WATER BUSINESS

Indian Water Industry

Indian Water Industry Overview

The Indian market for water and wastewater treatment is anticipated to expand as the nation sees an increase in private investments, as well as the government's implementation of new business models drawing in remote market participants and hastening the industry's expansion.

The Indian government has launched several programmes to promote the development of wastewater treatment infrastructure, such as the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) which aims to provide basic services like water supply and sewerage to households in urban areas. Additionally, the Namami Gange programme focusses on the cleaning of the Ganga River and its tributaries, which involves the construction of wastewater treatment plants along the river.

The private sector has also been investing in wastewater treatment, particularly in the industrial sector and also in Municipal sector wherever Recycle & Reuse opportunities exists for treated wastewater. Many large industries have set up their own wastewater treatment plants to comply with environmental regulations and reduce their water footprint.

Despite the growth in the industry, there are still challenges that need to be addressed, such as lack of skilled manpower, inadequate funding and inefficient regulatory frameworks. However, the Indian government and private sector are working towards overcoming these challenges and building a more sustainable and efficient wastewater treatment industry.

The Triveni Water Business Group (WBG) is pursuing opportunities with various clients in Engineering Procurement Construction (EPC) and Hybrid Annuity Mode (HAM)/ Public Private Partnership (PPP) projects. We are also exploring PPP opportunities for STP recycling in PPP format.

Current Water Opportunities

The water industry in India has seen significant growth in recent years, driven by increasing awareness of water scarcity and pollution. The industry includes a wide range of technologies and services, such as wastewater treatment, desalination, water purification, and distribution.

To address the water crisis, the Indian government has launched several initiatives and policies to promote water conservation, reuse, and treatment. The government's flagship programmes, the National Rural Drinking Water Program (NRDWP) and Jal Jeevan Mission (JJM), aim to provide safe drinking water to all rural households by 2024. The National Mission for Clean Ganga (NMCG) is another initiative aimed at cleaning the Ganga River and its tributaries.

This presents significant opportunities for growth and investment, driven by the country's growing water crisis and increasing demand for water treatment services. The new opportunities are expected to come from all over India, as various projects are in planning stage and several are undergoing tendering.

We are also exploring opportunities in international markets.

GLOBAL WATER INDUSTRY

Global Water Industry Overview

The global water treatment industry is expected to grow at a CAGR of 7.1% from 2022 to 2029, reaching a market size of USD 489.07 billion by 2029. The growth of the market is driven by a number of factors, including increasing population, rising urbanisation, and growing environmental concerns.

- **Increasing population:** The global population is expected to reach 9.7 billion by 2050, putting a strain on the world's water resources. This will lead to an increased demand for water treatment services, as more and more people will need access to safe and clean water.
- **Rising urbanisation:** The world is becoming increasingly urbanised, with more and more people living in cities. This is leading to increased pollution of water resources, as urban areas generate more wastewater than rural areas. Water treatment will be essential to ensure that the growing urban population has access to safe and clean water.
- **Growing environmental concerns:** There is growing awareness of the environmental impact of water pollution. This is leading to increased regulations on water quality, which will require more water treatment facilities to be built.
- **Increasing demand:** The demand for water treatment solutions continues to rise due to factors such as population growth, urbanisation, industrialisation, and climate change. This demand growth is observed across various sectors, including municipal, industrial, and commercial.
- **Water scarcity:** Water scarcity remains a significant global concern, with many regions experiencing water stress or facing Water Management practices and shortages. This situation drives the need for effective water treatment technologies to optimise water use, recycle and reuse wastewater, and develop alternative water sources.
- **Stringent regulations:** Governments and environmental agencies worldwide are implementing stricter regulations to address water pollution and ensure safe drinking water standards. These regulations require industries and municipalities to adopt advanced water treatment technologies and adhere to stringent water quality standards.
- **Advancements in technology:** The water treatment industry is witnessing rapid technological advancements. Innovations include membrane filtration, advanced oxidation processes, desalination, biological treatment methods, smart monitoring systems, and

data analytics. These technologies enhance treatment efficiency, reduce energy consumption, and improve the overall effectiveness of water treatment processes.

- **Wastewater management and reuse:** There is an increasing focus on wastewater management and reuse to alleviate water scarcity and reduce environmental pollution. Advanced treatment processes, such as membrane bioreactors (MBRs) and reverse osmosis (RO), are employed to treat wastewater to high-quality standards, making it suitable for various non-potable uses like irrigation, industrial processes, and groundwater recharge.

- **Desalination:** With freshwater sources becoming limited, desalination has gained prominence as a viable solution in regions with access to seawater. Reverse osmosis (RO) and other desalination technologies are being widely adopted to convert seawater into potable water. However, desalination is energy-intensive and poses environmental challenges related to brine discharge.

- **Decentralised and modular systems:** There is a growing shift towards decentralised and modular water treatment systems, particularly in rural and remote areas. These systems offer flexibility, scalability, and cost-effectiveness, enabling localised water treatment solutions tailored to specific needs, and reducing the dependence on centralised infrastructure.

- **Public-Private Partnerships:** Collaborations between the public and private sectors are increasingly common in the water treatment industry. These partnerships facilitate investment in water infrastructure, technology development, and knowledge sharing, leading to improved access to clean water and enhanced water management practices.

- **Sustainability and Circular Economy:** The industry is shifting towards sustainable practices and adopting the principles of circular economy. These include resource recovery from wastewater, such as extracting energy, nutrients, and valuable by-products from the treatment process, promoting resource efficiency and minimising environmental impact.

- **Emerging markets:** Developing countries, particularly in Asia and Africa, are witnessing rapid urbanisation and industrial growth. This creates a significant demand for water treatment infrastructure and solutions to address water pollution and provide safe drinking water to expanding populations.

The global water treatment industry is segmented by technology, application, end-user, and region. By technology, the market is segmented into membrane filtration, chemical treatment, biological treatment, and others. Membrane filtration is the fastest-growing segment of the market, due to its high efficiency and optimal operating costs.

By application, the market is segmented into municipal water treatment, industrial water treatment, and others. Municipal water treatment is the largest segment of the market, accounting for majority and focus both of the market share. This is due to the increasing demand for safe and clean drinking water from municipal water treatment plants.

By end-user, the market is segmented into residential, commercial, and industrial. The industrial segment is the fastest-growing segment of the market, due to the increasing demand for water treatment services from industrial companies.

The global water treatment industry is expected to continue to grow in the coming years, due to the factors mentioned above. The market is expected to be driven by the increasing demand for safe and clean water, as well as the growing environmental concerns.

TRIVENI WATER BUSINESS AT A GLANCE

Water Business Group (WBG) of Triveni is an industry leader today in the complete range of Water & Wastewater solutions, offering innovative technology and the latest equipment range. Triveni has strong management and innovation skills in handling EPC projects of any scale across sectors and regions. Triveni provides turnkey execution and operation of water and wastewater treatment plants for both the municipal and industrial sectors.

We have engineering roots and constantly invest in new technology to ensure premium quality with faster deliveries at an optimised cost for our products & services. We have carried out successful execution of more than 100 projects in municipal and industrial projects with quality and commitment to timely delivery.

Cost Management & Efficiencies are in our DNA which helps us to maintain leadership.

Current Water Crisis and What We Offer

- Global urban population facing water scarcity is projected to increase to 2.4 billion people in 2050, with India projected to be the most severely affected. Two billion people of the world do not have safe drinking water.
- Over-consumption and over-development, unsustainable water use, pollution and unchecked global warming are draining humanity's lifeblood.
- Aggressively growing middle class is creating a huge demand for clean and safe water.
- The Indian government and all the state governments have taken a series of initiatives to make our country's water secure. Government programmes like Amrut schemes, Namami Gange, Jal Jeevan Mission, State water and sanitation missions, etc., are yielding the desired results.

Our Water Solutions

Water Business Group offers complete Turnkey/ Engineering Procurement and Construction (EPC) solutions for:

- Water Treatment (Conventional, Ultra Filtration, Reverse Osmosis, Demineralisation, and Sea Water Reverse Osmosis)
- Wastewater/Sewage Treatment (based on advanced technologies like Sequencing Batch Reactor (SBR), Moving Bed Biofilm Reactor (MBBR), etc. both for Municipal and Industrial effluents)
- Design, Build, and Operate Water and Wastewater treatment plant based on Zero Liquid Discharge and reuse.

Water Business Group (WBG) of Triveni is an industry leader today in the complete range of Water & Wastewater solutions, offering innovative technology and the latest equipment range.

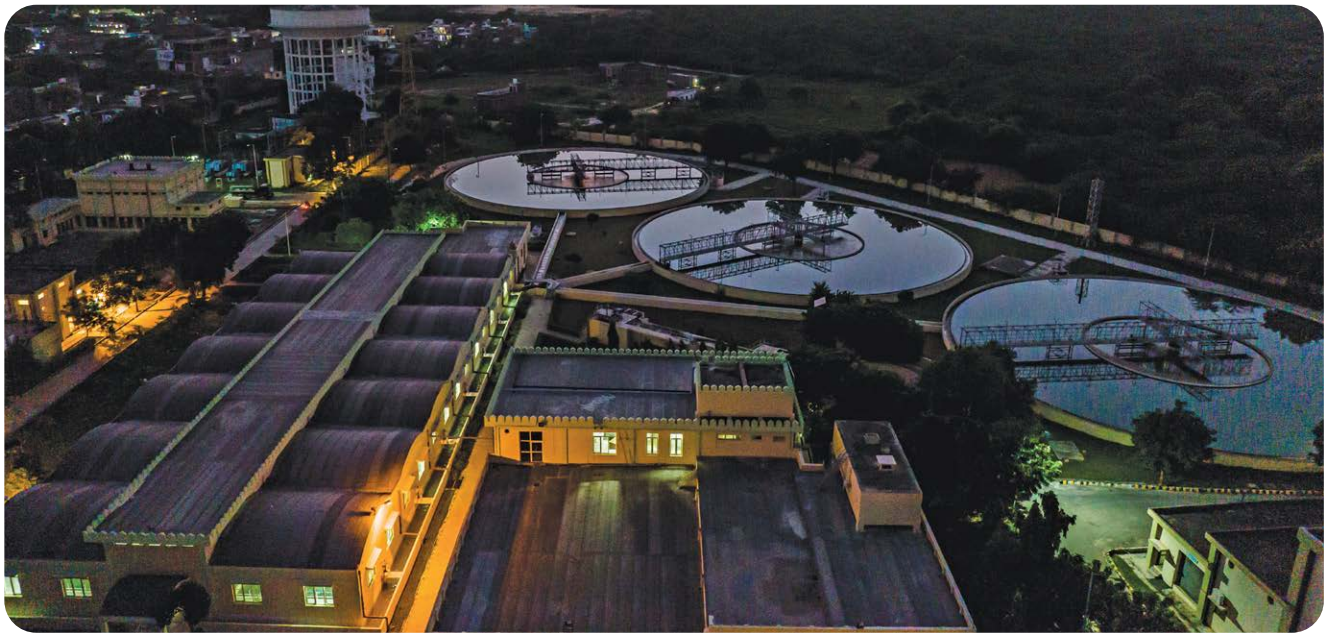
- Water and wastewater collection and distribution networks, including their design, construction, operation and management.
- Manufacturing of equipment for the entire spectrum of water and wastewater treatment industry.
- Operations and maintenance of water and wastewater treatment plants.
- Design Built and Operate Water and Wastewater management systems on Engineering Procurement and Construction (EPC)/ Public Private Partnership (PPP)/ Hybrid Annuity Model (HAM)/ Build Own Operate Transfer (BOOT) models.

Water Treatment, Wastewater Treatment, Tertiary Treatment, Recycle & Reuse and Zero Liquid Discharge

Water Business Group's objective is to provide a growing number of people with access to clean drinking water, and to secure environmentally-compatible disposal of municipal and industrial wastewater. We are committed to contributing sustainable solutions for Water Treatment, Wastewater Treatment, Tertiary Treatment, Recycle & Reuse and Zero Liquid Discharge and Environmental Protection with enhanced quality of life. This drives us towards the development of new technologies and optimisation of existing processes with a focus on emerging markets.

The wide range of water & wastewater treatment plants supplied by us in India includes:

- Municipal Water Treatment Plants
- Sea Water Desalination Plants
- Processing Water Treatment Plants
- Sewage Water Treatment Plants
- Common Effluent Treatment Plants
- Tertiary Treatment Plants
- Recycle and Reuse of Wastewater
- Zero Liquid Discharge



Hybrid Annuity Model (HAM)/ Public-Private-Partnership (PPP) Business

Triveni Water is executing the following two projects in Hybrid Annuity Model (HAM) format:-

Mathura Wastewater Management Private Limited (MWMPL) – a 100% subsidiary of TEIL

MWMPL has undertaken an Integrated Sewerage Management project for the holy city of Mathura (Uttar Pradesh) under one-city-one-operator framework in PPP/ HAM mode, as part of the Namami Gange programme of the Ministry of Jal Shakti, Government of India

With the objective of making the Yamuna river flowing through Mathura city pollution-free, sewage from the designed areas has been intercepted from the drains and diverted through pumping to various Sewage Treatment Plants (STPs) before being allowed into the river.

Our Mathura project subsidiary, MWMPL has undertaken an Integrated Sewerage Management project for the holy city of Mathura (Uttar Pradesh) under one-city-one-operator framework in PPP/ HAM mode, as part of the Namami Gange programme of the Ministry of Jal Shakti, Government of India

One of the key components of the project is recycling of treated sewage after membrane-based (Ultrafiltration followed by Reverse Osmosis – UF/RO) advanced treatment process to a crude oil refinery of IOCL (Indian Oil Corporation Limited) near Mathura city for their process water needs.

Various components of the Mathura project were physically completed during the year, and after completing the ongoing trials for demonstrating mandated KPIs (Key Process Indicators), Commercial Operation date (COD) of Mathura project has been achieved and MWMPL has started 15 years of comprehensive operation & maintenance (O&M) of the facilities.

Pali ZLD Private Limited (PZPL) – a 100% subsidiary of TEIL

PZPL is executing a 12,000 M3 per day (12 MLD) capacity textile wastewater treatment plant for effluent being generated by over 500 industrial units in one of the industrial clusters of Pali district in Rajasthan. The project was awarded by the industry association through their CETP Foundation, a Special Purpose Vehicle (SPV) created for the purpose. The project is being executed in PPP/HAM mode, with part capital funding as Capital grant being provided by the CETP Foundation and also by Rajasthan government through their designated agencies/departments.

The project includes comprehensive upgradation of the existing Common Effluent Treatment Plant (CETP), followed by state-of-the-art advanced tertiary level treatment plant (TTP) to make the treated water fit for use by the same industries, thus making the plant a truly Zero Liquid Discharge (ZLD) system.

Sludge generated from the plant will be minimised through extensive dewatering, drying, heating & incineration processes within the plant facilities and, post treatment, the sludge will be disposed of in secured landfill site.

For Pali-based industries, this will be a unique scheme to get assured supply of recycled wastewater for their process water needs. The recycled water will be of much better quality compared to currently used groundwater from sources in the neighbouring area, thus sparing them from further extraction.

For PZPL, the project scope includes comprehensive operation & maintenance (O&M) for 15 years after project's physical completion.

Operations and Maintenance

Operation and Maintenance (O&M) of Water and Wastewater Systems forms an integral part of the business as WBG conducts various water and wastewater system activities to ensure their effective functioning and compliance with various regulatory and technical requirements.

Triveni provides O&M to keep the water supply safe. We achieve the following outcomes related to operations and maintenance, and ensure that the client's system remains sustainable and costs are reasonable:

- Be knowledgeable of the water system's infrastructure (assets) and their locations.
- Be knowledgeable of the condition of the water system.
- Maintain an adequate disinfection residual in all parts of the system.
- Maintain positive water pressure under foreseeable operating conditions.
- Implement a backflow prevention and cross-connection control programme.
- Ensure proper disinfection and flushing procedures are used for repairs and new construction.
- Monitor for internal and external corrosion of piping and equipment and, if necessary, implement measures to reduce the rate of corrosion.
- Metre water supply and consumption to estimate water usage and losses and, if necessary, implement a leak detection programme.
- Maintain the source water intake, dam, raw water reservoir, or well-head site.
- Keep the treatment plant, pumping stations and reservoirs in good working order.
- Keep the distribution system's valves and hydrants in good working order.
- Swab and/or flush the watermains.
- Maintain a spare parts inventory.

Water Business Group of Triveni has significant experience in the Operations & Maintenance space of business for water and wastewater treatment plants, and offers the following services to customers:

- Operations and maintenance
- Annual maintenance contracts
- Product and process audits, health check-ups, and overhauls
- Pilot experiments
- Refurbishment, up-gradation and automation of existing plants
- Spares, service consumables, and chemicals
- On-site training and assistance

Achievements

- Across India, over 1,200 installations are successfully operating in various segments - infrastructure, industrial, and municipal.
- Through our projects and equipment, over 10,000 MLD of water is treated.
- We have received several Water Awards for innovative project designs.
- In FY 23, we secured Bangladesh (Construction of two sewerage treatment plants for Khulna Water Supply and Sewerage Authority), funded by ADB
- In FY 22, we secured the PALI HAM/PPP project
- In FY 22, we secured the Bhiwadi 6 MLD Zero Liquid Discharge (ZLD) project.
- In FY 21, we secured Maldives project of water and sanitation of six islands.

Processes and Technologies

Triveni Water has access to the latest technologies in water and wastewater treatment plants, and has gained sufficient experience in the following technologies:

- Moving Bed-Bio Reactor (MBBR)
- Sequential Batch Reactor (SBR)
- Activated Sludge Process (ASP)
- Conventional technologies
- Filters: Sand or Membranes
- High Rate Clarifiers
- Membranes and Anaerobic-anoxic-aerobic method (A2O) and nitrification / de-nitrification
- Recycling and Reuse
- Zero Liquid Discharge (ZLD)

OUR WATER BUSINESS PERFORMANCE

The Water business has achieved historically its highest annual turnover of ₹ 352.17 crore vs ₹ 270.21 crore in the previous year (+30.3%) with a PBIT of ₹ 24.28 crore vs ₹ 31.01 crore in FY 22. The higher revenues were the result of more focussed approach in execution.

WBG has a total current manpower strength of 339 employees. The average age of employees is 39, and the median is 38, which indicates a healthy workforce.

The historic high turnover and improving PBIT over the years is an indication that operational efficiency has improved during this time.

WBG is well positioned to undertake more jobs in its chosen area of expertise.

Key Highlights

- 80 MLD (52+28) Sewerage Treatment Plants at Khulna for KWASA, Bangladesh, funded by ADB
- WBG achieved a turnover of ₹ 352.17 crore in FY 23 and PBIT of ₹ 24.28 crore
- The orders received in FY 23 stood at ₹ 192.08 crore, excluding O&M orders
- WBG achieved COD of Mathura HAM project for NMCG/UPJN
- WBG's regular participation in new bids has given it market recognition and WBG is recognised as a major force in this business

New developments & achievements in FY 23

WBG, in FY 23, was successful in securing ADB funded STPs project at Khulna, Bangladesh. On Execution front, WBG achieved Commercial Operation Date (COD) for Mathura HAM project funded by NMCG which entitles it to receive HAM payments over the O&M period.

Business strengths

WBG's inhouse design & engineering and project execution teams are the core strength of our business. The sound financial health of the Company is leveraged for participating in PPP/HAM concession projects. WBG has pan India presence, besides operations in Maldives and Bangladesh. Our in-house Equipment vertical sharpens our skills and knowledge base, and adds to our strength.

OUTLOOK FOR WATER INDUSTRY AND OUR WATER BUSINESS

By 2030, the water demand from the municipal and industrial segments is expected to reach 1,500 cubic km. Thus, the water sector has a positive outlook and offers significant opportunities for various stakeholders, including EPC players, private developers, consultants, and technology and equipment suppliers.

- Government is continuously imposing stricter regulations related to industrial effluent, which catalyses opportunities in CETPs, Recycle & Reuse and ZLDs.
- Central and state governments in India are increasingly implementing environmental policies to ensure ecological balance and reduce water contamination in rivers, sea, lakes, and others.
- They are also emphasising on water conservation and wastewater treatment to maintain ecological balance in the face of shrinking freshwater sources.
- The strict governmental norms and the shortage of water in many regions of India are anticipated to increase the demand for wastewater treatment services.
- Government has started laying emphasis on capacity building and infrastructure development through programmes such as AMRUT, Smart Cities, Namami Gange & Swachh Bharat, and moving to one-city-one-operator model, where one agency will be responsible for all water needs and waste water management system in a city.
- Going forward, investments in the sector will be directed towards providing 24x7 water supply, improving industrial water use efficiency, deploying cost-effective seawater desalination technologies, and encouraging wastewater recycling and reuse.

The Central Government's focus on Namami Gange for cleaning of Ganga, JICA-funded projects in Delhi, Karnataka, and Maharashtra, AMRUT programmes for pollution abatement, recycling and re-use, and stricter vigil by the National Green Tribunal will be key demand drivers.

The Water business has achieved historically its highest annual turnover of ₹ 352.17 crore vs ₹ 270.21 crore in the previous year (+30.3%) with a PBIT of ₹ 24.28 crore vs ₹ 31.01 crore in FY 22. The higher revenues were the result of more focussed approach in execution.

Business Opportunities

New opportunities are emerging in recycle, reuse and Zero Liquid Discharge kind of business on EPC as HAM model. Sewage recycling is a new area of business and wherever Industries are available as off-takers for buying treated sewage, this model will emerge significantly.

NMCG will focus on Ganga tributaries and STP opportunities will emerge on EPC/HAM basis, besides opportunities in schemes like AMRUT, JJM, etc.

As the Water sector is a State subject and it is dealt with by the third layer of governance, it is historically under-funded, and therefore, more PPP/HAM opportunities will arise from Water Boards and ULBs. At present, the Delhi Jal Board is announcing several refurbishment/new STP projects on PPP/HAM formats.

Exim Bank of India is providing significant funding in Asia and Africa, and it is expected that opportunities in the Water sector will increase.

Outlook for FY 24

We are likely to see a surge in business opportunities and new funding flow from Government of India and various State Governments in the next few years. The private sector is ready to take investment position in PPP/HAM concessions, and there is a need to structure the projects properly. Equally important is the need to focus on mobilising new funding sources. Urban Local Bodies (ULBs) also need to build financial and operational capacity.

The outlook for FY 24 is positive. With good visibility on bids, we expect to book significant orders in FY 24 to maintain our growth journey, including EPC and HAM projects.

Opportunities for HAM in the Water industry

Many water boards and ULBs which are starved for funds are planning to structure projects on PPP/HAM basis. The market is also responding to HAM bidding and more than a dozen bidders have shown appetite to invest money in HAM concessions, which shows confidence in the Water sector. Triveni Water Business is in discussion with several municipal corporations and water boards to catalyse PPP and HAM opportunities, and we are trying to create a business niche for ourselves. With its strong financials, the Company can invest in PPP/HAM concession projects and increase EPC opportunities.