents while the percentage of urban and rural population with wastewater collection is only 39% and 1.5% respectively.

The limited financing of the wastewater sector, which requires high investment, is one of the main reasons for a significant disproportion between the development of two mutually dependent sectors - water supply and wastewater.

### **Description of Problem**

Rapid urbanization, industrialization and economic development are putting pressure on an overloaded social infrastructure, and contributing to widespread pollution and environmental threats in the Central Asia region. The rising demand for basic utility services is outstripping the financial and physical capacity of most urban centers. The environmental threats facing the country include the pollution of rivers and underground aquifers from untreated water.

Adequate maintenance of a sanitary state in cities and other settlements, and also of industrial enterprises, is achievable only if generated wastewater is directly removed from the concerned areas, treated and disinfected. Absence or inadequate functioning

of the centralized wastewater systems creates irretrievable losses of water, increases flooding, complicates sanitary and ecological conditions and negatively affects civil works.

Domestic sewers and surface water drainage generates wastewater of about 1400 million m<sup>3</sup> per year containing a wide spectrum of polluting substances and is one of the powerful factors of negative influence on the ecosystem.

The WWTW are all of a similar design based on the activated sludge process, irrespective of the level of pollution loading. It is worth pointing out that the existing wastewater treatment facilities have high-energy consumption and are based on the mechanical processing of sediments, hence are considered to be inefficient. Sludge is sometimes discharged untreated to land or rivers which from year to year lose their source reproduction functions. In recent years the situation has been aggravated by the inadequate performance of obsolete wastewater facilities. Due to overloading the sewerage and treatment facilities do not satisfy technological and sanitary requirements.

Some WWTW do not provide qualitative sewage treatment. The age of the equipment and facilities, together with the level of maintenance provided, tends to be such that their condition has deteriorated to a perilously low level. The out-of-date process equipment functions inefficiently or has completely failed, since their replacement/upgrading are not made, and works operate without major overhaul for many years. Deterioration of fixed assets of the wastewater sector means that more 60 % cannot guarantee performance of facilities to the level of design parameters. Special attention is needed concerning the condition of sewage pumping stations, pressure and gravity collectors, deterioration of which is about 70 %. Existing sewer collectors of the cities of Andijan, Gulistan, Urgench, Termez, and others are in a failure condition, and their replacement is required.

The current situation urgently demands the reconstruction/upgrading and extension of sewer collectors and WWTW based on innovative technologies of processing including sludge. Rehabilitation of WWTW will enable greatly improved efficiency of operation and reductions in power consumption and associated cost. Failure to invest in the wastewater sector will result not only in a reduction in the quality of treatment achieved and therefore an increase in the level of pollution by final effluents but also in the likelihood of major failures with serious environmental consequences.

However the modernization and strengthening of wastewater systems requires significant investments, as it is the most expensive, functionally significant and vulnerable sphere of public service. Lessons show that external assistance to the utility services is limited and basically is focused on the water supply and hygiene sector. This includes ongoing ADB water supply projects in Gulistan, Djizak and Karshi, and rural water supply project in western Uzbekistan; World Bank water supply, hygiene, and health project in Karakalpakstan and Khorezm, and a project for water supply in the cities of Bukhara and Samarkand. Bilateral assistance includes a number of water supply projects under preparation including an ADB project for rural water supply in Kashkadarya and Navoi. Assistance to cross-border cooperation on water and energy issues is being provided by the World Bank and by the United States Agency for International Development under its Environmental Policies and Institutions for Central Asia initiative.

Though water supply and wastewater sectors are mutually connected, implementing of wastewater projects with assistance of foreign investors has not been initiated.

### **Preliminary Approaches**

The Government is conscious of the urgent need to improve current wastewater management through policy and institutional reforms, and the repair and upgrading of existing wastewater infrastructure. The national wastewater management strategy that contains specific targets and a medium-term sector investment program has been formulated. The proposed list of priority projects in the wastewater management sector has been included in the Investment Program of the Republic of Uzbekistan for 2005, issued by the Resolution of the Cabinet of Ministers №560 of 30 November 2004. The initial proposed projects are following:

<b>No</b>	<b>Proposed Project Name</b>	<b>Required investments (\$mln)</b>	<b>Description</b>
1	Extension and reconstruction of the WWTW in city of Chirchik	20.0	Increase the percentage of urban and rural population with wastewater services
2	Extension of the WWTW in city of Namangan	15.0	Improve the performance of treatment and improve the epidemiologic situation in the region
3	Reconstruction of the wastewater system in city of Gulistan	7.0	Increase the percentage of population with wastewater services
4	Reconstruction of the WWTW in city of Karshi	10.0	Increase the percentage of population with wastewater services
5	Extension and reconstruction of the WWTW in city of Djizak	15.0	Increase the percentage of population with wastewater services
6	Reconstruction of the wastewater system and WWTW in city of Termez	12.5	Improve the performance of treatment and improve the epidemiologic situation in the region
7	Reconstruction of the WWTW and strengthen 9 km of trunk sewers in city of Urgench	15.5	Increase the percentage of population with wastewater services
8	Extension of the trunk sewers in city of Nukus (II stage)	3.4	Increase the percentage of population with wastewater and improve the epidemiologic situation in the region
9	Extension of the wastewater system in city of Bustan	11.5	Extent the trunk sewers by 25 km and improve the epidemiologic situation in the region
10	Extension and reconstruction of the wastewater facilities and trunk sewers in city of Andijan	2.2	Increase the performance capacity up to 50 thousand m <sup>3</sup> /day and strengthening 9.8 km of trunk sewers
11	Extension and reconstruction of the WWTW in city of Fergana	10.0	Improve the performance of treatment and improve the epidemiologic situation in the region

Since investment in wastewater management systems is urgently needed the effective and fruitful implementation of the national wastewater management strategy could be achieved in coordination with external assistance of multilateral and bilateral funding agencies. The development of the wastewater and sanitation sector should integrate with initiated and implemented water supply projects and should be one of the objectives of the country strategy of international financial institutions.

The medium-term sector investment program for the wastewater sector should be based on an action plan and viable projects which aim to: (i) assist in the implementation of the sector strategy and preparation of investment projects package with financing, policy issues and safeguard aspects; (ii) strengthen the institutional capacity and sustainability of sector management; (iii) repair, upgrade and expand based on the modern technologies, the trunk sewers and wastewater treatment works to provide hydraulic capacity and improvement to the performance of treatment of sludge and pollutants; (iv) introduce innovative laboratory facilities and initiate regular sampling and analysis of trade / industrial effluents and the imposition of full cost recovery charges; (v) provide possible TA for operational management.

The benefits of the projects should improve the standard of service to the community, increase performance efficiency and a corresponding reduction in energy consumption at pumping stations and wastewater treatment works and improves standards of final effluents. Thus there will be a reduction in environmental pollution and a corresponding improvement in community health.

### **Supporting Information**

1. General Scheme of Water Supply Development in the Republic of Uzbekistan for 2000 -2010. Tashkent. 1999.
2. Living Standard Strategy for 2004-2006 and period up to 2010. Tashkent. June 2004.
3. ADB Country Strategy and Program Update for 2005-2006. Uzbekistan. September 2004.