



SHURTAN GAS CHEMICAL COMPLEX UPGRADE PROJECT ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA)

Project Document No

SGCCUP-00-EN-REP-0003

NON-TECHNICAL SUMMARY

AUG 2022

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Overview

The Shurtan Gas Chemical Complex (SGCC) in the Kashkadarya region, Uzbekistan, operated by Uzbekneftegaz (UNG) (National Oil and Gas Company of Uzbekistan), is an existing facility, operational since 2001. The SGCC is to undergo facility and plant upgrade works, to increase the overall production output of polyethylene and introduce additional production of polypropylene. Completion of construction of facilities is scheduled for 2025.

The Environmental and Social Impact Assessment (ESIA) has been prepared in accordance with Good International Industry Practice (GIIP), namely the Equator Principles IV (2020), IFC Performance Standards (2012), OECD Common Approaches (2016), IFC Environmental, Health and Safety (EHS) Guidelines (2007) applicable to the Project.

Site Location & Context

The SGCC site is located in south-west of the Republic of Uzbekistan. The site is approximately 430km from Tashkent and 33km south west of the City of Karshi, and is within the Guzar District in the Kashkadarya Region. The area in which the SGCC site is situated is largely undeveloped, with the closest settlements being the villages of Otkuduk and Navbahor, 6km and 10km away. In addition, two work camps are also present within 3km of the site. Much of the immediately surrounding land is uncultivated; however, there was an areas of formal farmland within the Navbahor Village, which was established for the provision of products for the SGCC workers, but later was transferred to government authority. The Shurtan Specialized Forestry is also located approximately 2km north-west of the SGCC plant. Existing services and infrastructure available in the region of the SGCC site include a serviced railway and the national power grid. Water is supplied directly from the KMC (Karshi Main Canal) through the pump station and there is a back-up water supply for the SGCC provided by the SGCC Reservoir located 4km away.

Project Description

The current plant operated by SGCC utilizes natural gas from the Shurtan Gas field, to separate ethane and produce ethylene. The ethylene is converted into Linear Low Density Polyethylene (LLDPE), as the primary product. The Project aims to increase the Polymer Grade Ethylene production capacity from the current level of 140 ktpa to a level of 430 ktpa and add Polymer Grade Propylene production of 98 ktpa. With this additional ethylene and propylene SGCC intends to install a new bimodal polyethylene unit and a polypropylene unit to produce additional 280 ktpa of HDPE product and 100 ktpa of polypropylene product. This is achieved by using a feed of 430 kta of Naphtha from the nearby GTL plant and by increasing the ethane content in the natural gas feed to approximately 60%. The Ethylene/Propylene plant will additionally produce Hydrogenated Py-Gas as by-product.

Without completion of the SGCCUP, the current operation and output of polyethylene would continue at its current level, without change or modernization of the equipment, design technology or polyethylene production output.

For the supply of raw gas with highest ethane content, a new gas pipeline from Shurtan Gas Processing Plant (SGPP) will be constructed. In addition, natural gas booster compression station in SGPP will be modified in order to ensure the reliability of gas supply for newly constructed GTL Plant and SGCCUP as well.

The new landfill will be established/constructed nearby to handle the industrial wastes from both GTL and SGCCUP plants.

Other Infrastructure – Waste Management & Water Supply

Approximately 36 waste streams are generated from the SGCC as a result of the existing plant and utilities operations, including solid, liquid, sludge, domestic and food waste; and divided into hazardous and non-hazardous constituents. Long term storage of wastes is undertaken in an engineered landfill located 3 km from SGCC location.

The SGCC sources water from the Karshi Main Canal (KMC) through the pump stations. Water is diverted from the Amu Darya River to the Talimardjan reservoir by the Karshi pump stations. The Talimardjan Reservoir feeds the KMC which supplies water to irrigators and towns. The primary water supply is abstracted from the KMC via a pumping station and 25km pipeline (1020mm diameter) for distribution to the facility. A second water abstraction from the KMC is distributed to the artificial SGCC reservoir. This reservoir used as alternate water supply and a back-up water supply for the winter season as well.

Currently permitted waste water is discharged at two outlets into the export drainage YK canal (South canal). One outlet discharges clean effluent that requires no pre-treatment (260 m³/hr or 72 L/s). The second outlet discharges treated industrial and domestic effluent (109 m³/hr or 30 L/s). Treatment includes physical, chemical, mechanical, and biological processes.

Atmospheric Emissions

Gas fired combustion equipment including the cracking heater, steam boiler and flares are the key point sources of the atmospheric emissions from the site. Combustion of large quantities of fuel gas in the cracking heater during normal and decoking operations and within the boiler will result in emissions of nitrogen dioxides (NO_x), particulate matter (PM₁₀), carbon dioxide (CO₂) and water vapor. Sulphur dioxide (SO₂) emissions from the combustion sources depend on the levels of hydrogen sulphide (H₂S), estimated to be 20 mg/m³ maximum. Flue gas emissions (comprising the above mentioned gases and water vapour) from the cracking heaters may exceed 143,000kg/h and 160,000kg/h during normal and peak operations respectively.

Addition of a new flare for the SGCC Upgrade Project will increase the intermittent flue gas emissions. However, the increase in flaring emissions will not be proportional to the increase in plant capacity.

Construction Strategy

The proposed construction strategy for SGCCUP is to maximize on-site pre-assembly at an area local to the site, over a 30-36 month completion and commissioning programme. An existing construction accommodation camp will be utilized comprising:

- 5000 to 6000 construction personnel;
- Land area to cover approximately 43 Hectares;
- Includes service facilities (such as canteen, shops, laundry, sport area, medical aid, etc.) areas and vehicle / bus parking.

Legislative Framework

The SGCCUP and ESIA will conform to the following requirements:

- Uzbekistan regulatory environmental standards and management directives
- International Finance Corporation (IFC) (World Bank Group) Social & Environmental Performance Standards and the IFC EHS General Guidelines;
- Equator Principles;
- Good International Industry Practice (GIIP) following the approach of the Organization for Economic Cooperation and Development (OECD) Common Approaches (2016), and
- Corporate requirements from SGCC and their partner companies.

Baseline Environments

Climate & Emissions

Uzbekistan's climate is classified as continental with hot summers and cool winter. The Project site is located in a cold semi-arid climate area .

Greenhouse Gas (GHG) emissions in the country have been increased by 13.7% between 1990 and 2012. The total direct GHG emissions in the 2012 have been estimated to be 205.2 million tonnes CO₂ equivalent (CO₂e). 82.4% of the GHG emissions have been generated by the energy sector. Agriculture and waste contribute to 14% and 18% of total GHG emissions respectively. The most recent baseline air quality monitoring has been carried out as part of Oltin Yo'l GTL ESIA studies. The results indicate that the concentration of key air pollutants in the project area are very low and mostly contribute to a fraction of the ambient air quality standards.

Geology, Geomorphology & Soils

The SGCC site is located on the foothill plain of the southwest spurs of the Ghissar Mountain range. Middle Quaternary proluvial deposits are developed from the surface everywhere in the locality of the site and comprise loess/sandy loam and clayey sand. The ground investigation conducted on the SGCCUP site in 2017 indicates the shallow geology immediately beneath the site comprises of:

- Topsoil and loam/loess type deposits up to 10 m thick;
- Quaternary proluvial deposits comprising light brown clay and sand with gypsum noted throughout. The sequence becomes weakly cemented at depth with nodules / veins of gypsum.

The natural soil layer was removed or reworked during construction of the SGCC project. As a low rainfall semi-arid region, the soils in the broader area require irrigation for successful crop production. The irrigation schemes have been proven to damage the soil through salinization and modification of the soil structure lowering permeability and affecting plant growth.

Uzbekistan is located in the middle of Central Asia within a zone of high seismic activity. The Project site is in a seismically active area of moderate to high risk, with a seismicity of 7 points according to the Uzbekistan seismic code KMK 2.01.03-96 “Norms and Regulations for Construction in Seismic Zones”. Design seismicity of the Project site is to 8 on the Richter scale.

Hydrology, Hydrogeology & Water Resources

The Talimardjan reservoir is the largest surface feature fed by the Karshi Main Canal, with a capacity of 1.5 Bm³. The KMC serves an extensive network of feeder canals and irrigation ditches that cover the Karshi Plain. The water supplies irrigators and domestic users as well as the SGCC. The SGCC Reservoir, located approximately 4km to the northeast of the project, is a contingent water storage reservoir for the SGCC, and has a capacity of 11.5 Mm³. The reservoir is directly fed from the KMC through the Pump station B. As well as being a back-up water supply for the SGCC, the reservoir is also used for irrigation of the forest plantation (“Green Zone”) around SGCC. The SGCC Reservoir has a designated water protection zone of 20 m from the water’s edge.

Groundwater within the proximity of the project cannot be considered as a source for water supply due to the low permeability of the strata and generally poor water quality.

Noise & Vibration

The existing SGCC facilities are the main sources of anthropogenic noise in the project area. Initial calculations of the noise propagation from the plant location indicate that the construction site and about 1000m radius from the construction site can be exposed to high level construction noise. During the normal operations of the plant, the area of noise influence could be only a few hundred meters from the source because the noise level at a distance of 1m from the equipment should not exceed 80 d(B)A.

Biological Environment

Protected Areas

There are 23 protected areas in the territory of Uzbekistan: eight state reserves, one biosphere reserve, two National Parks, 12 state nature reserves and 6 IBAs. The closest to the project area are Gissar Mountain State Reserve and Surkhanskiy Mountain Woodland State Reserve.

Terrestrial Ecology

The project location area is characterized by semi-desert scrub lands. The vegetation cover is mostly sparse and consists of grasses and small shrubs with *Hordeum leporinum*, *Poa bulbosa*, *Vulpia persica* and *Poa* sp. being dominant species. The exception is the area surrounding water reservoir northeast of the site. The vegetation around the reservoir is represented by reeds and taller grasses. Vegetation in the project area display low diversity. Pioneer species have been identified in areas of ground disturbance, i.e. ditches, demolished buildings and generally dominate in the species composition.

Invertebrates

Arthropods constitute the largest group out of the invertebrates species in Uzbekistan with insects comprising the majority of species. Four protected species are recorded in the Kashkadarya Administrative Region; and 29 species were observed during the 2017 field survey, none of which were protected under IUCN. *Glaucopsyche charibdis*, listed in the Uzbekistan Red Book, status 2VU:D (Vulnerable:Declining) was registered during the 2017 survey.

Reptiles

In the desert areas of the Karshi steppe 26 species of reptiles have been recorded. Two listed species (*Testudo horsfieldii* – Central Asian tortoise and *Varanus griseus caspius* - Caspian Monitor) have been recorded on site during the survey undertaken by Golders from 27 April till 4 May 2010. *Testudo horsfieldii* (Central Asian tortoise) and *Varanus griseus caspius* (Caspian Monitor) were recorded again during the survey in 2017, as well as *Naja oxiana* (Central Asian Cobra) and *Phrynocephalus helioscopus* (Sunwatcher).

Avifauna

Due to its size and its central position between Europe and Asia, Uzbekistan hosts a rich avifauna, with an estimated total of about than 500 species. Forty-eight species (with 51 subspecies) of birds are included in the Uzbekistan Red data book, some of them breeding or wintering in the south-western part of the country. Several bird migration routes lie through Uzbekistan, Kazakhstan and Turkmenistan. Large numbers of birds (especially wildfowl, raptors and cranes) use favourable habitats for stop overs during migration. There are 47 Important Bird Areas identified in the territory of Uzbekistan. Talimarjan reservoir and South West Guzor Foothills are located in the close proximity to the Project (16km and 24km respectively). In recent decades several water reservoirs were created in the Karshi Steppe. Those reservoirs provide good stop overs for migratory birds. 23 Listed species were observed in Karshi Steppe during the 2010 (under the Red Book or Uzbekistan or IUCN). A single individual of a Red Listed species (*Phalacrocorax pygmaeus*) was recorded during the survey in 2017 near the SGCC Reservoir. A Bird surveys carried out near the Talimarjan reservoir have concluded that the breeding community of the Reservoir is poor. South West Gizzar Foothills is important for spring migration. The list of migrants is about 240-250 species, including high numbers of Demoiselle Crane (*Grus virgo*), in some years comprising more than 20,000 birds, which is about 10% of the entire global population.

Mammals

Species of fauna found in Uzbekistan include groups which in the historical past have migrated here from other regions, including Central Asian deserts and mountains, Indo-China, grasslands of Kazakhstan, Siberia, South Europe and North Africa. Currently there are 108 species of mammals in Uzbekistan. Out of 108 species 23 species could be observed in Karshi Steppe and particular the project area and surrounded territory. During the survey in the project area and adjacent territories only the following species listed were observed: *Spermophilus fulvus* (Yellow Ground Squirrel), *Lepus tolai* (Tolai Hare), *Vulpes corsac* (Corsac Fox) and *Hemiechinus auritus* (Long-eared Hedgehog). In addition to that a Kangaroo Rat was observed (*Dipodomys sp* - species not identified) and evidence of presence of large carnivore, probably striped hyena (*Hyaena hyaena*).

Aquatic Ecology

Uzbekistan is a country of predominately arid desert climate. Most of the countries' water is coming from rainfall and snowmelt from the mountains. The reservoirs normally start being filled in March-April time and reach the highest level in 40-80 days. The reservoirs are drained for irrigation during the summer and reach minimum water level by September (Kamilov & Urchinov, accessed on 9/12/2016). The hydrological pattern and water chemical composition are satisfactory for fish, even though water salinity gradually increases from foothills to lowlands. It was estimated that there are 819 (561 species – littoral, 132 – semi-submersed, 128 – submersed) species of aquatic and wetland plants in Central Asia, of which 39 belong to Chara genus, 62 – mosses, 17 – ferns and 701 are vascular flowering plants. Rotifers, cladocerans and copepods dominate amongst zooplankton species. Composition of benthos species is various depending on a water body and season (Kamilov

& Urchinov, accessed on 9/12/2016). No Red Book species of either aquatic flora and fauna were observed in SGCC Reservoir.

Critical Habitats

The 2017 survey undertaken confirmed the presence of three main habitats in the area, none of which were defined as a Critical Habitat:

- Desert habitat;
- Steppe habitat;
- The SGCC Reservoir.

Social Environment

Regional & Local Demographics

The total population of Kashkadarya is 3.34 million people, the majority concentrated within the capital city of Karshi (The State Committee on Statistics, 2021). The district of Guzor has a population of 212,400 (The State Committee on Statistics, 2021). The population of Otkuduk, is located within 3 km of the project site has a population of 500 people (Golders, 2014). Eshonkuduk, approximately 20 km from the project site, includes the settlements of Kengsoy and Abduhamit. The Mahallah (village council) of Eshonkuduk has a population of 4,032 people.

Of all territories/Oblasts in Uzbekistan, the region has the highest poverty rate and proportion of the population considered 'disadvantaged' (State Statistics Committee, Republic of Uzbekistan, 2007). Engagement with local leaders indicates that the most vulnerable groups are rural residents with lower educational levels, particularly women (Golders, 2014).

The rate of emigration from Kashkadarya has decreased over the past 24 years. In 2015 the number of both internal and external emigrants totalled 11,489 persons, compared to the 21,163 persons in 1991 (Indicators of Development, 2012-2015). Though no official statistics are available, discussions with stakeholders indicate that the current trends show young people leaving villages for larger towns and cities (Golder Interview, 2010 and 2013). Rates of immigration from Kashkadarya also decreased between 1991-2015, from 20,639 persons entering the region in 1991, to 11,598 persons entering in 2015 (Indicators of Development, 2012-2015). These tendencies (increasing) for both emigration and immigration are still kept as is to the date.

Regional Economic Profile

Kashkadarya as is a region is widely known for its natural resources with the largest fields of hydrocarbons in the country with the largest gas processing enterprises in Uzbekistan, the Shurtan Gas Chemical Complex (SGCC), Shurtan Gas Processing Plant and the Mubarak Gas Processing Plant. (Golders, 2014). The recently completed "Uzbekistan GTL" plant is one of them as well. The region also has substantial agricultural resources (Golders, 2014).

Regional Livelihoods

The livelihoods of the people of the settlements closest to the Proposed Development, Otkuduk in the Nishon district, and Enshonkuduk and Abduhamit in the Guzor district are very similar and largely based on livestock farming (Golders, 2014). Due to the climate, most farmers raise sheep and goats, which are less expensive to feed. Most animals are taken to markets in Guzor or Karshi. Many families also raise chickens and turkeys for personal consumption (Golder Interview, 2010).

Regional Landuse

At a local level, land is owned by the Government and is rented for periods of 30 to 50 years. The land used by the SGCC project is property of the Government with no private leases within the Project footprint (Golders, 2014).

The Shurtan Specialized Forestry is located approximately 2km north-west of the SGCC plant which the planting of Amaranthaceae. Haloxylon (saxaul) around the SGCC site covering an area of approximately 200ha. A significant proportion of the land within a 10 km radius of the project site is arid desert.

Impact Assessment Methodology

Impacts are defined as physical changes to the physical, biological and / or socio-economic environment attributable to the construction and operation of the SGCCUP, which will occur at different scales and extents over time and space. The significance of the impacts has been defined through consideration of the impact magnitude, receptor sensitivity and the probability of the impact occurring. This has been done both pre-mitigation and post-mitigation, taking account of measures incorporated into the project design to reduce or remove impacts. Where the impact assessment has defined high or moderate significance impacts, further consideration is given to additional mitigation measures, in conjunction with the design elements, to adequately compensate for the impacts.

The ESIA identifies opportunities to reduce adverse impacts recorded as 'Moderate' or 'High' through proposing of practical and cost-effective mitigation measures. Mitigation measures will include commitments to long-term operation and maintenance as well as monitoring required ensuring their effectiveness.

Environmental and Social Management and Monitoring Plan

All the mitigation, management measures and commitments identified during the impact assessment for the construction, operation and decommissioning phases have been incorporated into the Environmental and Social Management and Monitoring Plan (ESMMP). The ESMMP define the measures necessary to avoid, reduce, and remedy identified significant negative impacts to acceptable levels and promote and enhance positive impacts. These will satisfy both SGCC's internal policies, local HSE standards/guidelines and where these are not available, international standards/guidelines will be used. Any additional requirements being defined during the Project design phase will be also included in the updated ESMMP.

Human Rights Impact Assessment

In response to the requirements set forth in the fourth revision of the Equator Principles (EP4, 2020) and the International Finance Corporation (IFC) Performance Standards (PSs) on Environmental and Social Sustainability (2012) SGCCUP in cooperation with Environ Consult CIS developed Human Rights Impact Assessment (HRIA, Environ Consult CIS, 2022). In line with EP4, the Report gives due consideration to internationally recognised human rights statutes and guidance, including Universal Declaration of Human Rights (UDHR), the United Nations Guiding Principles on Business and Human Rights (UNGPs) and guidelines of Danish Institute for Human Rights. Each of the IFC Performance Standards has elements related to human rights dimensions that a project may face in the course of its operations.

A Human Rights Impact Assessment Report (HRIA, Environ Consult CIS, 2022) provides the result of human rights risk analysis and impact assessment conducted by Environ Consult CIS in respect of

the Shurtan Gas Chemical Complex Upgrade Project (SGCCUP). HRIA has assessed the SGCCUP and the Company's operations against these Performance Standards and will enable the Project to address identified human rights issues.

Climate Change Risk Assessments

The Shurtan Gas Chemical Complex is aware of potential of greenhouse gases (GHG) impacting the environment on a global scale through their contribution to the climate change and is committed to actively promoting the reduction of GHGs across its operations in a safe, technically and commercially viable manner.

SGCC confirms its full responsibility in managing GHG emissions of the Shurtan Gas Chemical Complex Upgrade Project, including identification, accounting and reporting, monitoring and control, prevention and minimization of the Project carbon footprint and increase of the Project energy efficiency. The Project is going to be implemented taking into account existing best practices for climate change mitigation and adaptation. Climate Change Risk Assessment (CCRA, Environ Consult CIS, 2022) based on the technical solutions used in the Project and is performed to establish the main impacts, climatic physical risks and transition risks associated with the Project. The assessment includes a description of the climate baseline, the main technical solutions and an assessment of their impact on climate change, including an assessment of greenhouse gas emissions.