Recognizing Excellence in Water Management & Conservation

Compendium of Best Practices



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This report is a compilation of best practices received as part of the 6th Edition of FICCI Water Awards. The case studies of the awardees are published in the report.

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Acknowledgements

FICCI acknowledges the eminent members of the Jury for their exceptional guidance in the final selection of the awardees. FICCI also acknowledges the valuable contributions of the Expert Screening Panel in assessing and evaluating each nomination. We also extend our gratitude to the organizations who participated under the various categories of the 6th Edition of FICCI Water Awards.

Team's Contribution to the FICCI Water Awards and Compendium

The entire process of the FICCI Water Awards and development of Compendium has been executed by the FICCI Water Mission Secretariat- Rita Roy Choudhury, Assistant Secretary General, FICCI; Biba Jasmine, Assistant Director, FICCI; Anju Choudhary, Research Associate, FICCI.

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Compendium of Best Practices

6th Edition of FICCI

WATER

AWARDS

2018




6th Edition of FICCI
WATER
AWARDS
2018



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FOREWORD

Water conservation and demand management holds tremendous potential to help India meet its water needs. As demand increases, water resources are becoming increasingly scarce. Water use has been growing at more than twice the rate of population growth during this century. By 2025, as much as two-thirds of the world's population could be living in countries subject to water stress, with a majority in developing countries.

Water is at the centre of economic and social development. It is vital to maintain health, grow food, manage the environment, and create jobs. Securing water supply for every citizen is vital for survival and economic growth. Creating effective water storage solutions is important. As of late, people are becoming a lot more environmentally conscious. Companies are becoming eco-friendly and a growing percentage of the Indian population is becoming more aware of their actions and the potential consequences that might occur. Despite this, water conservation has not seen the focus it should . The importance of water conservation cannot be stressed enough.

Water availability is and will continue to be a major driving factor for meeting the growth essentials across all sectors – agriculture, industry and public services. In recent years, we have witnessed a growing incidence of conflicts amongst different users and across different regions of our country over sharing of water. It is time that each and every user of water values the need for water conservation and takes steps to prevent its wastage.

These days the discussion is focused more around what is not being done appropriately for water conservation and management. As the need for adopting multifarious solutions to address the crisis is an absolute imperative, we also need a strong focus on what is being done right in a positive and proactive manner by industry, for managing our scarce water resources in a sustainable manner. This is where FICCI believes in creating awareness of models that are robust, scalable and replicable.

To recognize excellence in water management and conservation, The FICCI Water Mission was constituted in 2011 to promote awareness and provide thought leadership in water use efficiency through research, policy advocacy, and sharing of best practices. The Mission has instituted the India Industry Water Conclave and Awards on an annual basis to recognize excellence in water conservation and sustainable water management practices.

This year, considering the importance of wastewater management in urban areas due to high water demand and complex consumption patterns within small but densely populated areas, the Jury for the Awards decided to add a new category on 'Urban Wastewater Management'.

This Compendium of Best Practices is a compilation of the award-winning case studies which identify opportunities to reduce water use while achieving the aspirations of growth. It also aims to raise awareness on the scale and urgency of the water challenge facing the industrial and urban sectors in India and facilitate the engagement of new stakeholders in the discussion on the future management of water. I am deeply grateful to the eminent Jury of the FICCI Water Awards for their invaluable contribution, and for continuously raising the standard of the Awards. I am also thankful to the expert screening panel for their scrutiny and technical evaluations. Last but not the least, I would like to thank all the organisations who sent their nominations for the Awards and applaud the winners for setting high benchmarks for others to emulate.

Naina Lal Kidwai

Past President, FICCI

Chairperson, FICCI Water Mission

SPECIAL MESSAGE



India faces a growing multi-dimensional crisis of water, which becomes more serious by the day. The water solutions we have adopted since Independence are all based on the 20th century paradigm of water resource development, which is now reaching its limits and causing more problems than it solves. We desperately require a multi-pronged paradigm shift in the way we manages our water resources.

India is an increasingly urbanised society and industrialised economy. In my considered view, the problems of urban water are even more complex than those faced by rural India and our track record in tackling them remains poor. Indian industry has among the highest water footprints in the world. It is in its enlightened self-interest to invest in wastewater treatment and reuse the recycled water, since the payback period for these investments is very short. We must also recognise deep synergies in the water sector: recycled waste water can

meet industrial and agricultural needs and be a powerful source of revenue for urban local bodies, at the same time.

In order to draw national attention to these critical issues and to incentivise innovations that proffer solutions to these challenges, the FICCI Water Mission has been recognising the best players in the field through its annual FICCI Water Awards. The aim of the jury has been to reward those efforts that embody truly cutting-edge innovation, while also providing the best chances of replication on a large scale.

I heartily congratulate the winners and hope that FICCI Water Awards will continue to make this invaluable contribution to moving India towards a 21st century paradigm of water management.

Dr Mihir Shah
Chair of Jury – FICCI Water Awards 2018
President, Bharat Rural Livelihood Foundation



MESSAGE

Water resource management in industry is a crucial issue in India. Industrialisation and urban development have accelerated the rate of dependence on natural resources in an unprecedented manner. However, accelerating or even sustaining the water use rates will be a challenge unless issues concerning water security, distribution and usage are addressed. This is being increasingly recognised by FICCI at the highest level. The FICCI Water Mission highlights the need for sustainable initiatives in the management of water resources across different segments of water use .

FICCI strongly believes that industry can play a vital role not just as a user of water but as a benefactor of society at large. We believe there is a need to provide an enabling framework under which industry can partner the government in building effective public private partnerships in water and wastewater management, both in urban and industrial contexts. There is a need to build effective models that create circular and economically viable urban wastewater management models in India. Various

estimates for per capita water availability indicate a declining trend with a projection that India will move into the category of water stressed state by 2050.

There is also a growing realization on the need to save water resources for our survival and growth and across the years, efforts have been undertaken to promote water conservation amongst various users. As a result of this, one comes across initiatives undertaken by institutions in the government, non-government and industrial sectors. Individuals have also championed the cause of water conservation through their personal commitment. It is imperative for us to know what role Indian industry sees for itself in the emerging scenario, wherein there is rapid depletion of freshwater sources coexisting with the need to sustain a growing economy.

FICCI is actively working towards recognizing efforts and leadership in water use efficiency and conservation; developing a knowledge base on sustainable water management practices adopted by different stakeholders, and disseminating best practices for encouraging their adoption.

The Indian Industry Water Conclave and Awards instituted by the FICCI Water Mission recognises significant sustainability initiatives and best practices adopted by industry to towards water conservation and demand management. The categories under the Awards address many crucial questions, such as: How are companies working towards adopting sustainable water management approaches? How can technology help in enhancing water treatment and reusing the treated water? Fortunately, there are bright spots of innovation and new approaches within corporates and cities that are learning to do more with less.

Ensuring safe systems for our communities starts with leadership that embraces innovation and alternative financing while engaging the private sector in ways to provide safe and convenient water supply.

The prestigious Water Awards would further strengthen our commitment to continuous engagement with industry towards supporting their development as we recognise the value of building strong relationships with public sector, private sector and communities for sustainable growth.

This compendium provides a number of additional insights on activities and innovative approaches used by stakeholders in industry which could add value to others for similar adoption. I congratulate the winners of the Awards this year for their exemplary work. It is their work that we draw inspiration for others in industry and urban environment.

I thank the Expert Screening Panel for their immense effort in the scrutiny and assessment of each nomination. I am grateful to the Jury for their valuable time to this initiative, for elevating the understanding of excellence in sustainable water management, and for showing the direction towards making meaningful contribution to all stakeholders through the learnings of the FICCI Water Awards.

Dilip Chenoy
Secretary General, FICCI





FICCI WATER AWARDS

FICCI WATER AWARDS

FICCI launched the Annual Water Awards in 2012. The awards were initiated with the following objectives:

Recognize efforts and leadership in the area of water efficiency and conservation; and

Develop a knowledge base on sustainable water management practices adopted by different stakeholders and disseminate best practices for encouraging their adoption.

AWARDS CATEGORIES



Industrial Water Use Efficiency

Industrial units belonging to the water intensive sectors



Community Initiatives by Industry

Industrial units (CSR departments, civil society organizations involved, if any)



Water Initiatives by NGOs

NGOs (Registered as a society, trust, not for profit organization) working in the area of watershed management, drinking water and sanitation.



Innovation in Water Technology

Product developer/technology supplier in the area of water purification and treatment



Urban Wastewater Management

Any unit involved in water and wastewater supply and management in the urban space like, Urban Local Bodies (ULBs), Jal Boards, Water Intensive Industries etc. including the extraction, treatment, and distribution of water, and collection and treatment of wastewater-activities which are directly managed by Water and Wastewater Utilities (WWUs)

SELECTION PROCESS



PHASE 1

CALL FOR APPLICATION

Beginning 10th June 2018, call went live

The call for awards is put up through print and online advertisements, and nominations for the different categories are received. A standard template for sending information is developed for every category.

Through its network and database, FICCI Water and Environment division reached out to organizations working in the areas of water and wastewater management, based on the eligibility criteria

PHASE 2

PRELIMINARY SCREENING

Initial screening by the FICCI Water Secretariat, to ensure adherence to eligibility criteria.

PHASE 3

EXPERT SCREENING PANEL

An Expert's Panel was formed to screen each category and check the authenticity of the date and information presented. This was carried out before the first Jury meeting.

PHASE 4

JURY MEETING

Each application under all the five categories were presented by the Expert's Panel to the Jury. Jury upon thorough review and discussion, shortlisted applicants to make presentation to the Jury and answer additional questions.

PHASE 5

FINAL AWARDEES SELECTED

Post the presentation with the shortlisted applicants, the Jury finalized the winners in each category. FICCI Water Secretariat reached out to inform them and invite them to the awards.



WATER AWARDS THROUGH THE YEARS

2012

1. Essar Steel India Limited, Hazira, Winner, Industrial Water Use Efficiency Category.
2. ITC Limited, 1st Runner Up, Industrial Water Use Efficiency Category.
3. Tata Chemicals Limited, Winners, Community Initiatives Category.
4. Hindustan Unilever Limited, 1st Runner Up, Community Initiatives Category.
5. HSIL Limited, Winners, Innovation Category.

Winners of the Water Awards being felicitated by Shri Montek Singh Ahluwalia, Former Deputy Chairman of the Planning Commission, Government of India, Smt. Shiela Dixit, Former Chief Minister of Delhi, Ms. Naina Lal Kidwai, Chairman, FICCI Water Mission, Past President, FICCI and Dr. Arbind Prasad, Former Director General, FICCI.











2013

1. Noamundi Iron Ore Mine - Tata Steel Limited, Winners, Industrial Water Use Efficiency Category.
2. ITC Ltd – Bangalore, 1st Runner-Up, Industrial Water Use Efficiency Category.
3. JSW Steel Limited, Vijayanagar Works, 2nd Runner Up, Industrial Water Use Efficiency Category.
4. Ambuja Cement Foundation, Winners, Community Initiative by Industry Category.
5. ITC Limited, 1st Runner Up, Community Initiative Category.
6. Vikram Cement Works, 2nd Runner Up, Community Initiative by Industry Category.
7. IRRAD (An Initiative of S. M. Sehgal Foundation), Winners, Initiatives by NGOs.
8. Watershed Organisation Trust, 1st Runner Up, Initiatives by NGOs.
9. KGDS RE Pvt. Ltd., DST & NIOT, Winners, Innovation in Water Technology Category.
10. Ortho Clinical Diagnostic, J&J Company, 1st Runner Up, Innovation in Water Technology Category.

Winners of the Water Awards being felicitated by Shri Montek Singh Ahluwalia, Former Deputy Chairman of the Planning Commission, Government of India, Ms. Naina Lal Kidwai, Chairman, FICCI Water Mission, and the Past President, FICCI and Mr. Atul Singh, Group President, Asia Pacific, The Coca-Cola Company.





















2015

1. ITC Munger (1st Prize), Industrial Water Use Efficiency
2. Ambuja Cements Ltd (2nd Prize), Industrial Water Use Efficiency
3. Infosys Limited, Bangalore (3rd Prize), Industrial Water Use Efficiency
4. Ambuja Cements Foundation (1st Prize), Community initiatives by the Industries
5. Ultratech Cement Ltd (2nd Prize), Community initiatives by the Industries
6. Ramkrishna Jaidayal Dalmia Seva Sansthan (1st Prize), Initiatives by NGOs
7. SIRUTHULI and Watershed Organization Trust (joint 2nd Prize), Initiatives by NGOs
8. Sanjeevani Institute for Empowerment and Development (3rd Prize), Initiatives by NGOs

Winners of the Water Awards being felicitated by Ms Jyotsna Suri, Past President, FICCI.

















2016













1. ITC Ltd. Saharanpur, Winners, Industrial Water Efficiency Category
2. TATA Motors Ltd., 1st Runner - Up, Industrial Water Efficiency Category
3. ITC Ltd. Jalahobli, 2nd Runner - Up, Industrial Water Efficiency Category
4. ITC Ltd., Winners, Community Initiatives by Industry Category
5. Self Employed Women's Association (SEWA), Winners, Water Initiatives by NGOs Category
6. Group Photograph for the FICCI Water Awardees for 2016

Winners of the Water Awards being felicitated by Shri Shashi Shekhar, Former Secretary , Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India; Dr Mihir Shah, Chairman of Jury, FICCI Water Awards 2016; Ms Naina Lal Kidwai, Past President, FICCI; Dr Didar Singh, Former Secretary General, FICCI; Ms Rita Roy Choudhury, Assistant Secretary General, FICCI.

2017

1. Sterlite Copper Vedanta Ltd (1st Prize) in the Industrial Water Use Efficiency
2. Aga Khan Rural Support Programme (1st Prize) in the Water Initiatives by NGO's
3. Akhil Bhartiya Samaj Sewa Sansthan (2nd Prize) in the Water Initiatives by NGO's
4. Hindustan Ecosoftt Pvt Limited (1st Prize) in the Innovation in Water Technology category.
5. Technorbital Advanced Materials Pvt Limited (2nd Prize) in the Innovation in Water Technology
6. SM Sehgal Foundation (3rd Prize) in the Innovation in Water Technology

Winners of the Water Awards being felicitated by Mr Parameswaran Iyer, Secretary (DWS), Ministry of Drinking Water & Sanitation, Government of India, Dr Amarjeet Singh, Secretary, Ministry of Water Resources, Government of India; Dr Mihir Shah, Chair of Jury - FICCI Water Awards 2017, President, Bharat Rural Livelihood Foundation, and Former Member, Planning Commission; Ms Naina Lal Kidwai, Chairman, FICCI Water Mission, and Past President FICCI and Ms Rita Roy Choudhury, Assistant Secretary General, FICCI

















FICCI WATER AWARDS 2018



JURY



Dr Mihir Shah
Chair of Jury

Dr AK Gosain
Member of Jury



Mr Raghava Neti
Member of Jury



Mr VK Madhavan
Member of Jury

EXPERT SCREENING PANEL

Dr Dipankar Saha



Dr Manoranjan Hota

CHAIR OF JURY, FICCI WATER AWARDS 2018



Dr Mihir Shah
Chair of Jury – FICCI Water Awards 2018
President, Bharat Rural Livelihood Foundation
Former Member, Planning Commission

Dr Mihir Shah has spent the past three decades living and working in remote, central tribal India, forging a new paradigm of inclusive and sustainable development, and strengthening Indian democracy through initiatives for people's empowerment, led by women.

From 2009 to 2014, he was Member, Planning Commission, Government of India, holding the portfolios of Water Resources, Rural Development and Panchayati Raj. He is the youngest ever Member of the Planning Commission. Dr. Shah was chiefly responsible for drafting the paradigm shift in the management of water resources enunciated in the 12th Five Year Plan. He also initiated a make over of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), the largest employment programme in human history, with a renewed emphasis on rural livelihoods, based on construction of productive assets.

In 2015, the Government of India invited him to chair a Committee on Restructuring the Central Water Commission and Central Ground Water Board and also to chair a Committee to draft the National Water Framework Law and the Model Groundwater (Sustainable Management) Bill. These are currently under the active consideration of the Government of India. In 2017, he was invited by the Government of Karnataka to Chair the Task Group set up to draft the State Water Policy.

Dr Shah graduated in Economics from St. Stephen's College, Delhi University (where he won the prestigious KC Nag Economics Prize) and did his post-graduation from the Delhi School of Economics (where he was Merit Scholar) in the 1970s, before going on to complete a much-acclaimed doctoral dissertation at the Centre for Development Studies, Kerala.

He is the first President of the Bharat Rural Livelihoods Foundation, set up by the Government of India to support innovative civil society action in close partnership with state governments.

His papers have been published extensively in pre-eminent journals such as Economic and Political Weekly, Current Science, Ambio, Hydrogeology Journal, Journal of Hydrology, Contributions to Indian Sociology, Review of Development and Change, Seminar and Indian Journal of Labour Economics.

Dr Shah has addressed audiences on his life's work all over the world from Stanford University to the World Bank in Washington, the OECD in Paris, the Arctic Circle in Iceland, Chatham House and University College, London; UNESCO-IHE at Delft, International Institute for Applied Systems Analysis in Austria, the EAT Forum, Stockholm; the Himalayan University Consortium in Chengdu, China; International Water Management Institute in Colombo and the Singapore Water Week.

JURY MEMBERS



Dr A K Gosain

Professor, Department of Civil Engineering
Indian Institute of Technology- Delhi

Dr. Ashvani K. Gosain, is an Emeritus Professor in the area of Water Resources Engineering and GIS Technologies, in the Civil Engineering Department, IIT Delhi. Prof. Gosain pioneered the climate change impact assessment on Indian water resources that was incorporated in the NATCOM I & II – two National Communications made to the UNFCCC. He has also been reviewer for AR4 and AR5 of IPCC.

Prof. Gosain has served on many prestigious assignments within and outside the country. Twenty three students have completed their Ph.D. under his supervision. Prof. Gosain contributed to the formulation of the Ganga River Basin Management Plan (GRBMP), of which he was the Team Leader of the Water Resources Management group. He has also formulated the Drainage Master Plan of NCT of Delhi for the Delhi Government. He is also part of the expert committees appointed by the National Green Tribunal to suggest solutions to deal with the ever increasing pollution levels in Ganga and Yamuna. Prof. Gosain has his distinction in the formulation of the Ganga Act on behalf of the Ministry of Water Resources, River Development & Ganga Rejuvenation, as a member of the committee.



Mr Raghava Neti

Senior Infrastructure Specialist
The World Bank, India

Mr.Raghava Neti has about 27 years of experience in Urban Development, Rural and Urban Water and Sanitation, Natural Disaster Risk Mitigation sectors. He worked in diverse set of development projects and Technical Assistance activities, supporting the central and state governments in India. He is a Senior Infrastructure Specialist, with the Water Global Practice, based at New Delhi. Raghava Neti has led many of the innovative projects in the World Bank, some of them are implemented for the first time in India. He is leading the country's first Program-for-Results (PforR) investment support program that was designed to disburse funds only upon achievement of results in the Rural Water Supply and Sanitation (RWSS) Sector in Maharashtra. He is also leading the World's largest sanitation program financed by the World Bank – Swachh Bharat Mission Support Operation (USD 1.5 billion). In the Urban Water Sector, he has successfully led to completion, the country's first 24x7 water supply project in India that has demonstrated improved and sustainable 24x7 water services in India. He is working on a Green Field capital city development project in Amaravati, Andhra Pradesh, India.



Mr VK Madhavan

CEO
Water Aid-India

Following a Master's in International Politics from Jawaharlal Nehru University in 1991, Mr. Madhavan commenced working with the Urmul Rural Health Research and Development Trust in Bikaner district of north-western India where he worked in various capacities till 1998. Subsequently, Madhavan worked with ActionAid and The Hunger Project in New Delhi following which he spent eight years working in the Kumaun region of Uttarakhand with the Central Himalayan Rural Action Group (Chirag). In his years as a development professional, Madhavan has worked on an integrated approach to rural development - community health, primary education, natural resource management, on and off-farm livelihoods and investing in young generation. Prior to assuming his role as Chief Executive of WaterAid India, Madhavan was Managing Director of Skills Education Private Limited, a company that provides youth with access to information, skills and opportunities leading to employment.

EXPERT SCREENING PANEL



Dr Dipankar Saha
Former Member (HQ), Central Ground Water Board,
MoWR, RD & GR, Govt. of India
Former Member Secretary, Central Ground Water Authority

Dr Saha is a former of Member, Central Ground Water Board, under Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India. He had also served as Member Secretary, Central Ground Water Authority and Head of National Ground Water Training and Research Institute, Raipur. He spearheaded the National Aquifer Mapping and Management Programme, the largest ground water mapping endeavor in the world, as National Coordinator. He obtained PhD on Ground Water Management from IIT-ISM, Dhanbad.

He has authored more than 50 papers in International Peer Reviewed Journals and delivered more than 300 lectures and key note addresses in national and International Seminars. He is professionally trained from Asian Institute of Technology, Bangkok and from JICA, Tokyo. He represented the country and presented papers in World Bank session at Kathmandu, International Atomic Energy Agency at Ho-Chi Minh City, and Vienna, World Water Week – Stockholm, India-UK Water Security Exchange- Wallingford, Oxfordshire, IAH Congress in Dajeon, Korea.

He led the Govt of India Delegation to Myanmar. He is the recipient of National Geoscience Award – 2010 conferred by Ministry of Mines and Excellence in Ground Water conferred by International Association of Hydrogeologist-Indian Chapter in 2014. He is presently Secretary of International Association of Hydrogeologist- Indian Chapter.



Dr Manoranjan Hota
Former Advisor
Ministry of Environment, Forest and Climate Change, GoI

Dr Hota has professional experience in the field of Chemicals & Waste management, Environmental Impact Assessment, Pollution Control, Project management in pollution control and waste management, Environmental Health, Environmental Management & Environmental Audit, Sustainability and Environmental governance, Policy planning, Research, Life Cycle Assessment, Biosafety, Environmental Law enforcement, monitoring and Compliance.

Besides, He was the UNEP Regional Advisor for Biosafety Clearing House and also has experience of other Multilateral Environment Agreements (MEAs) in chemicals and wastes by representing India in negotiations in the Minamata Convention, Rotterdam Convention, ICCM.

He was the Regional Coordinator for Strategic Approach for International Chemicals Management (SAICM) for the Asia-Pacific region; Member, Chemicals Review Committee, Rotterdam Convention of Prior Informed Consent on international trade of hazardous chemicals; Chair, UNEP Asia-Pacific Mercury Storage Programme Member, UNEP Mercury Global partnership programme and represented India in the UNEP Intergovernmental Negotiating Committee meetings on Mercury.

He has experience with the implementation of Cartagena Protocol on Biosafety. He was the National Focal Point for the Biosafety Clearing House for the CBD Secretariat of the Cartagena Protocol on Biosafety and represented India in negotiations in the CoP meetings. He has experience in serving as an International Biosafety System Expert in many countries particularly with the Asia-Pacific Countries.

Awardees 2018



CITATION FOR THE AWARDEES

CATEGORY

Industrial Water Use Efficiency

ITC Maurya
1st Prize

ITC Maurya is being awarded the first prize in this category for demonstrating its commitment to reducing its consumption of water by investing in efficiency improvements across a wide-range of areas within its premises. By demonstrating application of the principles of water use efficiency widely in the hotel, ITC Maurya will help set a bench-mark for the hospitality industry to follow suit. The improvements in water use-efficiency have been demonstrated by a reduction in total consumption per head per day between 2016-17 and 2017-18 from 300.5 litres to 251.3 litres (including kitchen and laundry). The initiatives include water efficient dishwashers, condensate recovery system and an automatic tube cleaning system in addition to treatment and reuse of waste-water.

CATEGORY

Community Initiatives by Industry

HSBC - WASH Project, in partnership with South Asian Forum for Environment (SAFE)
1st Prize

The HSBC - WASH Project implemented in partnership with the South Asian Forum for Environment is being awarded the first prize in this category for its holistic approach to sustainable water and sanitation. This project has led to attention being focused on a hitherto ignore aspect of the urban environment – lakes and wetlands. The creation of a women-centric integrated solution to safe water, safely managed sanitation, renewable energy and livelihoods through this project is a model worth emulating.

CATEGORY

Urban Wastewater Management

Surat Municipal Corporation
1st Prize

Surat Municipal Corporation is being awarded the first prize for their exemplary work in the Urban Wastewater Management category. Surat Municipal Corporation has demonstrated a well-planned, integrated approach to urban water management backed by a comprehensive use of technology, data and analytics and recognition of not just the need to influence consumer behaviour but to respond to their needs. Their sustainability measures include: A. The establishment of a Water Supply Grid for economic transmission of water from water works to water distribution stations; and to supply the lifeline water supply requirements in case of any breakdown. B. Instituting a Domestic Sewage Recycling plant for subsequent use by industry. C. The recycling and reuse of 0.3 Million litres of domestic wastewater in various Municipal parks and Gardens across Surat city. D. Creating French-wells for obtaining sub-surface water to meet water demand and E. Rain-water harvesting. Surat Municipal Corporation could serve as an example of sustainable water management in a city for the rest of this country.

CITATION FOR THE AWARDEES

CATEGORY

Innovation in Water Technology

Joint 1st Prize

Transchem Agritech Private Limited

Transchem Agritech Pvt. Limited is jointly being awarded the first prize in this category. Transchem has developed a bio-filter for usage in waste-water treatment. This bio-filter can not just treat industrial effluents but domestic sewage as well. The requirement for space and the capital expenditure required by this technology is lower than other conventional methods that are currently being used in this space. The treated water can be used for non-potable applications like farming, agriculture and washing purposes. The potential for use of this technology not just by industry to treat effluents or waste water but more importantly for treatment of both grey and black water from urban habitations makes this an attractive effort.

WATSAN Envirotech Private Limited

WATSAN Envirotech Private Limited is jointly being awarded the first prize in this category for the Natural Terafil, Arsenic & Fluoride removal water filters. Terafil Technology allows purification by percolation of water through nano-porus clay candle medium. The technology helps in Arsenic and Fluoride removal through passive absorption. These filters are low-cost, do not require any energy for operation, low maintenance and do not lead to rejection of water and concern about the treatment of the reject water. Given the extent of arsenic and chemical contamination, these filters could provide a low-cost and sustainable answer to the requirements of a large section of our population.

CATEGORY

Innovation in Water Technology

NTPC Limited

3rd Prize

NTPC Limited is being awarded the third prize in this category in recognition of the contribution of NTPC Limited to thermal power generation in India and the potential for scaling-up the innovation in this plant across NTPC's plants in the country. This innovation has demonstrated its potential for converting waste water into water with a quality equal to distilled water using heat – a resource that is adequately available in thermal power plants. This technology is of particular significance for coastal areas where salinity in water is a concern. The technology, has demonstrated its capacity for water saving, heat rate improvement, water reuse and minimisation of water discharge. Widespread adoption of this technology could lead to NTPC producing not just power but safe drinking water.



Category: Industrial Water Use Efficiency

CATEGORY: INDUSTRIAL WATER USE EFFICIENCY

1st PRIZE

ITC Maurya



Mr Zubin Songadwala
General Manager, ITC Maurya

'Ecological degradation is looming large on the horizon. Global warming, depleting water level, deforestation and their combined effect on living and non-living beings have reached such a proportion, that it has become a threat to humanity. ITC Hotels follows the Responsible Luxury credo.

Various initiatives on Sustainability have contributed towards a carbon positive, solid waste recycle positive and water positive system. With water scarcity increasingly becoming an area of serious concern, ITC Maurya continues to focus on integrated water management including water conservation and harvesting initiatives at its units - while also working towards meeting the water security needs of all stakeholders. These include adopting latest technologies to reduce fresh water intake and increase reuse and recycling practices, best practices to achieve zero effluent discharges, rainwater harvesting, and more'.

ITC HOTEL
RESPONSIBLE LUXURY
ITC MAURYA
NEW DELHI
THE LUXURY COLLECTION

ITC Maurya - Sustainable Water Conservation Agenda

As a part of its Responsible Luxury initiatives, ITC Maurya has pioneered endeavors towards maintaining a greener and healthier environment. The hotel undertook a host of multi-faceted programmes to not only improve its own environment, but also to propagate environmental causes. The guiding principle is 'Triple Bottom Line Approach' which considers Socio-Economic & Environmental impact and thereby creates a Planet Positive experience for our Guests. The hotel has its own long term water sustainability programme, encompassing local participation, creating awareness among employees and internal conservation, through energy and water saving, state of the art technologies , external water audits and usage of environment friendly material.

INNOVATIVE PROJECTS IN WATER SAVING



IITC Maurya is nested in the heart of Delhi – a premier luxury hotel, acknowledged as the preferred "residence for world leaders and global Icons" for over the years. The unit has contributed in energy efficient Dishwasher, Condensate Recovery System, Automatic Tube Cleaning System, Agni Sumukh Gas Burner, Sewage Treatment Plant etc. to reduce the water requirement and optimize the process.

The Water-Use Pattern

The Hotel has a benchmarking of 320 litres per head total consumption per day excluding laundry, kitchen, staff and water bodies.

ITC Maurya's per head water consumption in 2016-17 was 300.5 litres which has successfully reduced to 251.4 litres in 2017 - 18.

Year	Daily Consumption (In liter)	Total FnB Cover (Annually)	Total consumption (in liter per head)
2016-17	529290	642912	300.5
2017-18	526530	764341	251.4

Year	Water use in Industrial process only (in m^3) STP water – (Cooling Tower + Flushing)	Water use in Utilities and other services# (in m^3) STP water (Army Mess + Horticulture)	Water use for Drinking purposes (in m^3) (NDMC)	Actual production of the plant (mention unit of production) (Total NDMC + Bore well) (In m3)	Specific water consumption (m^3 per unit of production)	
					For fresh water only Drinking Water/ (FnB Cover)	For total water (NDMC + Borewell)/ FnB Cover)
2014-15	61381	107300	40779	188463	0.069	0.32
2015-16	63793	107557	52298	191024	0.095	0.35
2016-17	63793	111142	53410	193194	0.086	0.31
2017-18	67006	110437	52985	192183	0.069	0.25

ITC Maurya has reduced the total production of the plant by 10,11,000 litres of freshwater with respect to 2016 -17 with an increased cover in food and beverages.

Water Conservation Measures

DRY CLEANING MACHINE

The Team has identified the water utilization process for Dry Cleaning Machine based on heat exchanger cooling and distillation process.

It was observed by the team that the water after utilization in cooling the machine heat exchanger and distillation process was going to the drain, and only the water used for dry cleaning process was sent to the Sewage Treatment Plant (STP).

The team brainstormed on the potential opportunity of water saving and decided to take the input water of the heat exchanger by tapping chilled water line and drain water pipe line.

- The impact on HVAC load was negligible.
- Water Saving of 6,170 litres.
- It improves the machine performance by 7%.
- Periodicity for oil replacement reduced to half.

Unit has shared the modification with Original Equipment Manufacturer (OEM) and they have appreciated the efforts.

Wastewater generation and treatment



Dry Cleaning Machine



Condenser



Oil Separator

WATER & ENERGY SAVING AGNISUMUKH GAS BURNER



BEFORE



AFTER

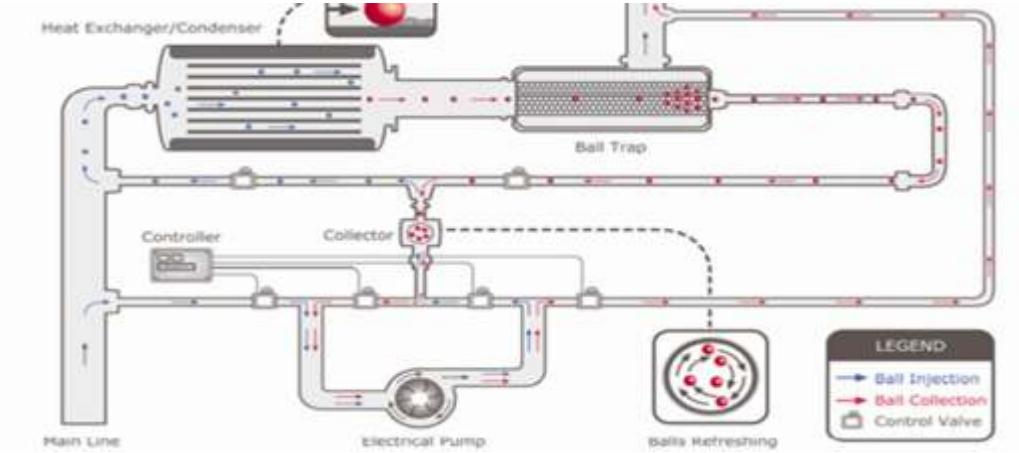


Advantages over the conventional type gas ranges :

- Uniform heat without burning while retaining the moisture of the food ensuring tastier and healthier food;
- Using lesser water for cooking as compared to regular conduction type of cooking range;
- Convention cum radiant heat which has infrared rays capable of penetrating the tiniest water molecules and passing heat through them;
- A radiation with this frequency of energy converts molecule into tiny atoms and cooks with minimum gas pressure compared to the conventional gas burners.

AUTOMATIC CHILLER TUBE CLEANING SYSTEM





- Automatic tube cleaning system continuously cleans the condenser tubes of the chiller plant. eliminates the wastage of water done in the manually scale removal process.
- This prevents fouling inside the tubes and maintains constant heat transfer.
- This results in constant condenser approach in chiller operation thereby improving chiller energy performance.

3D TRASAR (COOLING TOWER WATER OPTIMIZER)

3D Trasar technology platforms help to optimize scale, microbiology and corrosion condition with innovative chemistry sensors and control algorithms.

- Saves the substantial amount of amount by raising cycles of concentration.
- Reduces chemical consumption and water discharge.
- Maximizing cooling tower performance.





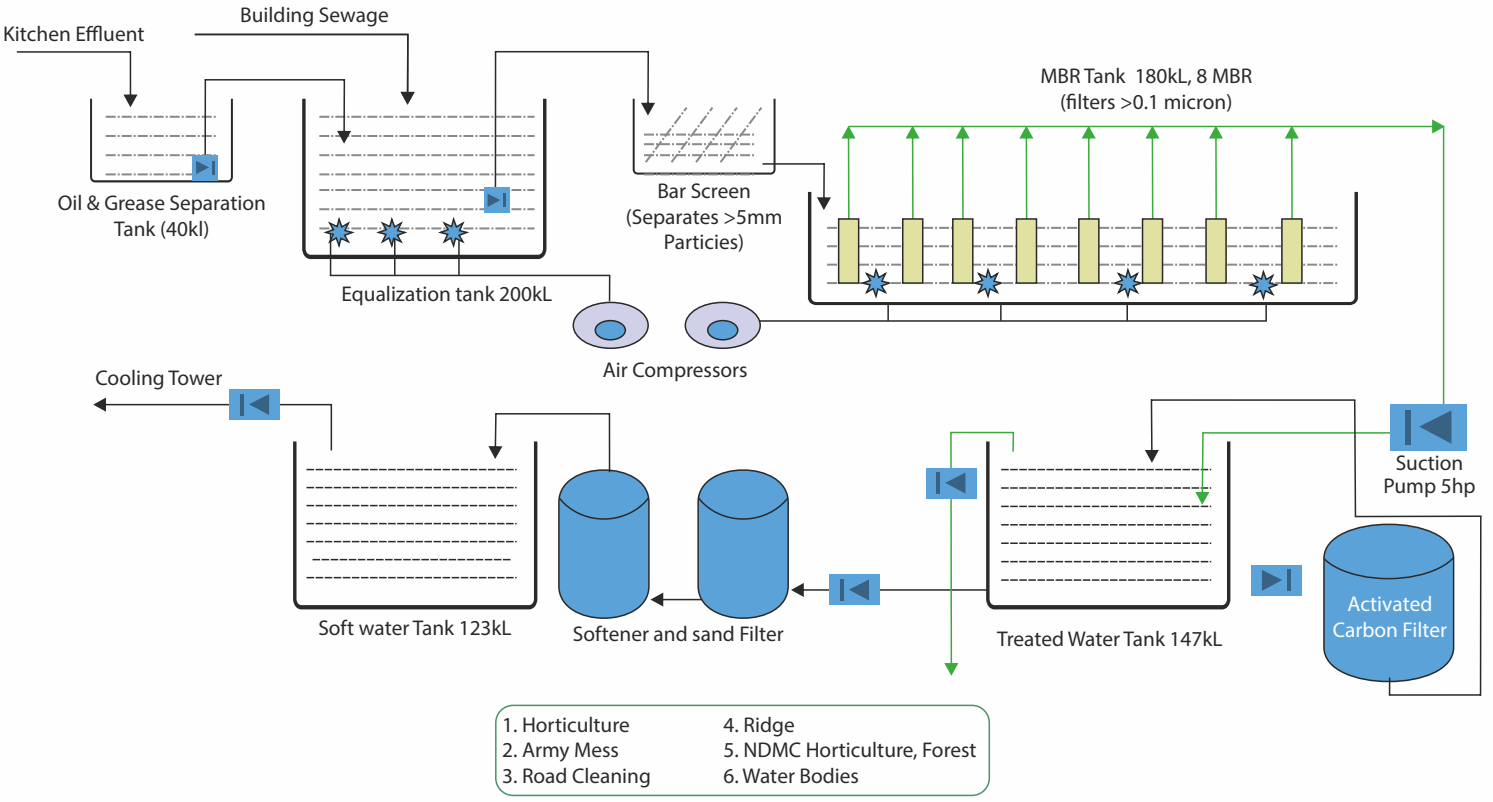
MEMBRANE BIO REACTOR BASED SEWAGE TREATMENT PLANT

The process is a combination of biological wastewater treatment and membrane filtration. Biodegradable pollution is reduced using bacteria and microorganisms (BioAmp system). Following biological treatment, the activated-sludge is separated from the treated water by a microfiltration membrane.

Unit utilizes treated Waste water within the building for Gardening, Air-conditioning (cooling towers), Flushing in guest room and associate toilets, Road washing. Excess STP treated waste water is given to neighbouring complexes for their gardening purposes, thus reducing ground water intake.

BioAmp is an on-site microbial fermentation and delivery system that produces an unprecedented amount of active, naturally occurring bacteria, automatically every day. This BioAmp system delivers 30 trillion live, vegetative Pseudomonas and Bacillus bacterial cells every 24 hours into your drains, grease traps or waste water systems.

STP (Membrane Bio-Reactor) Layout



WATER EFFICIENT DISHWASHING STATION



Dishwasher technology has improved dramatically over the last decade. New energy star certified models reduces the water and energy consumption and improve performance.

- It has sensors to adjust the cycles for optimum cleaning with minimum water and energy use.
- Allow efficient use of detergent and water through the cycle.
- More efficient jets use less water and detergent to spray over the dishes when cleaning.
- Optimum use of the water in the water efficient veg washer nad immersion cleaning machines instated of cleaning under running taps.
- Washing and spinning with in one programme sequence without having to put the salad/vegetables into the another basket self cleaning programme.
- Better ergonomics for charging and discharging.

WATER EFFICIENT VEG WASHER



AUTOMATIC IMMERSION CLEANING MACHINE



SWIMMING POOL ROBOTIC CLEANING

Automatic pool cleaner is a vacuum cleaner intended to collect debris and sediments from the swimming pool with minimal human intervention.

- Use of robotic pool cleaner is more energy efficient than a standard main pool filter system.

Saving on chemical usage - It vacuums all type of debris and remove algae and bacteria thereby substantially reducing the amount of chemicals needed





AUTOMATIC PURGING VALVE



Automatic purging valve quickly and effectively remove the air trapped inside the chilled water pipeline. As the air in the water system can cause the corrosion reduced the efficiency, inadequately cooled rooms and ongoing complaints. Thus, manual purging was done to avoid the concerns.

With use of the automatic purging valves, eliminates the manual purging and directly saves on the wastage of the chill water occurs due to the manual purging. The process is basically, air rises and collects in the air chamber before they are vented form the system via an integral automatic valve.





Category: Community Initiatives by Industry



CATEGORY: COMMUNITY INITIATIVES BY INDUSTRY

1st PRIZE

HSBC - WASH Project, in partnership with South Asian Forum for Environment (SAFE)



Ms Aloka Majumdar
Head of Corporate Sustainability
India, HSBC

"HSBC's environmental initiatives support access to safe water and sanitation, freshwater sustainability, climate change, and conservation of biodiversity and habitats. In India, water is a key focus area as millions of people lack access to clean drinking water. Developing dedicated projects under water and providing access to clean drinking water, will have a long term sustainable impact on the communities we are helping."

HSBC- Sustainable Water Conservation Agenda

Water is a basic necessity. It helps build healthy communities and drive socio-economic growth. Launched in 2012, this is the 7th year in which we are running our water programmes in various parts of the country. Today, we have projects running in communities located in the Sundarban Islands in West Bengal, we support communities affected with Fluorosis in Tumkur, Karnataka, projects that help restore farm lands, redistilling of farm wells in Kolar, Karnataka, Hosur in Tamil Nadu and Vizag in Andhra Pradesh.

HSBC launched a Sustainability Training Programme across three cities namely Mumbai, Hyderabad and Bengaluru which engages volunteers to collect data on various water bodies in these cities for research being conducted by institutions such as Centre for Environmental Science & Engineering, Indian Institute of Technology IIT Mumbai, Centre for Water Resources, Jawaharlal Nehru Technological University, Hyderabad, and Indian Institute of Science IISc, Bengaluru.



South Asian Forum for Environment (SAFE) uses solar energy to power the energy intensive WASH sector to create equitable and uncompromised access to WASH for the poor. The enterprise has propounded an innovative circular design for a sustainable and gender equitable circular economy towards climate adaptive lifestyle of urban poor to facilitate basic amenities like water, energy, and sanitation with minimal emission footprint.

The purpose is using new energy solutions in energy intensive WASH sector for equitable and uncompromised access to WASH for the poorest of poor. A sustainable revenue linked model based on solar power for integrated and inclusive development in health, prosperity and community services that can scale up on its own. A women centric end-to-end solution for climate adaptive lifestyle of urban poor to facilitate basic amenities like water, energy and sanitation with minimal emission footprint. A solar based business enterprise propounding circular economy at grassroots.

Implemented in four slum areas namely, Kalikapur, Bantala, Nonadanga and Raina.

Introduction

The programme under the aegis of HSBC & SAFE partnership is aligned to newly drafted National Water and Sanitation Policy in India, propounding right to clean drinking water and sanitation to all. The policy has prioritized regional preferences of action to address the statistical gap in achieving national targets. Therefore, the proposal importantly focus on three primary aspects

1. Access to safe water for all, ensuring community governance towards budgeted and wise-use of water resources and its recovery as well through ecological harvesting.
2. Establish a sustainable revenue linked participatory model, by developing community ownership and warranted community sanitation habit
3. Integrate the community intervention on water and sanitation with a 'low-carbon' initiative by prompting the use of renewable energy in WASH sector

Clean water is touted as "Next Oil" in recent times and UNDP report (2010-11) states that slum dwellers in global south do not have direct and equitable access to drinking water and sanitation standards, as recommended by WHO. Though, the dream for free access to clean drinking water for all is next to impossible in peri-urban slums of India, this proposal tries to deliver a sustainable solution by developing a revenue return model and as well subsidizing the

WASH services so that poorest of the poor can afford it. Very uniquely the intervention touches up nine Sustainable Development Goals depicting an inclusive growth.

Prologue & Rationale

Despite longstanding efforts, water supply and sanitation in India continues to be inadequate and the level of investment in water and sanitation is albeit low by international standards. Local self-government institutions are weak and lack financial resources to carry out their functions of operating and maintaining the water and sanitation infrastructure. An estimated 79% of economically challenged Indians still lack access to safe water and improved sanitation facility. As of 2010, the UN estimation based on Indian statistics shows that 626 million people still practice open defecation. In June 2012, Indian Minister of Rural Development stated that India is the world's largest "open air toilet". According to Indian norms, access to improved water supply exists, if at least 40 liters/capita/day of safe drinking water are provided within a distance of 1.6 km or 100 meter of elevation difference, to be relaxed as per field conditions. In this context the main water and sanitation challenges pertain to 24X7 continued supply of safe potable water for all, for which an average 4 man-hours per day are spent now in collecting the same. Inadequate management of water distribution through an inefficient distribution system supplying contaminated water adds to its worse. At the moment, households are forced to complement a deficient public water service at prohibitive 'coping' costs; of average US$0.67 per day per household which is 35% of their income in the rural sector and for the peri-urban poor as well. There are about a 2700 urban and peri-urban slums in the metropolis of Kolkata itself wherein water supply systems are defunct. Urban Local Bodies play only a limited role in provision of drinking water supply and sanitation facilities in these areas and there has been limited success in implementing decentralization.

The Genesis of A Panacea for WASH

The proposed intervention is an integrated community based holistic plenary on 'water and sanitation' issues of urban poor, inhabiting the slums of metropolis in India. It propounds a sustainable revenue return model for unrestricted access to WHO recommended safe drinking water through micro-retail services for community and clean sanitation facility. The facility, named as 'WASH-US' meaning 'Water Sanitation and Hygiene for Urban Slums', has an improvised Solar Power run water-treatment plant sustained on harvested surface water in ponds and supplying budgeted volume of drinking water to slum dwellers at a nominal and affordable price, along with a common hygienic sanitation unit for them. Community enjoys the facility with a contributory 'service fee' for maintenance of the facility and also earns revenue by micro-retailing the excess of potable water to urban consumers in the area. A biogas plant fed with the refuse of community toilet and other organic garbage of the area supplies to a community kitchen in the day time and generates electricity to illuminate strategic points at night for the safety and security of womenfolk. The HSBC - SAFE partnership established the first project named as 'WASH-US' in 2014 in Kalikapur Slum in Kolkata followed by with support from HSBC and furthered it in 3 slums of Kolkata, viz. Bantala, Nonadanga and Rania and the unique innovative model has been scaled up in northeastern India, by the World Bank

Cyclic Technology: Renewable Energy in WASH

The intervention provides 24X7 safe drinking water to the beneficiaries through automated water dispenser using a chip enabled RFID touch-card. A 7.5 kVA photovoltaic solar plant runs a 100 Ltrs/hr capacity membrane filtration unit for water treatment. The zero-effluent 'cyclic design' of the intervention enables

refusal water from the treatment plant to flush hygienic bio-sanitation, whereas the effluents of bio-toilets generate bio-gas and bio-manures to earn nominal fees for these services. The excess of drinking water and solar energy is sold to urban communities and power grid respectively, for earning additional revenues.

Cyclic Economy: The Entrepreneurial Model

The intervention is run and managed through women led Joint Liability Groups (JLGs), who are trained and initiated to the business model through capacity building. These JLGs are bank linked and share the profit for inclusive growth and extend community services and benefits too. The intervention has the business potentials for scaling up and can be credit linked to bank finances as a small scale enterprise. The gross monthly income from sale of water and power with service fees collected from sanitation, biogas and bio-manure is used to sustainably suffice the operational cost of each WASH-US unit. 80% of Cash Flow After Tax is kept as reserve for scaling up and rest 20% is distributed as profit to JLGs.

Innovations in the Technology

A. Using new energy solutions in energy intensive WASH sector for equitable and uncompromised access to WASH for the poorest of poor. This has broken the water-energy nexus making the poverty trap wider.

B. A cyclic design and circular economic couple to make sustainable revenue linked model based on new-energy regime for integrated and inclusive development in communities at the bottom of the economic pyramid.

C. A women centric end-to-end solution for climate adaptive lifestyle of urban poor to facilitate basic amenities like water, energy and sanitation with minimal emission footprint.

Community Partnership

The community partners have active roles in decision making system, resource budgeting, and participatory planning towards set-up and operations, management of funds, and budgeting for maintenance. Further, they are involved in strategic assessment and third-party evaluation through feedback systems. While stakeholders find great prospects in showcasing it as a sustainable climate adaptive intervention in an essential service segment with a circular design, the community partners benefit from revenue returns, insurance coverages and financial inclusion for inclusive growth, sustainable development and poverty alleviation other than the facility of equitable access to water energy health and sanitation for the community. Towards enrichment of human resources, there are three tiers of skill building in this intervention, of which the first one is a community-based activity for participatory water and energy resource budgeting and its allocation. The other one is purely technical training for installation, operation and maintenance of the solar run water treatment plant, which has been given to community youth and the last one is on financial inclusion, marketing and retail supply chain, value chains etc for business promotion that has been imparted to women entrepreneurs.

Social Impacts

Instilled WASH interventions in four slums caters to 1800 households with nearly 10,000 heads of whom 47% are women. It achieved 100% gender equitable access to WASH facility and as well to new energy for sustainable lifestyle. The facility attempts to culminate all social conflicts on water and energy usage prompting participatory resource budgeting. Water borne disease occurrence is reduced by 68-70% in 30 months that impacted a 47-55% reduction in medical expenses and as well school drop outs got reduced by 45-50%. 40% women have saved time for alternative livelihood and underwent capacity building for the same, whereas 80% reduction in social conflicts & events of domestic violence assured societal cohesion and fraternity. Poverty alleviation prompted child care and formal education, recreation and community preparedness, etc. Gender equity, self esteem and shared responsibilities in community activities would expectedly enhance. 93.8% women admitted water and sanitation is easily accessible with 78% less queue time as 85% sustainably using bio-sanitation. 85% women have bonus time and 370 women joined training courses for alternative livelihood.

Ecological Impact

The 12 instilled facilities would run entirely on solar power and abate 180MT of CO2eq. of emission per year in addition to 17.8 MT from bio-gas. The 'zero-effluent' circular design reduce water footprints by 75-80%. At an average 37000 Lt/Yr Green water was harvested, 80000 Lt/day Grey water reused & equivalent Blue water recharged by reclaiming 120 Hectares of urban wetlands. Installed 38 kVA Solar Power units for renewable energy and as well production of nearly 1.5 LPG cylinder equivalent biomass energy / month were climate adaptive advantages. The integrated system recycled nearly 1700 MT/Yr Municipal Solid Waste and revived nearly 25 sq km urban habitat with plantation and wetland conservation to leverage as a green quotient. Associated environmental impacts entail production of equivalent volume of organic manures that would reduce the usage of 40 MT of chemical fertilizers per annum.

Economic Benefits

The enterprise targeted a profit volume ratio of 80-85% and achieved 72% profit on sale with an expenditure-income ratio of 3.85 and a breakeven period of 40 months per unit. It also assured a beneficiary pay out of INR 3000.00 per head per month, keeping in reserve 40% of cash flow after tax deduction. Economic benefits for the community, as expected, was an increase of 17-20% in per capita income of the JLG members managing the WASH units and 100% financial inclusion and insurance coverage of the community members therein. The facility generated 7000 manhours to generate 24 employments for both the genders. There was a direct and positive impact on the lifestyle of the beneficiaries and the basic amenities like health education and habitat could be assured without any compromise on the livelihood.

Overall Outcome

Usage of renewable energy in 'energy intensive' WASH sector has not only enabled commons at the bottom of the economic pyramid with equitable access to state-of-art WASH facility, it has also imparted lifestyle education on sustainable consumption and production through wise-use and participatory planning. The success of the intervention has definitely helped in poverty alleviation, health rejuvenation and habitat restoration, but more so it has given

the freedom from the fear of failures of participatory action at the community level that has enhanced community resilience and augmented preparedness. The impact of ecological well-being in economic betterment is so evident in this intervention that the gap between thought and action could be sustainably mended. It has up-scaled aspiration, established the 'Theory of Change' through societal and economic achievements, furthering the signifance of circular design in circular economy.

Scale-up Potentials

The sustainable revenue linked model of the intervention allows the enterprise to scale-up and grow on its own with a mere pay back period of few months, such that the facilities will tripple in next 05 years post-ante installation. The scope of scaling up is very high given the socio-economic advantages and environmental benefits. Owing to the same reasons, the enterprise can well avail credit linkages for such circular economic interventions from financial institutions or may be supported with corporate grants under the aegis of their societal responsibility windows. The most urgent needs would be to economise the capital costs and assuring better maintenance of the facility in trained hands. For this, a workshop needs to be set up for putting assembly lines of the solar and water machineries and to do maintenance activities. More capacity building is required for the community partners for empowering them and as well reduce the cost of maintenance. More perfected economic cost-benefit analysis is also essentially important for easy credit financing for scaling up.

Gender in WASH

The enterprise is an equal opportunity enterprise and ensures gender equity in all steps and tiers of planning implementation, production, management and maintenance. Women are given equal opportunities and equivalent scope of participation and partnership to sustainably manage the enterprise. Gender considerations are integrated equitably in participatory resource budgeting and allocation, distribution of products and services, management of facilities and its up-scaling, trouble shooting and conflict resolution. Even in technical innovations and facility hardware management, gender equity is stressed upon. Gender equity and responsibility sharing in facility and fiscal management scored 83.88% in a 5-point attitude scale.



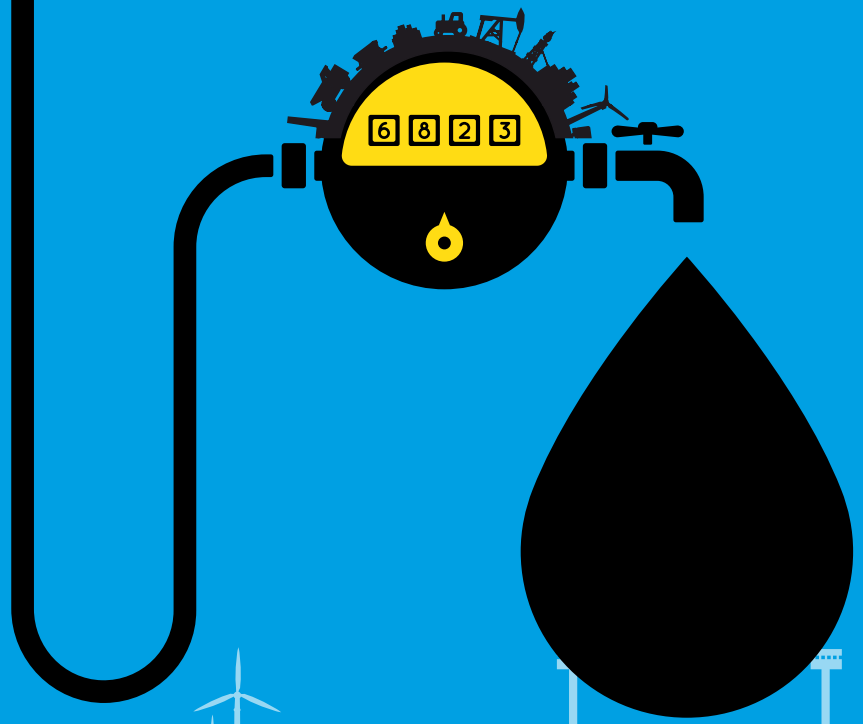
GLOBAL IMPACTS: Awards & Accolades

The intervention is sustainably scaled up in the deltaic areas of Sundarbans World Heritage site reaching out to nearly 10,000 climate vulnerable households in 18 rural hamlets. The cyclic design was awarded, adopted and replicated by World Bank Groups in Assam, and Meghalaya under the aegis of India Development Marketplace in 2014. Beyond borders, it was also adopted by 03 Municipalities in India & 02 in Bangladesh for replication and policy implication in WASH. Internationally, the intervention won the 'Water for Life Award 2015' from UN-Dept. of Economic and Social Affairs and was one in top-10 innovations in WASH of Open-ideo platform after being longlisted for Ashden Award in 2016. Most recently it has been awarded Hogan Lovell's Community Innovation Award 2018 for replication in Sub-Saharan Africa.





Category : Innovation in Water Technology



TRANSCHEM AGRITECH PRIVATE LIMITED

1st PRIZE



Mr Atul G. Shroff
Managing Director
Transchem Agritech Private Limited

"The need of the nation is sustainable and cost effective water management. In the last 25 years we have been doing the research and development using multi dimensional approach using chemistry, inorganic chemistry, botany and biotechnology with our experience of more than 80 years in chemical industry to develop trans Bio filter."

Transchem Agritech Private Limited - Sustainable Water Conservation Agenda

The 20th century has brought a lot of innovations and development but unfortunately not in the field of wastewater treatment, particularly in developing countries like India. There are various options for wastewater treatment, from conventional Effluent Treatment Plants (ETPs) / Sewage Treatment Plants (STPs) to Bio-Filtration wastewater treatment system. In the 21st century, the solutions providers who win will inevitably be those that are efficient, decentralized and with minimal land use, all of which allows substantially reduced costs. For developing regions of the world, the focus is on building cost effective and sustainable decentralized systems, wherein wastewater can be treated at the source, since water transportation costs are 70-82% of governments spending for water management in most countries.

TransBio-Filter is a patent pending, proprietary, green, sustainable and cost-effective wastewater treatment technology developed with 25 years of Research & Development keeping the need of the society in mind.

TransBio-Filter is an innovative technology that harnesses the energy, carbon and other elements of wastewater and converts it to "Bio-nutritional" products, Bio-Fertilizer and nutrient rich water with the use of hybrid earthworms, organic and inorganic media.

Trans Bio Fiilter works brilliantly in treatment of sewage and industrial effluent. It has proven to treat simple waste water like city sewage and also complex industrial effluent streams containing phenol and pyridine in a cost effective and sustainable manner.

Transchem Agritech Pvt. Ltd. is a specialized company offering wastewater treatment solutions that are cost-effective, sustainable and reliable. It is considered advanced green technology. Trans Bio-Filter is our patent pending, proprietary and sustainable technology which is an innovative wastewater treatment system in India and in the world. Throughout India's development, we've found that 20th century advancements did not change much in terms of wastewater treatment. We've always thought of the multitude of challenges of the 21st century. From 25 years of continuous Research & Development, incorporating customer feedback and accounting for the needs of society, our technology has withstood time. Our system is 100% Environment-friendly and cost-effective.

The rationale and importance of our innovative technology is that it directly helps users with a very real problem. India's generating thousands of millions of liters of wastewater daily and the existing capacity to treat it is far less than that. This means that the environment and ultimately all living beings are affected by the dirty sewage and industrial effluent which pollutes the natural water sources.

For the innovative 21st century, trans Bio-Filter is a wastewater treatment technology that fits right in. Trans Bio-Filter can efficiently treat industrial effluent and domestic sewage and is ecologically and economically viable with a low footprint. A decentralized approach addresses a number of issues including transportation, reusability and costs. The treated water can be used for non-potable applications like farming, agriculture and washing purposes.

Technology details

Trans Bio-Filter is sustainable, green and cost-effective technology and is one of its kinds in the world. The concept is 'Design with Nature'. It has proved its worthiness and moved successfully from lab research to the practical world. There is a range of applications from treatment of domestic sewage & municipal wastewater to industrial effluent e.g. Chemical Distillery Effluent- Slop Multi Effect Evaporator Condensate, Phenolic Effluent treatment, Natural Dye, Caprolactam Effluent treatment and Dairy Effluent.

The trans Bio-Filter has four layers. It consists of a bed filled with organic and inorganic media along with hybrid earthworms. The wastewater passes through the filter beds where the organic matter is retained. The organic matter is then degraded. Trans Bio-Filter is designed for maximum removal of contaminants.

Layer characteristics:

1. The top most active layer comprises of custom organic and inorganic media consisting of earthworms, microbial cultures & bedding material.
2. Next layer comprises of gravel, sized from 50 - 70 mm.
3. Below that is a layer of big gravel aggregates of 100 - 150 mm in size.
4. The bottom most layer comprises of big rubbles, sized from 200 - 230 mm.

Vermi filtration is age old technology and is being used for treatment of sewage across the world. The research included the principles of organic chemistry, inorganic chemistry and biotechnology. We've been able to treat complex industrial effluents through our biological treatment system i.e. Trans Bio-Filter.

Our biological system i.e. Trans Bio-Filter reduces COD and BOD loads and other impurities like Ammonia-NH3, H2S etc. even in presence of high TDS and at varied hydraulic load giving cost effective sustainable results.

It also involves removal of organic matter by adsorption & filtration followed by biological degradation. There is also oxygen supply by natural aeration to the treatment system. It is a natural way of recycling nutrients and removing toxins.

The output of this is bio-compost which can be harvested once in a year. There is also treated water rich in nutrients (including Nitrogen and Phosphorus) and Oxygen. The bio-compost and the treated water can be used for agricultural purposes. The treated water can also be used after tertiary treatment for flushing, washing along with other applications.

Considering the nutrient content in treated water as:

- Available Nitrogen - 50 mg/l
- Available Phosphorous -- 7 mg/l
- Available Potassium - 25 mg / l

For 800 cubic meters of treated water, the nutrient availability is:

- Nitrogen - 40 kgs/day i.e. 14000 kgs/annum equivalent to 28 tons of Urea
- Phosphorous - 5.6 kgs/day i.e. 2000 kgs/annum equivalent to 4.0 tons of DAP
- Potassium - 20 kgs/day i.e. 7000 Kgs/annum equivalent to 12.0 tons of Potash

Technology impact on water management

The product enables 100% water recycling, a substantial reduction in ground water contamination and better agricultural produce. The nutrient-rich treated water allows farmers who use it for farming generate a yield of four times the crop in comparison to if they had watered their crops with regular water.

A decentralized approach can help address a number of issues including transportation, reusability and costs. When treated at source, the water can be used for non-potable applications. It also leads to substantial savings in transportation costs since we build our system near the source. This also means that there are reduced energy costs.

The organization has replaced a conventional industrial ETP (chemical industry effluent containing Sulphur and chloride) with Trans Bio-filter system, with a plant capacity of 180 KLD:

1. The power load was reduced by 82%
2. The retention time was reduced by 99% from 10 days to 45 minutes
3. The Capital Expenditure was reduced by 75%
4. The Operations Expenditure was reduced by 65%

With reference to one of the Sewage Treatment Plant (STP), the results are:

Sr. No.	Parameters	Units	Before treatment inlet	After Trans Bio-Filter treatment	Standard Irrigation Norms*
1	pH	--	7.0 – 7.8	**7.5 – 8.0**	5.5-9.0
2	Color	--	Dark Grey	**Pale yellow**	--
3	Odor	--	Strong	**Odorless**	--
4	T.D.S.	ppm	1500 – 2000	**1200-1800**	2100
5	Turbidity	NTU	100 – 150	**<10**	--
6	C.O.D.	ppm	500	**50-80**	100
7	B.O.D.	ppm	100 – 200	**10-20**	30
8	DO	ppm	Nil	**3-4**	--
9	Fecal Coliform	MPN / 100 mL	$> 10^6$	**$< 10^3$**	$< 10^3$

Nutrient Recovery Through Trans Bio-Filter

Sr. No.	Parameters	Units	Before treatment inlet	After treatment
1	NH_4-N	Ppm	25-40	**< 1.0**
2	NO_3	Ppm	10-20	**> 50**
3	Total P	Ppm	4-8	**1-2**
4	Available P	ppm	1-2	**5-7**
5	Potassium	Ppm	10-15	**20-25**

Nutrient Conversion in Treated Water.

Successful Pan-India Installation

Guru Nanak Dev Engineering College, Ludhiana, there is a 500 KLD trans Bio-Filter plant for the treatment of sewage. The treated water is used for agricultural purposes. The farmers' produce is 4 times higher than before the installation due to the use of nutrient-rich water. The cost of the treated water is ₹ 6-7 / KL.

Krishi Vigyan Kendra Jalna, Aurangabad, the source of the wastewater is from the nala. It is a 100 KLD sewage treatment plant. We've implemented a decentralized approach so that since we treat wastewater at its source, we've considerably reduced the transportation and energy costs. Due to the nutrient-rich treated water the farmer's crops yield has increased 4 times than before the installation. The cost of the treated water is ₹ 6-7 / KL

Ekalbara, Gujarat - The capacity of the Industrial wastewater treatment plant is 180 KLD. We achieved a 90% reduction in COD. In terms of economic viability, the cost of operations from our plant is ₹63 per KL as against ₹181 per KL. That is among the lowest in the industry. It is easy to maintain as there is no skilled personnel required to operate our plant.

Excel Crop Care 1.2 MLD (Million Liters Daily) trans Bio-Filter wastewater treatment plant located in a region which is water-scarce especially during the summer. Initially water cost ₹ 80/KL. The cost of the treatment is ₹ 50/KL, which is a 37.5% cost-savings. The treated water can be utilized for gardening. It has been successfully running for five years now.

Economic Viability of the Technology

The cost of operations from our plant is ₹63 per KL as against ₹181 per KL. That is among the lowest in the industry. The annual saving with trans-Bio-Filter system is ₹ 77.52 lakhs. It is truly one of the most cost-effective technologies for our clients. It is also easy to maintain as there is no skilled personnel required to operate our plant. That means there's savings for the long-term for our clients. There is also correlating initiatives of rainwater harvesting along with recharging it.



MULTI-STOREY PLANT



AGROCEL TRANS BIO-FILTER PLANT.



AGROCEL TRANS BIO-FILTER PLANT



CIVIL CONSTRUCTED PLANT

WATSAN ENVIROTECH PRIVATE LIMITED

1st PRIZE



Ms Chandrasekaran J
Founder Director
Watsan Envirotech Private Limited

"'WATSAN strives to provide pure portable water to see smiling children not die because of water borne diseases in near future'.

WATSAN Envirotech Private Limited - Sustainable Water Conservation Agenda

Watsan Envirotech Private Limited – has so far installed 2,10,000 water purifiers and 3,000 arsenic removal filters across their supply chain. Watsan Envirotech also partners with the various state governments like Orisaa, Andhra Pradesh, Karnataka, in helping them mitigate high levels of Arsenic and Fluoride. It plans to appoint 10 representatives in 10 states by 2018, and plans to extend across 19 states by 2020 in India.

Case Study

Watsan vision is to improve the living standards of at least 100 million families within the next three years by providing the most efficient, electricity-free, affordable water filters and ready-to-fit toilets, ensuring a dignified, happy and healthy life.

Clay and sand sintered in patented, tried and tested method by IMMT - CSIR (Council of Scientific & Industrial Research) gives you the CPO Natural Terafil®™ Water Filter which is retrofitted in best water containers designed and moulded at CIPET, the Premier Institute for Plastics technology, who guarantee virgin, toxic free, and food grade containers supply.

OPERATIONS

Raw water is to be filled up in the Filter Unit (top container) by gravity it percolates through the CPO Natural Terafil®™ Water Filters fitted to get filtered through nano-holes, thereby filtering away the pathogens, salts and minerals detrimental to health but retain retain all good salts in the bottom container in few hours time with clean and safe potable water. Therefore, the murky water which also has iron particles and pathogens gets filtered and clean water flows down due to gravitational pull and gets collected in the bottom container.

POTABLE WATER MEETING STANDARDS

Turbidity: Within BIS limit

Iron: Within BIS limit

Micro-organisms: Significantly removed (near BIS)

pH Limit: 7.00 +/- 0.5

Addons: Arsenic removal, Fluoride removal: All meeting WHO standards.

SPECIAL FEATURES

CPO Natural Terafil®™ Water Filters do not use chemical substances for purification. They are electricity-free and are not built with high cost gadgets, refills, moulded bodies or accessories. Hence, they are maintenance-free and they come in an affordable price.

WATER CONTAINERS

Virgin, Toxic Free Food Grade Plastic Containers moulded at CIPET, the Premier Institute for Plastics technology, who guarantee virgin, toxic free and food grade containers to build Watsan Water Filters.

APPROVAL & COLLABORATION

Approval by Department of Science and Technology (DST) in Collaboration with the Inno Nano Research Private Limited, a company incubated and run by alumni and researchers from IIT - Madras.

The Salient Features of Watsan Water Filters are as follows:

1. These water filters do not require any electricity to operate.
2. They are manufactured with nano technology to eliminate disease causing pathogens, filter away Iron, dirty coagulants, odour and colour.
3. There is no spare parts needing replacement, so there is no requirement for any spares or service.
4. The filters can be cleaned regularly using a Tooth Brush (once in 3/4 days) and used.
5. As the filters have a long life usage, there is no recurring expense.
6. They are affordable, maintenance free, portable and simple to use water filters to deliver safe drinking water for years.
7. Watsan stand-alone filters are available for homes as standalone unit comprising a 15 litre upper filtering container and a 15 litre filtered water storage container right below it.
8. High quality food grade containers certified by CIPET is used for Watsan Water Filter containers helps retain the quality of water filtered and stored.
9. The high quality containers do not degrade and have a long life usage.
10. Watsan Filters are manufactured for commercial establishments as a 200, 1000, 2500 litre units.
11. Customized higher volume units can be designed and manufactured as per project needs.
12. Turnkey solutions are also available for Iron & Arsenic and Fluoride filtration.

NTPC LIMITED

3rd PRIZE



Mr. Gurdeep Singh
Chairman & Managing Director
NTPC Ltd.

एनटीपीसी NTPC
A Maharatna Company

"In times of looming global water crisis, we need to drive water efficiency through technological interventions as well as water-saving behavioural change."

NTPC Limited – Sustainable Water Conservation Agenda

Water is a scarce as well as a shared resource. Being a thermal power major, NTPC recognizes its dependence on water and is fully committed to reduce its water footprint.

NTPC follows two pronged approach to drive water conservation and efficiency at its projects. Firstly, it is minimizing its fresh water usage and making its processes water efficient through implementation of state-of-the-art technologies and process re-engineering. Notable among them are changing of "Cooling Tower Blow down from Cold water side to Hot Water side" with saving potential of 8- 10 m3/ hr for a 500 MW unit and "increasing the cycles of concentration (COC) in its cooling water system" leading to water saving of 400 m3/ hr for a typical 1.5 GW station. Air Cooled Condensers (ACC) are being adopted at three projects namely Patratu, North Karanpura and Singrauli, which would save around 77% of water compared to a typically Water Cooled Condensers (WCC).

Secondly, through policy intervention and capacity building NTPC is ensuring good quality fresh water is available in and around its plant locations. It has developed the roadmap for "Zero Liquid Discharge (ZLD)" for all of its plants, 3 among which has already been declared as ZLD plants. Also, to unify the efforts and set the vision for water stewardship, NTPC developed a dedicated Water Policy in 2017. For the CSR initiatives also NTPC has selected water as one of the four focus areas.

As mentioned in the vision and mission of NTPC that it envisions to provide reliable power in an environment friendly manner, it is fully determined to reduce its water consumption significantly. The declining trend of specific water consumption of NTPC plants substantiate the same. But, this is just beginning and NTPC will strive to set new industry benchmarks for water conservation and efficiency.

NTPC-NETRA is an R&D wing of NTPC, catering to the need of 50000 + MW stations, by means of offering technological solutions, validation of innovative technologies, and scientific support. Described here is an innovative and effective technology which is in operating condition and having high potential for converting waste water into good quality (distilled) water using waste heat, which is available in plenty in coal based thermal power plant.

The distilled water can be used as good quality potable water after appropriate remineralisation. This water can also be as make up to demineralisation plant, or cooling water system. This technology has a great significance in coastal cities, where generally scarcity of drinking water prevails. Significance of this technology is that, any industry, having waste heat can convert plant effluent or low quality water into high quality water.

This technology, has demonstrated its capacity for water saving, heat rate improvement, water reuse, minimisation of water discharge.

This technology is tried first time in India. This projected technology has potential for replication and wider use.

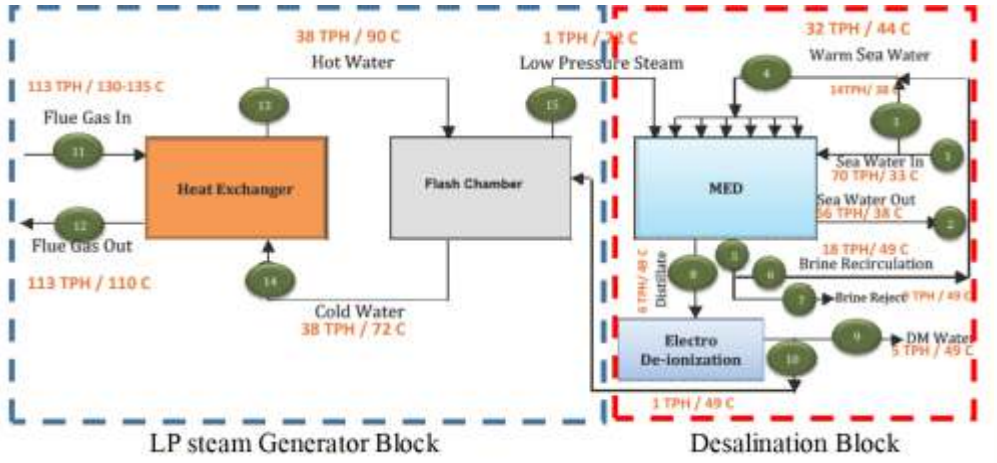
This set of technologies shall pave way for wider application in power stations across India and facilitate conserving most important water resources for the larger benefit of our people.

System Description:

This desalination plant based on waste flue gas is divided in to two main blocks. First block is Low Pressure (LP) steam Generator Block and other is Desalination block. In is LP steam generator block the thermal energy from exhaust flue gas exiting Induced Draft (ID) Fan, in a power plant is utilized to generate hot water at desired temperature using a gas to water heat exchanger.

This hot water is flashed in a chamber which is maintained under vacuum to generate low pressure steam. The flash steam so generated is fed to Desalination block i.e. the 1st effect of Multi Effect Distillation (MED) plant. In this chamber, sea water is sprayed over LP steam piping. Due to the combined effect of high skin temperature of the LP steam piping and vacuum in the distillation chamber, part of the sprayed sea water is evaporated. This phenomenon is similar to a 'falling film reactor'.

This evaporated vapour is fed to the next distillation chamber of MED where it acts as working steam and the above mentioned process is repeated. Last stage of MED is a condenser was vapour generated from preceding stage is condensed. The number of effects depends primarily on the input steam parameters and the Cooling Water (CW) inlet temperature to MED condenser. The desalinated vapours produced in various effects are condensed and send to the electrode-deionization system where it is converted to DM water. Process flow diagram of the installed desalination plant is attached herewith.



Impact of the Technology

This plant has used blow down water of a cooling water circuit (which otherwise is effluent from Cooling water system of plant) and is high TDS water. The output of the system is a distilled water which of < 10 ppm of TDS which is converted into high quality Demineralised water for internal use in plant.

Thus waste water from blowdown was converted into high quality DM water.

The Distilled water was re-mineralised by adding minerals to generate high quality drinking water.

The entire process uses waste heat and waste water and minimal electrical energy to generate high Low Cost quality vapour distilled water.

This plant has the potentiality to use low grade waste heat (around > 90 0C water or > flue gas of 120 0C) of any form from any plant (e.g. coal/gas based power plant, cement plant, Process industry) to desalinate high TDS water and produce vapour distilled high quality water. The salient feature of the system is:

- Utilization of waste heat.
- Cost effective desalination technology.
- Sustainable & Environment Friendly. [No ground water need to be extracted for generating water]

  a) Minimal chemical consumption: MED working temperature (< 65 C) considered below the solubility temperature of carbonates (70 C) and sulphates (67 C).

b) Continuous operation system: No intermittency in operation, therefore high yield & plant availability.

c) Modular & Scalable design.

d) Product water can be used as

- DM plant make up
- Cooling tower make up
- Can be converted to potable water after remineralisation.

Economic Viability Model

The investment can be paid back in 4.2 years and can be replicated in any plant (e.g. coal/gas based power plant, cement plant, process industry), where waste heat is available.

Total cost of pilot plant of 120 M3/Day is 7 crores; [Cost of design, Engineering, Equipment = 6 crore; Cost of Erection and commissioning= 1 Crore]



Flue gas based sea water desalination system





Category : Urban Wastewater Management



CATEGORY – URBAN WASTEWATER MANAGEMENT

1st PRIZE

SURAT MUNICIPAL CORPORATION



Mr M.Thennarasan, IAS
Municipal Commissioner
Surat Municipal Corporation

Surat Municipal Corporation

"Exponential growth has been witnessed in Surat City leading to ever rising demand for most essential service of water supply. Through all round water security measures and integrated approach in water and waste water management, uninterrupted water supply has been ensured."

Surat Municipal Corporation - Water Conservation Agenda

Recycle and Reuse of Waster Water for Industrial Application	***By August 2019*** ■ 35 MLD capacity TTP shall be commissioned ■ 40 MLD capacity TTP shall be commissioned Therefore, by August 2019 total 75 MLD capacity TTP will be added leading to total quantum of 115 MLD Tertiary Treated Water for Industrial Application . ***By 2022*** ■ 349 MLD capacity TTP are under consideration for its utilization in Industrial Application
Packaged TTPs	■ 1 MLD capacity TTP plant have been commissioned for gardening, ponds, parks etc. ■ 7 More such Packaged TTPs are planned in each zone of Surat City
Zero Liquid Discharge (ZLD)	■ Three Turnkey Projects related to Water Treatment Plants are under construction with ZLD facilities and expected to be commissioned by May 2019, contributing total 48 MLD of back wash water recycling ■ Two more projects are under consideration for its execution by 2022, contributing total 32 MLD of backwash water recycling.
24x7 Water Supply Scheme with 100% metering	■ Once scheme with total supply of 42 MLD is in operational stage having total loss of less than 14% ■ Two more 24x7 Water Supply scheme are under execution and expected to be commissioned by Mar.2020
Execution of Rain Water Harvesting Structures	■ 280 operational Structures in various municipal properties and ■ 844 operational structures in private properties across the city have been executed. ■ More 40 structures are planned in various municipal properties for ground water recharging
Barrage on River	■ One more barrage is planned (Subject to the availability of financial assistance) in the downstream of existing weir - cum causeway which will help surat city in preventing salinity ingression in longer run. Once executed, storage of 19 Million Cubic Meter shall be created.

Introduction

Surat is a city located on the western part of India in the state of Gujarat. It is one of the most dynamic cities of India with one of the fastest growth rate due to immigration from various part of Gujarat and other states of India. In terms of population and area under the jurisdiction of Municipal Corporation, it is the 2nd largest city in Gujarat.

The Surat City has witnessed the highest population growth in the nineties, which has imposed drastic demand for the establishment of basic amenities including water. Surat City is the one of the three cities selected under Asian Cities Climate Change Resilience Network (ACCCRN) in 2008. The city is falling in flood prone zone and additionally, the city is envisaged as vulnerable to the potential effects of climate change. Therefore, satisfying "Life line water demand" is a priority.

Surat City has a supply of 1250 Million Liters per Day (MLD) presently and for the envisaged population of 1.23 Crore in 2041, the water demand will reach to more than 2300 Million Liters per Day. Also, since, Surat City is falling in flood prone zone and having forecasted the possibilities of extreme events, resulting in flood / drought like conditions in city, water supply may be badly affected during such conditions. Surat experienced devastating floods in August 2006 and along with other essential services, water supply system was badly affected. However, due to the operational French wells / infiltration wells the water supply could be restored within 36 hours. This brings out, the efficacy of French wells as a technology for meeting at least the "Life Line" water demand in extreme situations.

The only source of water supply is surface water of river Tapti with no backup / alternative source. In the event of floods / drought, against normal water demand, the Life line water demand is of 220 MLD which would reach to 500 MLD in year 2041 and in the same context, various sustainable measures have been implemented to ensure Water Security. Such measures are

- French wells for obtaining sub surface water to meet the life line water demand,
- Water Supply Grid Networking for
    - Economic transmission of water from water works to water distribution station and
    - To supply the lifeline water supply in case of any breakdown / shut down / eventuality
- Rain Water Harvesting - Total 382 Rain Water Harvesting Structures have been executed for recharging ground water through the percolation of rain water.
- Recycling and Reuse of domestic wastewater through
    - Tertiary Treatment for Industrial Use in city - 40 MLD capacity Tertiary Treatment Plant for domestic sewage treatment is implemented and successfully in operation since 2013
    - Secondary Treated Water for - 0.3 Million Liters of secondary treated wastewater is being used in various Municipal parks and Gardens across the city

- Tertiary Treatment for Pond restoration - one (1) million liters per day capacity TT plant have been executed.

- 24 x 7 Water Supply with 100% consumer metering and loss monitoring thereby - A scheme is being operated successfully in identified area of Surat City, wherein, on daily basis, 45 MLD of water is being supplied. Extent of Losses restricted is upto 13.68% only and cost recovery is 100%.
- Aquifer Mapping Study - In order to ensure that the entire city gets at least Life Line Water Supply, establishment of additional French wells is the need of the hour. Therefore, it is felt that to accurately locate geographically the French wells, the scientific technique called "aquifer mapping" was found to be most appropriate. This technique though has been used for other purposes is used for this purpose for the first time in India. Ground survey based on ERT was completed during June and July 2017 and Helicopter based Heliborne TEM survey was completed during 10-10-2017 to 20-10-2017, wherein, total Geographical Area covered was 270 sq.km with total 1600 line kilometer. Based on preliminary outcome of the study, exploration of subsurface water through drilling work is in process for total 5 locations.

Surat Municipal Corporation has left no stone unturned to put all its best practices, innovative projects so that water security can be ensured and life line water demand can be managed in any eventuality.

The urban wastewater reuse measures taken during the period (April 2014 - April 2018)

Sl. No	Urban water and wastewater reuse project measure implemented	Year of implementation	Actual/ Planned date of completion	Annual water saving in m3	Monetary saving due to water saving	Investment made (Lakhs)	Paybac period in years	Replicability of the measures implemented
1	Treatment of domestic sewage through 40 MLD capacity Tertiary Treatment Plant (TTP)	2014	2012-2014	14,600 m3 per annum	Revenue Generation of Rs.29 Crore per annum through supply of exclusive TT water	Rs.8512 Lakhs	Less than 6 years	Two more TTPs are under implementation with total capacity of 75 MLD

The urban wastewater reuse measures taken during the period (April 2014 - April 2018)

Sl. No	Urban wastewater treatment measures implemented	Year of implementation	Amount of water treated in m3	Investment made (Lakhs)	Replicability of the measures implemented	Reuse of treated urban wastewater			Level of compliance by the introduction of the measures
						Amount reused (m^3)	Reused for	Amount discharged (m^3)	
1	Treatment of domestic sewage through 40 MLD capacity Tertiary Treatment Plant (TTP)	2014	40,000 m3 Liters per Day	Rs.8512 Lac	Two more TTPs are under implementation with total capacity of 75 MLD	40,000 m3 Liters per Day	Industrial units (Textile based industries within City Area)		All Sewage Treatment Plants being operated in City Area by Surat Municipal Corporation is in compliance with Gujarat Pollution Control Norms. Additional Treatment upto Tertiary level is being given.

Municipal water and wastewater network

- Total Installed Capacity of Water Treatment Plants (WTP) - 1468 Million Liters per Day
- Total Operating capacity of WTPs - 1250 MLD (2018-19)
- Coverage of population under piped water supply network - 97%
- Total Installed Capacity of Sewage Treatment Plants (STPs) - 1032 Million Liters per Day
- Total operating capacity of STPs - 900 MLD
- Coverage of population under sewerage network - 97%

Technology involved in treating the water and wastewater

- **Water Treatment Plants (Drinking Water)**

o Technology -

- Clarifloculator + Rapid Gravity Sand Filtration
- Lamella Clarifier + Rapid Gravity Sand Filtration
- Zero Liquid Discharge for recycling of backwash water - 36 MLD capacity under implementation

- **Domestic Sewage Recycling for Industrial Use**

o Tertiary Treatment Plant of capacity 40 MLD is in operation since 2013 for recycling and reuse of domestic sewage for Industrial purpose.

o Technology - Reverse Osmosis (Membrane), Ultra Filtration with Activated Carbon filtration process

o Additional TTP of 75 MLD capacity is under implementation

- **Domestic Sewage Recycling for Municipal Gardening - On daily basis, 0.3 Million Liters of Secondary Treated Sewage is being utilized for gardening purpose.**

Waste minimization and water demand reduction

o French wells are designed and executed in river bed such that it delivers potable grade water directly which doesn't require any conventional water treatment. This has helped in saving of precious land towards the construction of water treatment plant. Putting all French wells together, Surat Municipal Corporation is able to supply potable grade of water of 145 Million Liters which doesn't requires any conventional water treatment.

o Drinking Water Treatment plants are being operated in such a way that it generates backwash water maximum upto 3-4% of total raw water intake.

o Zero Liquid Discharge setup is being executed in current year through which, on daily basis 36 Million Liters of water shall be recycled.

o Recycling and reuse of Tertiary Treated sewage in industrial consumers in Surat has helped saving of 40 Million Liters of fresh water. Quantum shall be increased to 115 Million Liters by March 2019 once additional 75 MLD capacity TTP is commissioned.

o Water Supply System has got operational components like 8 water works and 34 water distribution stations and all components are interconnected with Grid Networking. This has helped in

- Transmission of water from water works to water distribution stations in economic manner. Through continuous monitoring and up gradation, specific energy consumption has decreased from 355 KWH/ML (Year 2002-03) to 272 KWH/ML (2017-18).
- Meeting the breakdowns / shut downs. Through well established water supply grid networking, water supply could be restored within 36 hours during the devastating floods of 2006.

o Consumers in 24x7 water supply area are 100% metered, wherein the measured distribution loss is 13.68% (August 2017 to July 2018)

- Storm water transportation and collection -
  - o Surat City is falling in flood prone zone and also used to have average rain fall of 900 mm every year. For the same, storm drainage (box drain type) have been executed across the city and linked with River Tapti for safe collection and transportation upto river body.
  - o Total length of Storm Drainage network is 568 km.
- Re-use of treated wastewater for non-industrial or non-domestic uses like gardening, irrigation in peri-urban areas etc.
  - o Recycling and reuse of Tertiary Treated sewage in industrial consumers in Surat has helped saving of 40 Million Liters of fresh water. Quantum shall be increased to 115 Million Liters by March 2019 once additional 75 MLD capacity TTP is commissioned.

Replicability and Scalability of the Technology

In Water Supply System as well as in Sewerage System, all innovative measures taken so far are being replicated within corporation as well as by other Municipal Corporations in Gujarat Too.

i. Having realized the success stories of French wells, capacity have been increased from 35 MLD to 145 MLD recently. More and more French wells are planned based on Aquifer Mapping Study (conducted by CSIR - National Geophysical Research Institute, Hyderabad)

ii. TTP plants are being augmented having explored the end users (Textile Industries mainly) (From existing 40 MLD to 115 MLD by March 2019)

iii. Rain Water Harvesting structures are helping in increasing the ground water table across the city and also, since, city is near to the Arabian Sea, it helps preventing salinity intrusion. Presently, 382 Rain Water Harvesting Structures have been executed across the city in various Municipal Properties and every year, more structures are planned.

iv. Out to total supply of 1250 MLD, 45 MLD of supply is being managed under 24 x 7 water supply system in identified area of Surat City. Total area is 19 sq.km. Billing cycle in 24x7 water supply area is bi-monthly, where, loss measurement / NRW have been assessed. Loss measurement in distribution network is 13.68% only. Practice is being replicated under

a. Smart City Mission projects for total 8.87 sq km., wherein 24x7 water supply system is being executed with ultimate demand of 120 MLD and 100% AMR metering

b. Identified area of Suart City in South West and West region having total area of 20 sq.km, wherein 24x7 is under execution.

Public Health Safety

Effectiveness and efficient water supply management can be judged through Water Quality Monitoring at consumer end and contamination cases observed in city area.

Consumer water samples are being collected, tested in dedicated water testing laboratory and reported to higher management including health department of Surat Municipal Corporation, wherein, 98 % of the total collected samples have been declared as fit in year 2017-18.

FICCI Water Mission

Access to safe water is one of the essential elements for sustainable development and poverty reduction. However, the past few decades has seen an increase in demand amongst various water using sectors putting enormous stress on the natural resource.

FICCI constituted a 'Water Mission' to work on policy advocacy by providing inputs from Industry on policy formulation related to water use efficiency and sustainable water management. It aims to facilitate the sharing and dissemination of best practices across industry sectors in order to encourage corporate and industry players to imbibe a culture of water conservation within their organizations.

The objectives of the Mission's work are:

- To work on policy advocacy by providing inputs from industry on policy formulation related to water use efficiency and sustainable water management.
- To document and disseminate best practices across various sectors and create a forum to facilitate exchange of information and experiences in the country.
- To promote good practices in sustainable water management and innovative technologies for water conservation, efficiency and management.

FICCI Water Awards & India Industry Water Conclave

The FICCI Water Mission has instituted the India Industry Water Conclave and Awards on annual basis to recognize excellence in water conservation and sustainable water management practices. The Conclave and Awards brings together diverse stakeholders from the corporate sector, government, academia, non-governmental organizations, civil society, and financial institutions to showcase best practices, deliberate on policy issues, and propose solutions to surmount challenges in sustainable water management.

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