Identifying best available technologies for decentralized wastewater treatment and resource recovery for India

Technology Market Uptake

Dr. Markus Starkl, BOKU
Prof. M.M Ghangrekar, IITKGP

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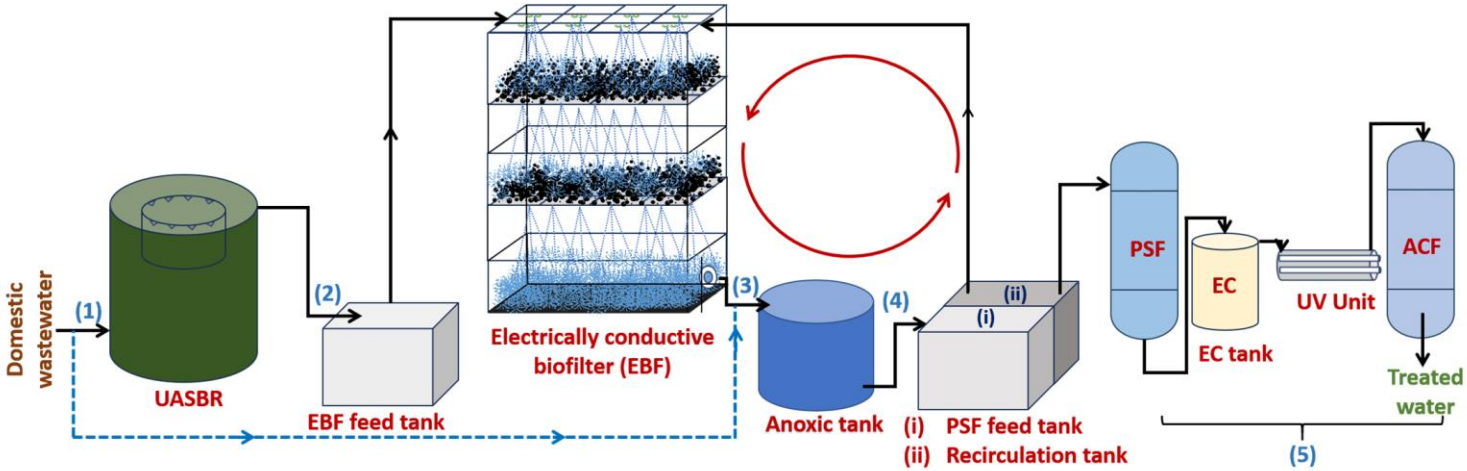
Pilot 6: Anaerobic digestion coupled with Electrically conductive bio-filter

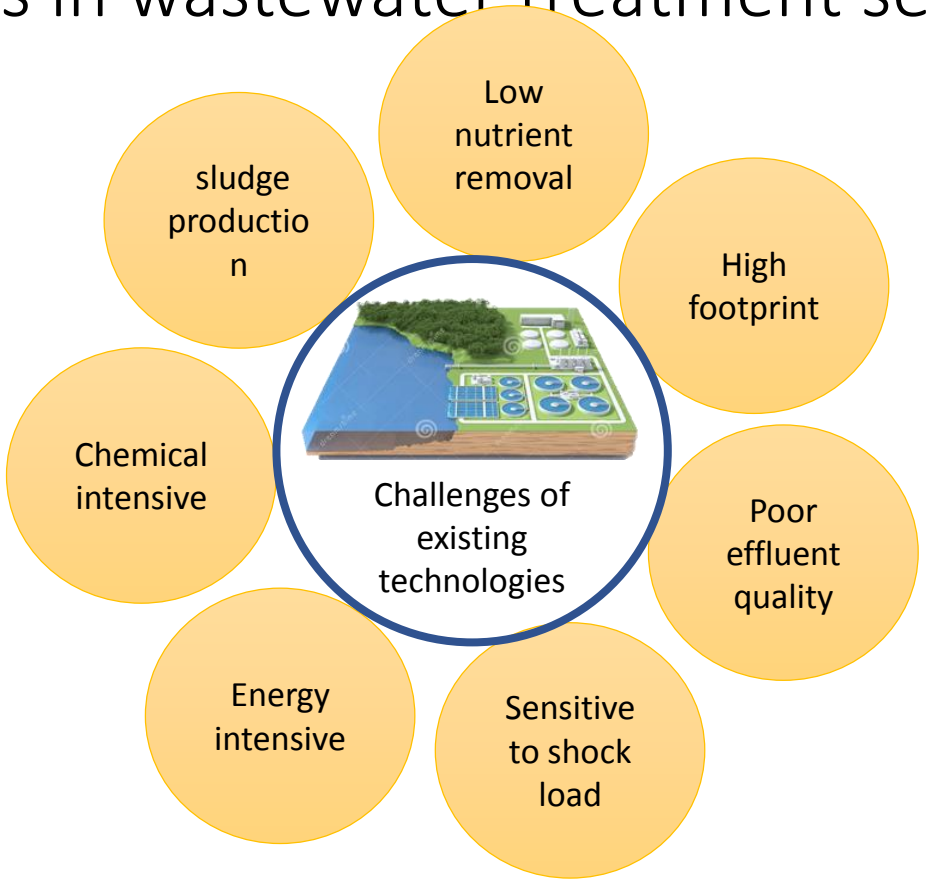
Cost-effective and environmentally benign technology for producing high quality effluent for non-potable usage

Team: CENTA Spain, METfilter S.L., IIT Kharagpur.

Technology layout



Existing issues in wastewater treatment sector



Solutions offered by our technology

Vertical reactor design requires less land area

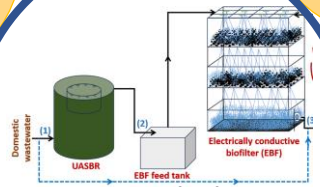
low footprint

No sludge cleaning required from the bio-filter even after 1.5 years of operation

Low sludge formation

high nutrient removal

Almost 80% removal of total Nitrogen and complete removal of total phosphorous



Coupled bio-filter technology

Only table salt was used during disinfection

Minimal chemical use

High effluent quality

Superior effluent quality meeting NGT standards with BOD < 3 mg/L; COD < 30 mg/L; TN < 10 mg/L; and MPN < 3/100 mL

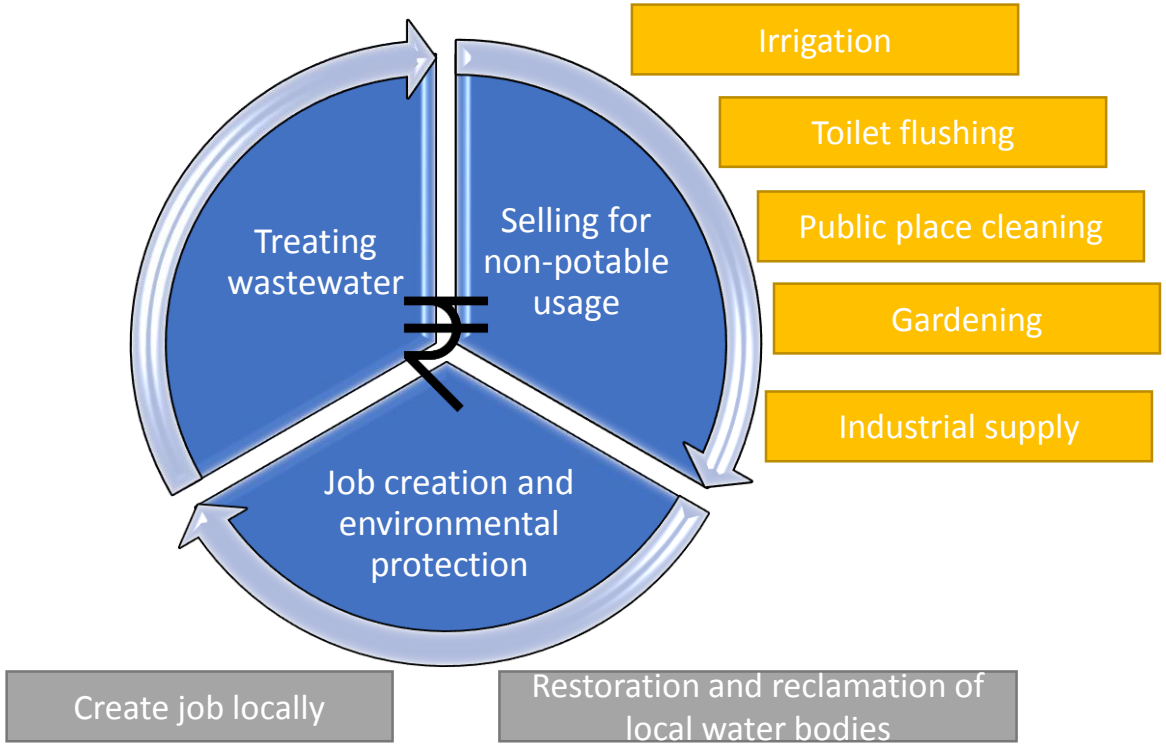
No requirement of aerator and skilled manpower

Low-cost operation & less energy required

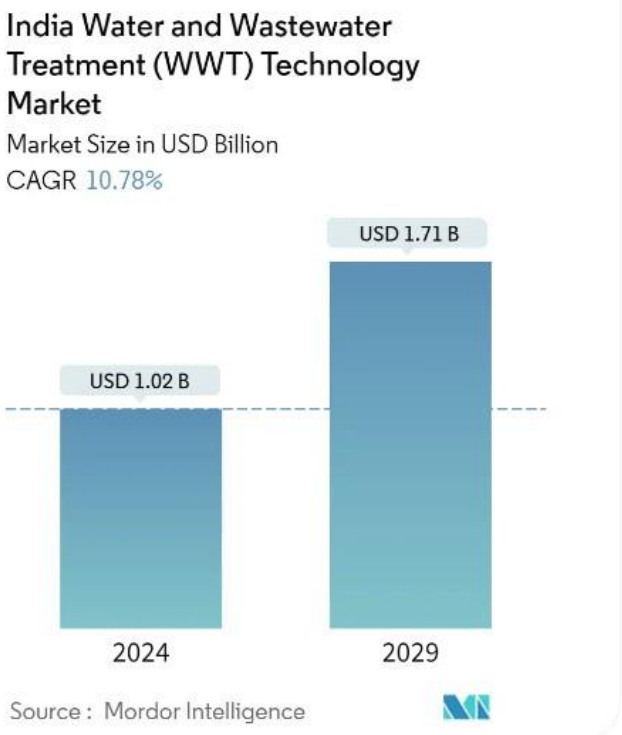
Handle shock load

Despite varying effluent characteristic effluent quality was more or less same

Business model



Market opportunity and competitors



Study Period	2019 - 2029
Base Year For Estimation	2023
Market Size (2024)	USD 1.02 Billion
Market Size (2029)	USD 1.71 Billion
CAGR (2024 - 2029)	10.78 %
Market Concentration	High

Major Players

suez WABAG DUPONT VEOLIA THERMAX

*Disclaimer: Major Players sorted in no particular order

Market opportunity and competitors

India Water and Wastewater Treatment Market size was valued at USD 1.51 billion in 2022 & is estimated to grow at a CAGR of around 11.22% during 2023-28.

CHALLENGE
Lack of Standardized Law for Wastewater Management

DRIVERS
Government Inclination Towards Sludge & Greywater Management

Market Value
$1.51
Billion
In 2022

SEGMENTATION

Based on Offering: The Water & Wastewater Treatment segment is projected to acquire a major share market during 2023-28.

Based on End User: Municipal segment is expected to hold a significant share of the India Water and Wastewater Treatment Market during 2023-28

Key Players

Larsen & Toubro, Ion Exchange, Thermax, Veolia, Suez, SPML Infra, VA Tech WABAG, Triveni Engineering, Nalco Water, Toshiba, Others

Scope of market growth in future

Market value of treated wastewater will rise to rupees 1.9 billion in 2050

Only 10 states in India have treated wastewater reuse policies so far

Nitin Bassi, Saiba Gupta, Kartikey Chaturvedi, CEEW

29 Mar 2023 • 9 mins read

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Wastewater sector: an emerging economy

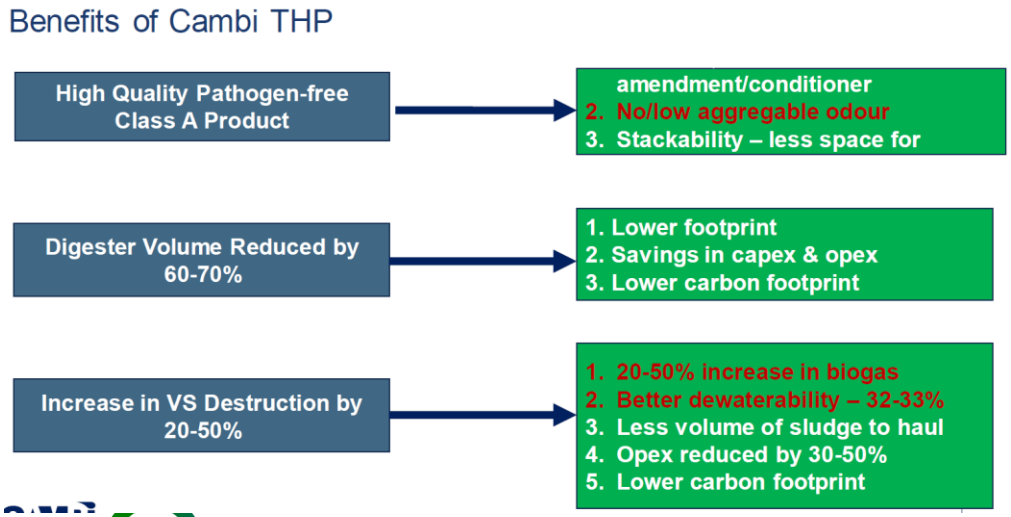
Source: BlueWeave Consulting

Pilot 7: CAMBI Thermal Hydrolysis Process

Pilot 7: CAMBI Thermal Hydrolysis Process

Technology: To pretreat sludge for several benefits regarding subsequent anaerobic digestion.

Need/Solution: India produces large amount of sludge which needs to be managed in a sustainable manner. Cambi THP can produces pathogen-free biosolids which can be used as fertilizer, reduces digester volume and increases biogas recovery from digestion. One Cambi plant can serve several STPs and hence supports asset optimization and principles of resource recovery and circular economy.



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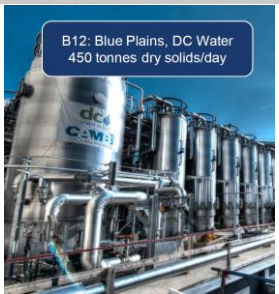
Pilot 7: CAMBI Thermal Hydrolysis Process

Market: Cambi THP can be installed in all STPs across India which produce sludge.

Adopters: Municipal utilities and industry.

Business model: Contract based (Tender system common in India, Hybrid Annuity Model, PPPs). The core technology would be shipped from CAMBI HQ (Norway) to India but all ancillaries would be outsourced to India (eg boilers, heat exchangers, etc.). Cambi would partner with a local manufacturer & distributer depending on the pipeline of projects.

How ready is the solution? TRL is considered only 7 for India because India uses mainly SBRs and this sludge with extended aeration time is unique for Cambi THP. Testing THP with this sludge has been done in Pilot 7 (IIT Roorkee) and has given very good results.



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Pilot 7: CAMBI Thermal Hydrolysis Process

What is needed? To reach TRL 9 in India a large scale demonstration plant in India would be required. Expected investment costs are in the range of 15 Mill EUR (around 135 crore INR) for smaller township. This would need an organization/investor that is willing to take the financial risk in project development costs. Larger international banks are reluctant to take this risk due to missing overall masterplans in India for cities.

Institutional barriers and drivers relevant for market uptake:

- India is still lacking (updated) regulations/standards/policies for sewage sludge which would be a key driver for solutions for sustainable sludge management (e.g. updated sludge regulations, end use of biosolids, carbon footprint, co-digestion with food waste, etc.)
- For cost competitiveness, cost comparisons need to take full costs of existing practices into account (e.g. true landfill costs, etc.)
- Lack of master plans for cities

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Pilot 7: CAMBI Thermal Hydrolysis Process

How change barriers to drivers?:

- India would need a whole sustainable policy for sludge/biosolids management, ideally also including cross sectoral policies to allow for co-digestion of sludge with food waste.
- EU has several decades of experience in this sector but India needs to leap frog and achieve this in much shorter time frame
- Hence, India can can learn from existing EU policies (tariffs, circular economy, sludge directive, country specific regulations, sludge centers, etc.)
- EU also should more proactively offer its know how in this field to India, as EU competes with other countries/regions in this regard.
- If model works in India it can be replicated in other emerging markets such as Africa.

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