**Summary of Shared Water Challenges**

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| **Water Challenge** | **Associated Public-sector****Agency Initiative** | **Relevance/Rationale for Stakeholders** | **Relevance/Rationale for Site** | **Priority for****Site** | **Rationale for Prioritization** |
| Water Un-Availability | Karachi Water Supply & Sewerage Board | **Surface Water** (Keenjhar Lake receiving water from Indus River). In Pakistan, Indus River water is allocated to different provinces as per Indus Water Accord (IWA) of 1991. Sindh Province has second highest water share of Indus River water after Punjab Province in Pakistan as per IWA of 1991. However, incidents of less water supply to Sindh Province due to unjust distribution of water shares by Indus River system Authority (IRSA) were reported in past by some media articles. These water sharing conflicts between Sindh and Punjab provinces might affect the water availability to Sindh.• The present supply of KWSB from the Indus (Keenjhar) and Hub source is ~665 MGD (2955 m3/day) against a demand of 820-1200 MGD, resulting in a shortfall of 155-535 MGD. Out of the 665 MGD, ~35% (232 MGD) of the supplied water is lost during transmission, decreasing the water availability to a mere 433 MGD (1968 m3/day). Thus, Karachi is grappling with severe water scarcity and the situation is expected to worsen in the future as the city's population is likely to grow by over 30 % from 2017 to 2030.•Keenjhar Lake provides 95% of Karachi’s water supply. Progressive siltation has been observed in the Keenjhar Lake due to the silt-laden water of the Indus River. The life expectancy of the Keenjhar Lake after siltation has reduced to 87 years from 132 years. Water levels in Keenjhar Lake were reported to be continuously declining, and frequently reaching 14.02 m (46 feet).•In Karachi, groundwater usage has increased considerably due to the acute shortage of surface water supply. Major industrial units and agriculture farmers in Karachi arrange their water sources on their own, e.g., Pakistan Steel Mill and ICI industries bring water from Keenjhar separately via their own water system, while many industrial units and agricultural farmers heavily depend on local groundwater sources. •Some private water supplying companies extract, process, and sell groundwater at a very high commercial cost in bottles. • Apart from this, groundwater availability in the area is sparse, and most of the groundwater is saline and brackish, and hence not fit for drinking or domestic purposes. •Continuous and rapid urbanization and industrialization has constantly driven up water demand against the nearly existing and ageing water supply infrastructure. | The key issue facing the Site is reliability of continuous water supply throughout the year from the piped water supply. Strategic water stewardship at the site level, and at watershed level would significantly assist in sustaining the non-renewable resource of the area over long-term. This may be achieved by undertaking measures to limit water withdrawal and consumption by adopting efficient processes and operations, spreading awareness among stakeholders to utilize the resource sparsely, assisting competing water users to adopt efficient management practices, and implementing artificial recharge measures to replenish the resource at watershed level. | **High** | Business as usual approach could likely lead to: 1) increased competition for the resource and significant increase in stress on the resource.2) more stringent regulations. 3) need to drill bore holes and exploit groundwater sources to support Plant operations. 4) prompt exploration for Prospects of alternate water sources. 5) investments in high water conservation technologies and waterless technologies.6) staff training and awareness to reduce water consumption.8) higher cost of sourcing water from alternate sources; and9) relocation of the Plant to a different area with higher water availability. |
| **Poor Water quality** | **Sindh Environmental** **Protection Agency (SEPA)** | **Surface Water**A study found bacterial contamination (E.Coli and Total coliform) in the entirety of the KB feeder canal indicating human and animal waste inflow at the upstream of the canal. Further, the Kotri CETP located at the upstream of the Keenjhar Lake was reported to be non-functional and discharging untreated industrial waste and municipal waste directly into the canal. Heavy metal contamination from fluoride and arsenic was also observed in the KB feeder canal.• Consequently, the water quality reports for Keenjhar Lake indicate the presence of bacterial contamination making it unfit for drinking purposes without treatment. No heavy metal contamination has been reported in Keenjhar Lake. However, if the water quality of the KB feeder canal continues to deteriorate further in the future, there is a high possibility, that the Site might be at risk of receiving low-quality water/water contaminated with microbes.•To further strengthen the above-mentioned findings, it was found that out of the 118 samples (99- Surface water, 13-Groundwater, 3-RO plants, 3- other groundwater and surface water sources) collected from Karachi by the Supreme Court Task Force in 2017, 107 samples were found unsafe for drinking purposes indicating faecal contamination and turbidity beyond the safe limits. •Anthropogenic sources of pollution and their impact on groundwater are reported from different areas of Karachi.• This has resulted in severe chemical contamination of the water bodies, rivers and streams. •Groundwater quality in the area is known to be saline and brackish, or contaminated due to wastewater discharges. | Receiving good-quality water is important both for site's process and drinking water. The key water quality issue present on site is receiving good quality water consistently through the year. This will ensure reduction of treatment costs | **High** | Good quality process and drinking water sources is important to the site. Quality of source water can impact treatment cost for process water.In addition, the site may impact the underlying aquifer with its wastewater treatment and discharge practices. |
| **Inadequate WASH**  |  | About 71% and 85% of the population in Pakistan have access to basic sanitation and basic hygiene status respectively as per the national estimates for 2023. •70.9% of overall population of the Sindh province has access to drinking water within their residential premises with 73.7% in urban areas and 67.6% in rural areas.•40.1% of overall households in Sindh province have coverage under flush to sewer with 66.9% in urban areas and 8.6% in rural areas, followed by flush-to-open drains at 19.3% and dry pit toilets having 10.4% of coverage. However, almost 12% of households have no toilet facilities available.• In Karachi, ~80% of the households have access to piped water, with private water tankers supplying much of the water required in informal settlements. However, Karachi's surface water as well as groundwater is reported to be heavily contaminated and thus requires prior treatment before catering to the residents of Karachi. According to the reports, 62% of the households receive water without any prior treatment which could give rise to water-borne diseases and affect human health. •Karachi has a separate system for the disposal of sewage and stormwater. However, it was reported that the stormwater drainage networks are not functioning due to massive encroachment and blockage resulting in stagnant water on the road | With the increasing demand for water supply from different stakeholders, the Site may face competition from the communities in the proximity of the Plant. The Site may also face concerns from the communities due to its water use and wastewater discharge practices. Strategic water stewardship at the community and at watershed level may benefit Site in improving its relations with the communities in the region by providing water security in the region. This may provide Site the advantage of being perceived as a water steward in the region. | High | Stakeholder engagement is an important facet of corporate growth and perception specifically in a water stressed region.With growing competition for limited water resources in the region, a positive perception of the proximal communities reduces the risk of community backlash in future. Additionally, it facilitates in ensuring long-term business continuity for the Site specifically, from a community perception standpoint and strengthen its CSR profiling. |
| **Destruction caused by flooding, earthquake, tsunami & other natural disasters**  | Karachi water and supply Department (KWSB) Karachi Municipal Corporation (KMC)Sindh Environmental Protection Agency (SEPA) | • Past incidents of flood (latest in 2022) were found affecting Sindh province especially its agriculture sector.• According to the Post Disaster Needs Assessment of 2022 flood conducted by the Asian Development Bank, European Union (EU), United Nations Development Program (UNDP), and the World Bank, it was found that about 70% of the total damages and losses in Pakistan happened in Sindh province. Sindh’s overall needs assessment for post-flood recovery and reconstruction stands at US$7.9 billion, which is the highest of all the provinces.• Pakistan is number five in the list of top 10 countries most affected by climate change. • Karachi, which is the one of the most vital business centers and important city in Pakistan, is highly susceptible to effects of climate change. • Some of the key climate change risks that may affect the city are heat stress, which is likely to increase the health risk for the citizens and also increase the energy consumption due to increasing domestic and industrial cooling requirements. • This is also likely to increase the water demand and exert stress on the water supply infrastructure. • This is also likely to impact the water and wastewater infrastructure due to submergence, power supply disruptions | The area is exposed to natural hazards and extreme events. This could result in disruption of operations, damage of property and risk to human health.The Site is completely dependent on groundwater as the only source of water. Further it is dependent on external infrastructure for discharge of wastewater. Extreme events can result in temporary or medium-long term disruption of water and wastewater infrastructure. Frequent droughts may result in temporary disruption in water availability and supply. No water governance accountability and responsibility have been defined in provided documents regarding efficient response to water-related events such as floods or droughts. In case of these kinds of events, the site would not be able to efficiently manage | High | Business as usual approach could likely lead to one or more of the following:1) increased competition for the resource and significant increase in stress on the resource.2) potential business interruptions from lack of water supply. |