



**Envisol**  
POWERED BY **ARVIND**



**20<sup>th</sup> AfWA International Congress and Exhibition 2020 Breaking new grounds to accelerate access to water and sanitation for all in Africa**

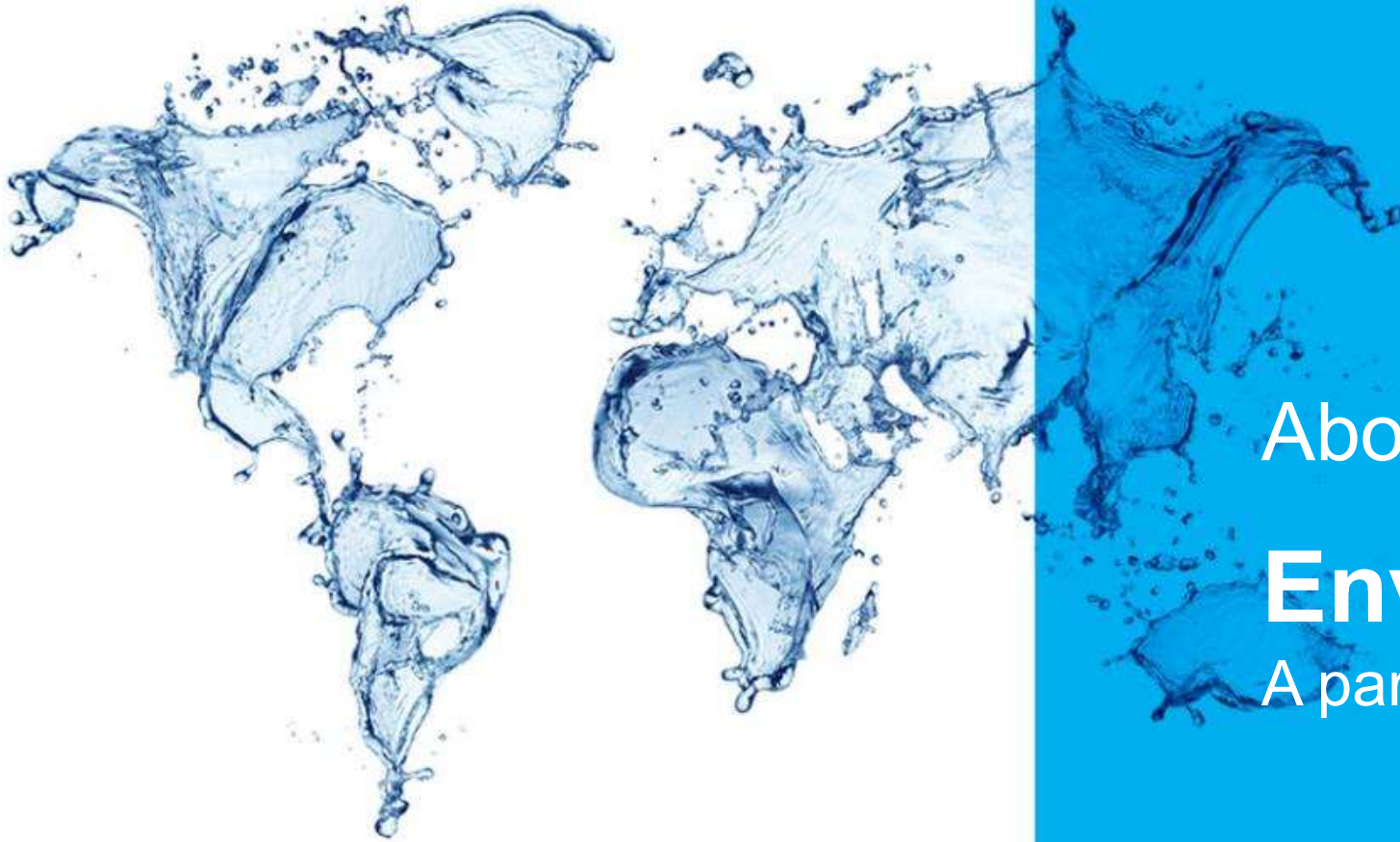
**Innovative Solutions for Wastewater Treatment and Recycle for Green Africa**

24<sup>th</sup> – 27<sup>th</sup> February 2020, Kampala, Uganda

**DR. S. KARTHIKEYAN**

**HEAD – PROJECTS & O&M**





About Us

**Envisol**

A part of Arvind Limited

## Who Are We?

# Our Business is Water

Arvind Limited, a part of the \$1.7 billion Lalbhai Group was incorporated in 1931 and is in the businesses of Textiles – fabric & garment manufacturing , Branded apparel & Retail , Environment Solutions, Agriculture, Engineering and Real Estate.

Established in 2011, Arvind Envisol has witnessed strong pull from Indian and international market over last few years

AEL is a world class water management company providing end to end solutions for water treatment, industrial waste water treatment, sewage treatment, desalination and **Zero Liquid Discharge (ZLD)** solutions at minimal costs.



**150+**

Million Litres water  
and waste water  
processed per day



**120+**

Projects executed  
till date



**38**

Registered Patents  
across the globe



**END TO END**

Offerings in the entire water  
chain



**STRONG**

Pre Qualification  
References

# What We Do?

In order to cater to different need segments and organized into 3 verticals

## Infra Practice



- Projects on EPC as well as on BOOT basis

Sectors include:

- Municipal
- Industrial
- Desalination
- Drinking water
- Hi-purity water

## Design, Service & Support (DSS) Practice



- Offerings to clients and partner OEMs through in-house brand
- Products and services include:
  - Components
  - Consumables & Spares
  - O&M / AMC
  - Retrofitting

## Knowledge Practice



- Niche services offered to customers / Analytics
- Services include:
  - Consulting
  - Training
  - Collaboration & Research



Textiles



Pharma



F&B



Chemicals



Oil & Gas



Automobiles

..& Other Industries

# What We Contribute to the Environment?

offering solutions across water, waste water, solid waste and emission problems employing clean energy

Convergence Approach

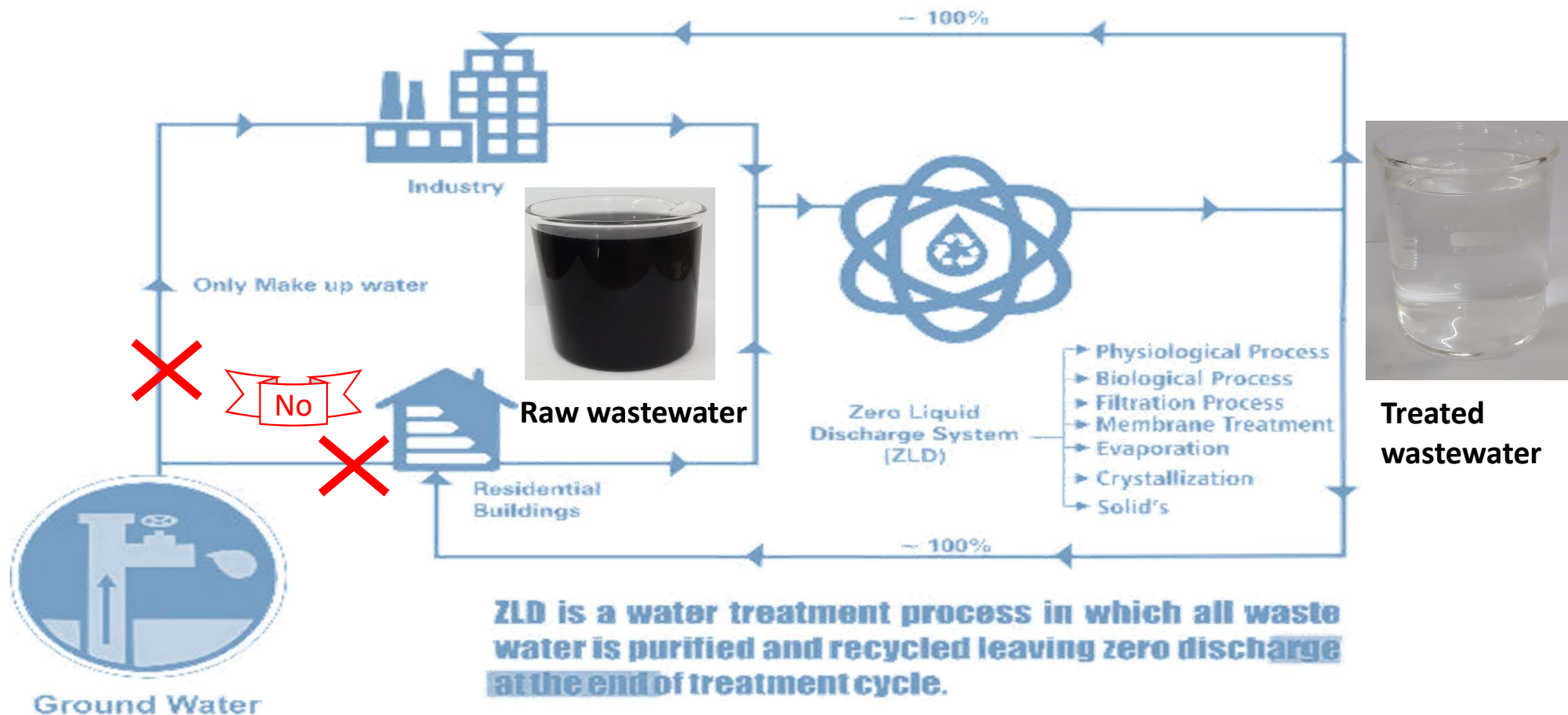




## What Is ZLD and How It Works?

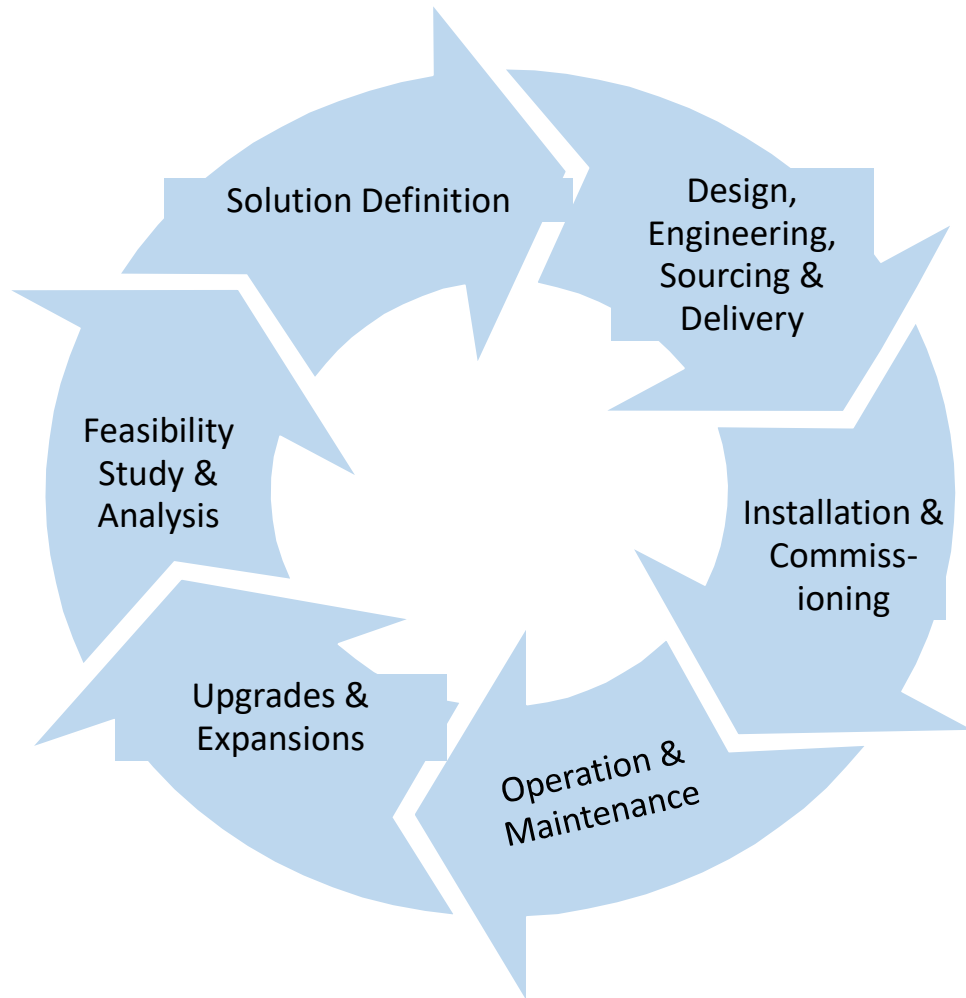
### ➔ Zero Liquid Discharge

Envisol's heart beats to purify and recycle waste water through patented technologies



# How Do We Do?

➔ Through Turnkey EPC Projects – we enable sustainable operations



## Sustainable Outcome



### CUSTOMERS

Clean, efficient operations and high return on investment



### SUPPLIERS

We build partnerships with our supplies on long term basis



### EMPLOYEES

Meaningful and rewarding jobs



### SOCIETY

Improved resource efficiency, clean environment, prosperity



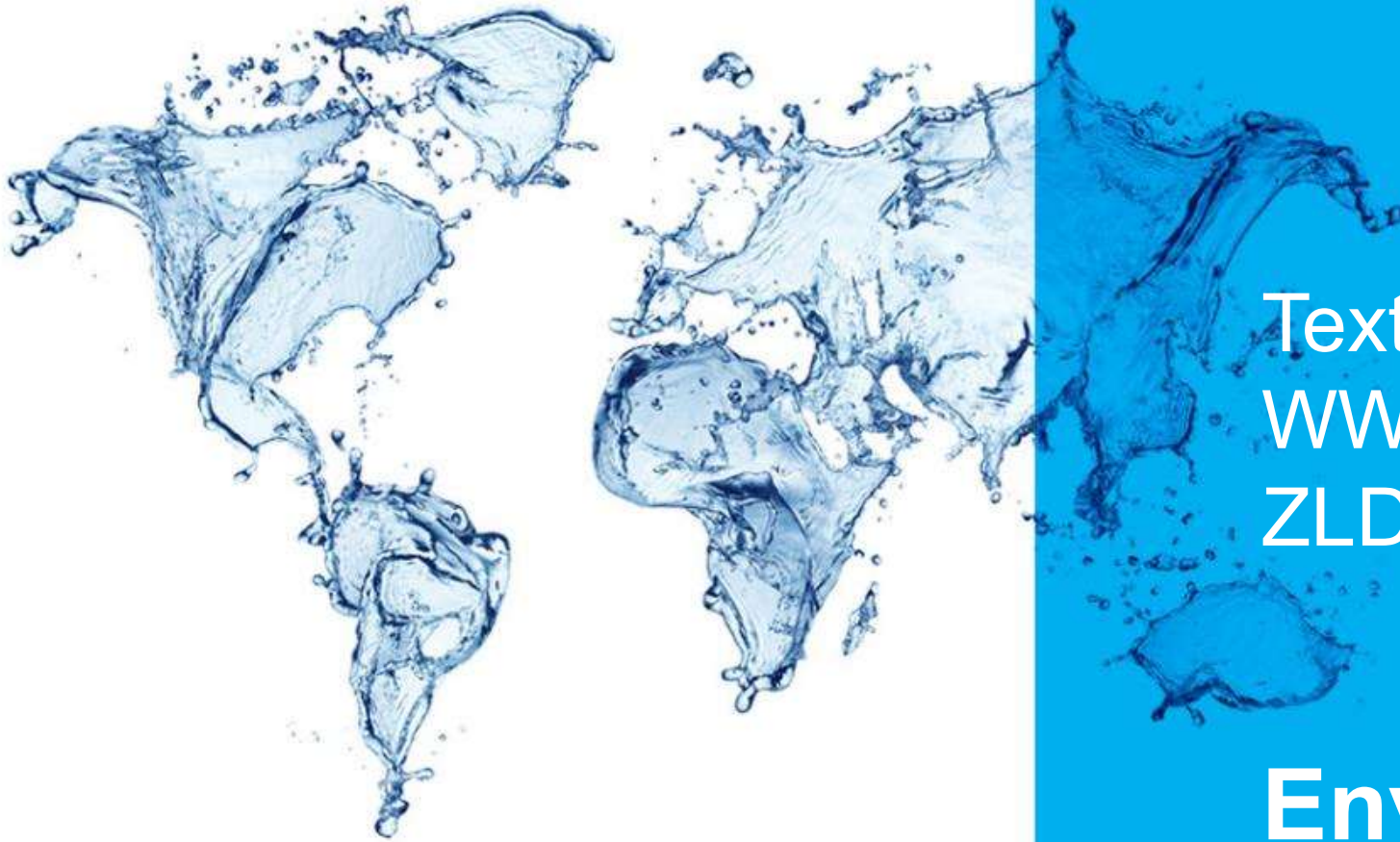
### SHAREHOLDERS

Investing in a responsible company



### ECOLOGICAL FOOTPRINT

Technologies with low impact



Textile & Tannery  
WWTP, Recycle,  
ZLD Solutions

**Envisol**

A part of Arvind Limited



# Typical Wastewater Characteristics for Textile Industry Waste Water

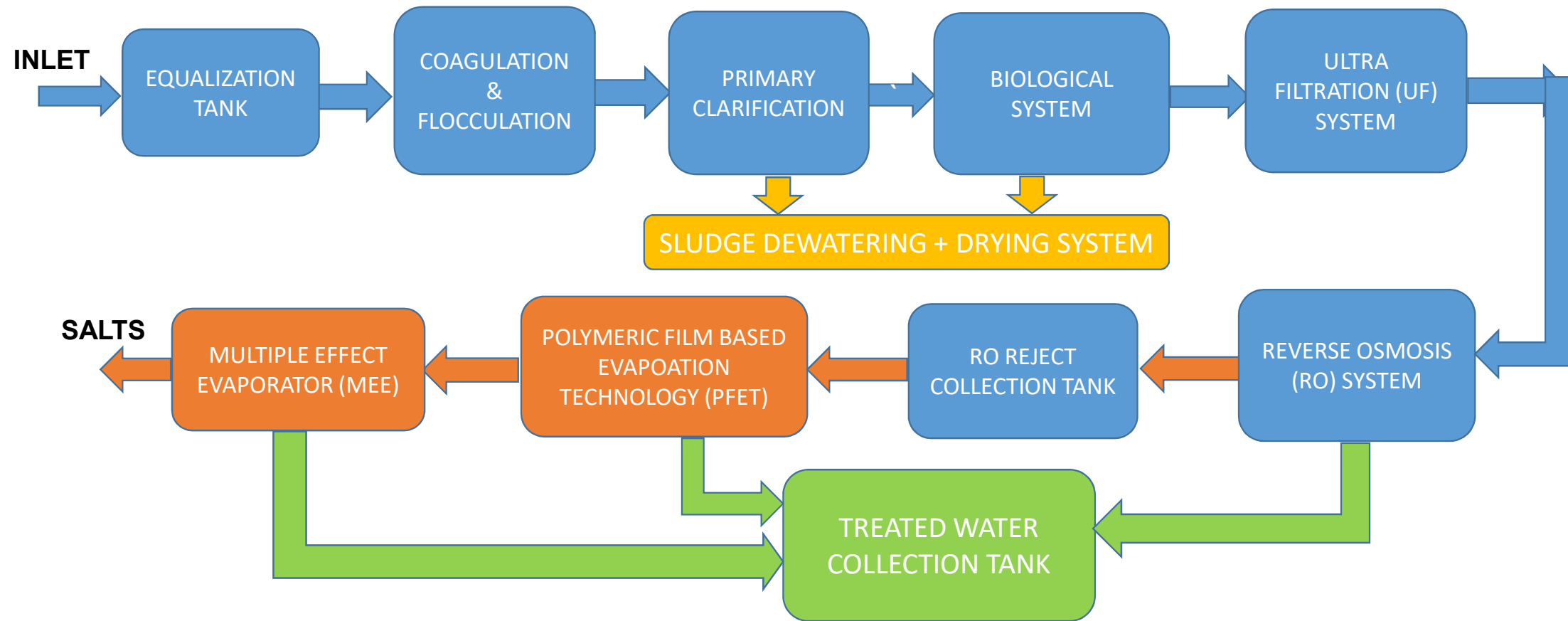
## Common Textile Effluent Characteristics

Common Textile Process	TSS	COD	pH	Colour	TDS
Dyeing	200-300	1000-1500	10-11	3000-5000	3000-4000
Printing	500-800	4	8.5-10	10000-15000	1200-1500
Beaching	2	5	0	0	
Mercerizing	1	0	0	0	
Sizing / De-sizing	1	2	1	0	
Washing	2	3	2	2	
Paper	9	6	7	3	
<b>Grand Total</b>	<b>19</b>	<b>20</b>	<b>12</b>	<b>5</b>	

## Waste-water Discharge Norms

mg/L unless otherwise noted	Limits		
	Foundational	Progressive	Aspirational
<b>Sum parameters</b>			
Temperature [°C] *	Δ15 or max. 35	Δ10 or max. 30	Δ5 or max. 25
TSS	50	15	5
COD	150	80	40
Total-N	20	10	5
pH	6-9		
Colour [m <sup>-1</sup> ] (436nm; 525; 620nm)	7; 5; 3	5; 3; 2	2; 1; 1
BOD <sub>5</sub>	30	15	5
Ammonium-N	10	1	0.5
Total-P	3	0.5	0.1
AOX	5	1	0.1
Oil and Grease	10	2	0.5
Phenol	0.5	0.01	0.001
Coliform [bacteria/100 ml]	400	100	25

# Typical Process Schematic Diagram for Textile Industry Waste Water ZLD





**11 MLD Zero Liquid Discharge Plant at Hawassa Industrial Park, Ethiopia**



# Case Study of Arvind Limited, Santej, India

## Largest single premise 17,000 M<sup>3</sup>/day Textile Effluent ZLD plant in Asia





# Case Study of Hawassa Textile Industrial Park, Ethiopia

## Envisol built state-of-the-art ETP + STP of 11,000 m<sup>3</sup>/day capacity

### Key Facts :

**Bagged Order: 2015      Completed: 2016**

- > Effluent Treatment Capacity : 8 Million Litres Per day (8000 cu.mt per day).
- > Sewage Treatment Capacity : 3 Million Litres Per day (3000 cu.mt per day).
- > Treatment Plant Area Spread : 32,000 Square meters.
- > Green Belt Area Spread : 10,000 Square meters.
- > Tallest Structure : 25 meters.
- > Treatment System : Zero Liquid Discharge.
- > Water Storage Capacity : 5 Million Litres (5000 cu.mt.)

Effluent coming from Textile Sizing, De-sizing, Dyeing, Finishing, Washing & Garmenting units dealing in Cotton as well as MMFs





# Case Study of Sewage to Textile Process Water, Arvind, India

First of a kind Zero Ground Water use 8,000 m<sup>3</sup>/day treated Sewage to Process Water Plant

## Key Facts :

Bagged Order: 2019

Completed: 2019

- > Sewage Treatment Capacity : 8 Million Litres Per day (8000 cu.mt per day).
- > Tertiary Treatment Technology: Membrane Bio-Reactor + Ozonation
- > Sludge Treatment Technology: Heat-pump based Low Temperature Dryer
- > Treatment Plant Area Spread : 3000 Square meters
- > Water Source: Ahmedabad City Municipal Sewage Line
- > Water Storage Capacity : 4 Million Litres (4000 cu.mt.)



# Case Study of Denim Washing Waste-Water Recycling Plant, Bavla, India

## 500 (+500 planned) m<sup>3</sup>/day Closed Loop Water circuit at Denim Washing Unit

### Key Facts :

- > Effluent Treatment Capacity : 500 Kilo Litres Per day (500 cu.mt per day).
- > Wash / Bleach Types: Enzyme Wash, Stone Wash, Chlorine Bleach
- > Treatment Technology: Speciality Membranes eliminating Secondary
- > Sludge Treatment: Zero Biological Sludge Generation
- > System Design Type: Modularized, Pre-fabricated System
- > Treatment Plant Area Spread : 500 Square meters





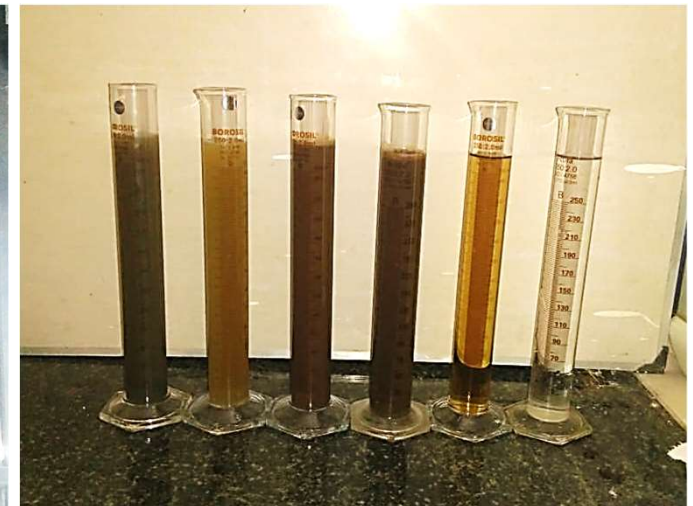
# Case Study of Tannery Effluent ZLD Plant, Vanitec CETP, India

## 1200 m<sup>3</sup>/day Tannery effluent ZLD using Patented PFET; Managing complete plant O&M

### Key Facts :

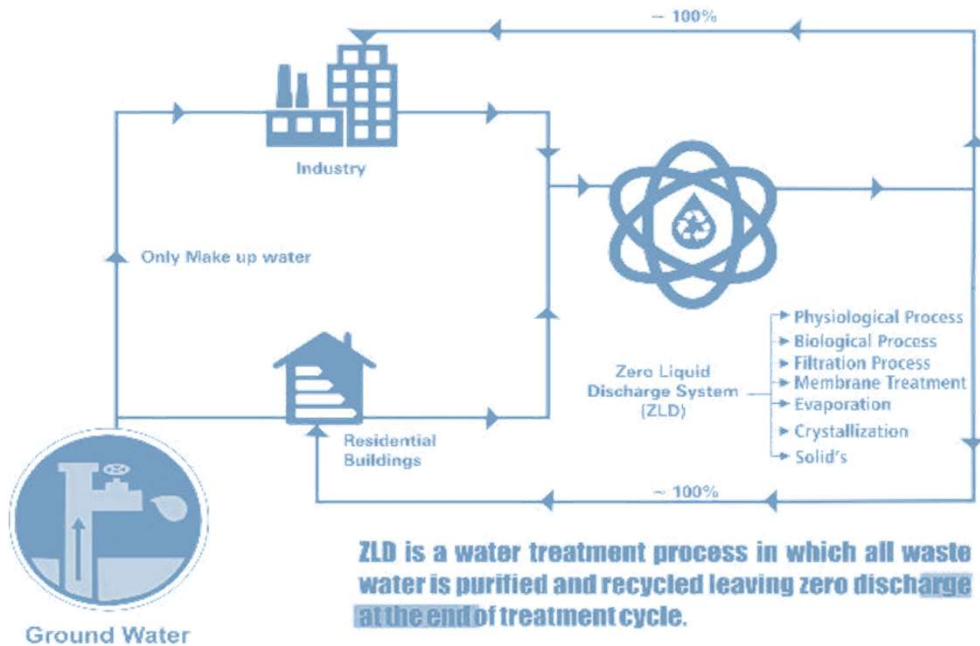
- > Industry Type: Tannery
- > Key Processes catered: Hair Removal, Leather Softening, Dyeing
- > Effluent Treatment Capacity : 1.2 Million Litres Per day (1200 m<sup>3</sup> per day).
- > Contract Scope : Supply of PFET, O&M Entire Plant
- > Key Technology Elements: Screens, Anoxic, Tubular MBR & PFET

Parameter	Feed	Permeate
TSS (mg/L)	3648	0
COD (mg/L)	4576	34
BOD (mg/L)	1515	1
pH	6.2	6.9
TDS (mg/L)	19820	560



## Zero Liquid Discharge

Envisol is a market leader in Zero Liquid Discharge - recycling waste water through patented technologies



Patented Polymeric Film MVRE for 12 MLD ETP,  
Veerapandi, India

## Patented ZLD Technology – Polymeric MVRE

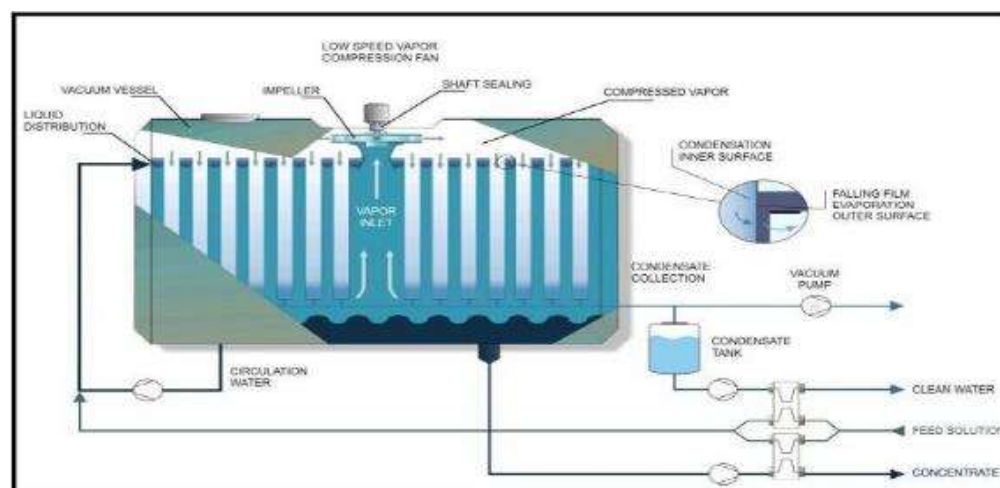
Patented heat transfer polymer element enables efficient heat transfer at lower temperatures Improves efficiency and uses MVRE for reduction of costs and maintenance



The Evaporation Module

Cassette

MVR Fan-Heart of the system



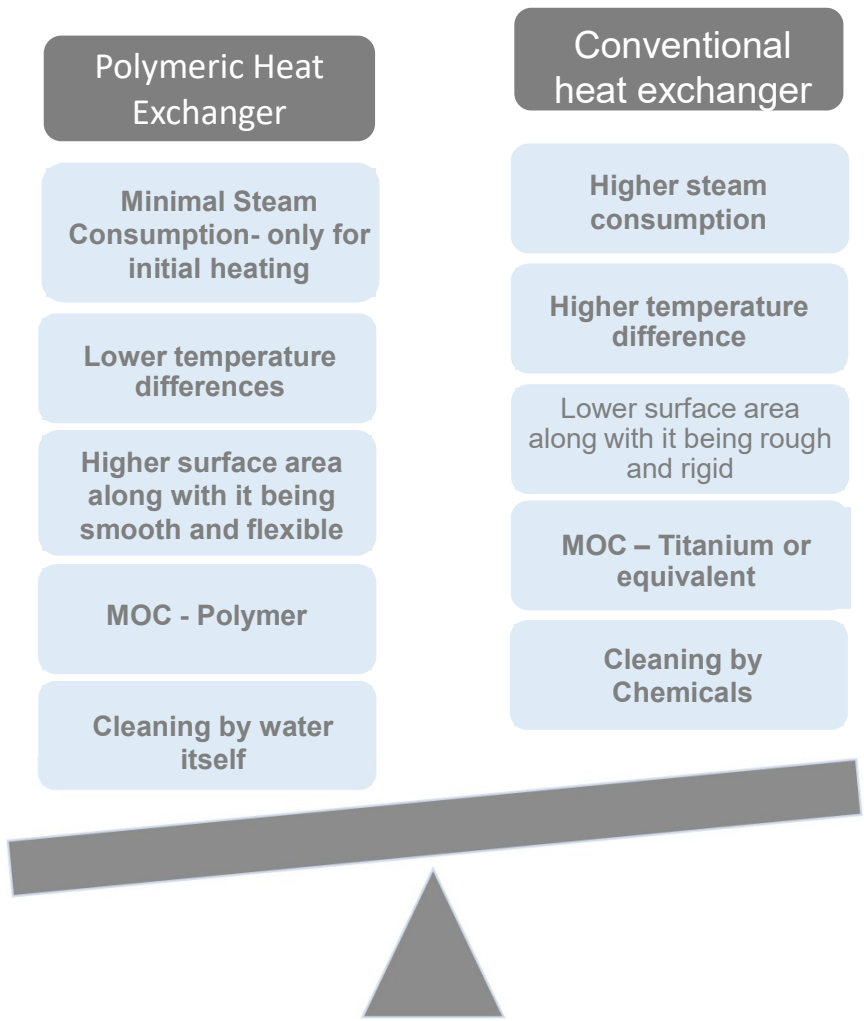
Operating Principle – Evaporation Module

Patented Polymer film

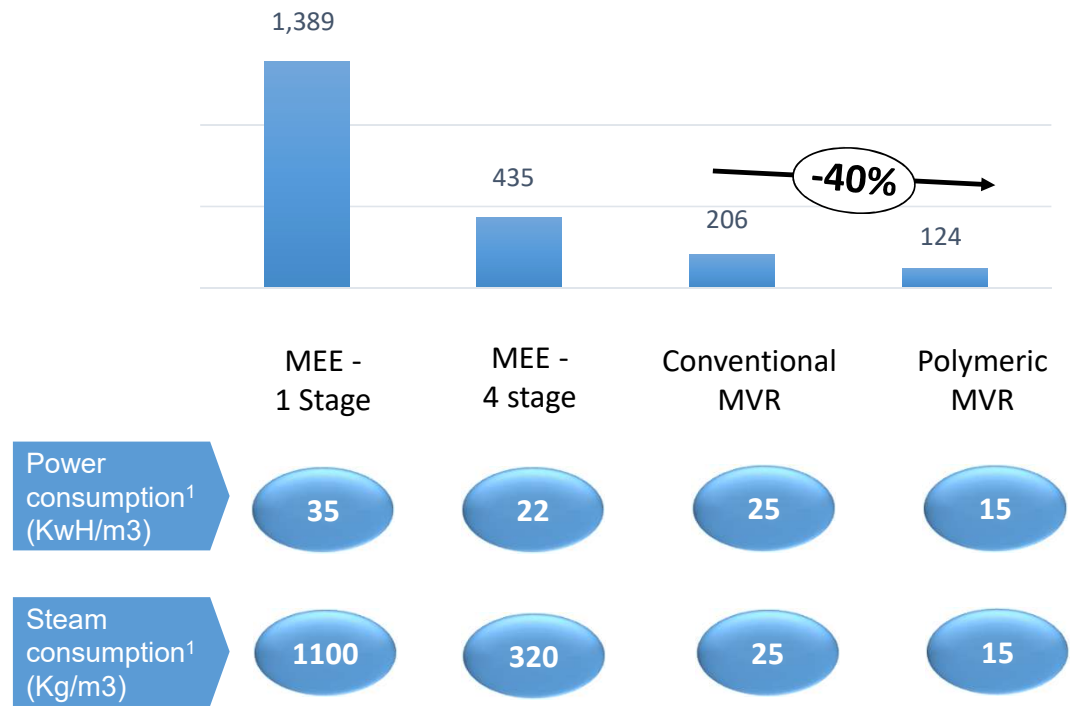




# Significant advantages in operating costs can be achieved through Polymeric Film Evaporation Technology



## Operating cost comparison – Rs/m3



## Crystallizer Unit & Salt Recovery Application



# How Do We Do?

## ➔ Through Well Established Technology

### Primary treatment

To remove physical impurities like suspended solids, oil and colour



Clarifiers and Clari-flocculator



Tube settlers/parallel plate separators



High rate solid contact clarifiers



Dissolved air floatation (DAF)



Electro Coagulation



Pipe flocculator

### Secondary treatment (Biological Processes)

Degrading organic material in the waste water like BOD and COD



Activated Sludge Process (ASP)



Extended Aeration system (EAS)



Upflow Anaerobic sludge blanket reactor (UASB)



Sequential Batch Reactor (SBR)



Moving Bed Bio Reactor (MBBR)



Membrane Bio reactor (MBR)



# How Do We Do?

## ➔ Through Innovative Technologies

### Evaporation Technologies



Mechanical Vapor  
Recompression (MVR)  
OR  
Multi Effect Distillation (MED)



Multi Effect Evaporators (MEE)  
and Crystallizers



Multi Stage Flash (MSF)  
Evaporators



Agitated Thin Film Dryer  
(ATFD)

### Sludge Management Technologies



Sludge Digester



Incinerator



Screw Press



Centrifuge



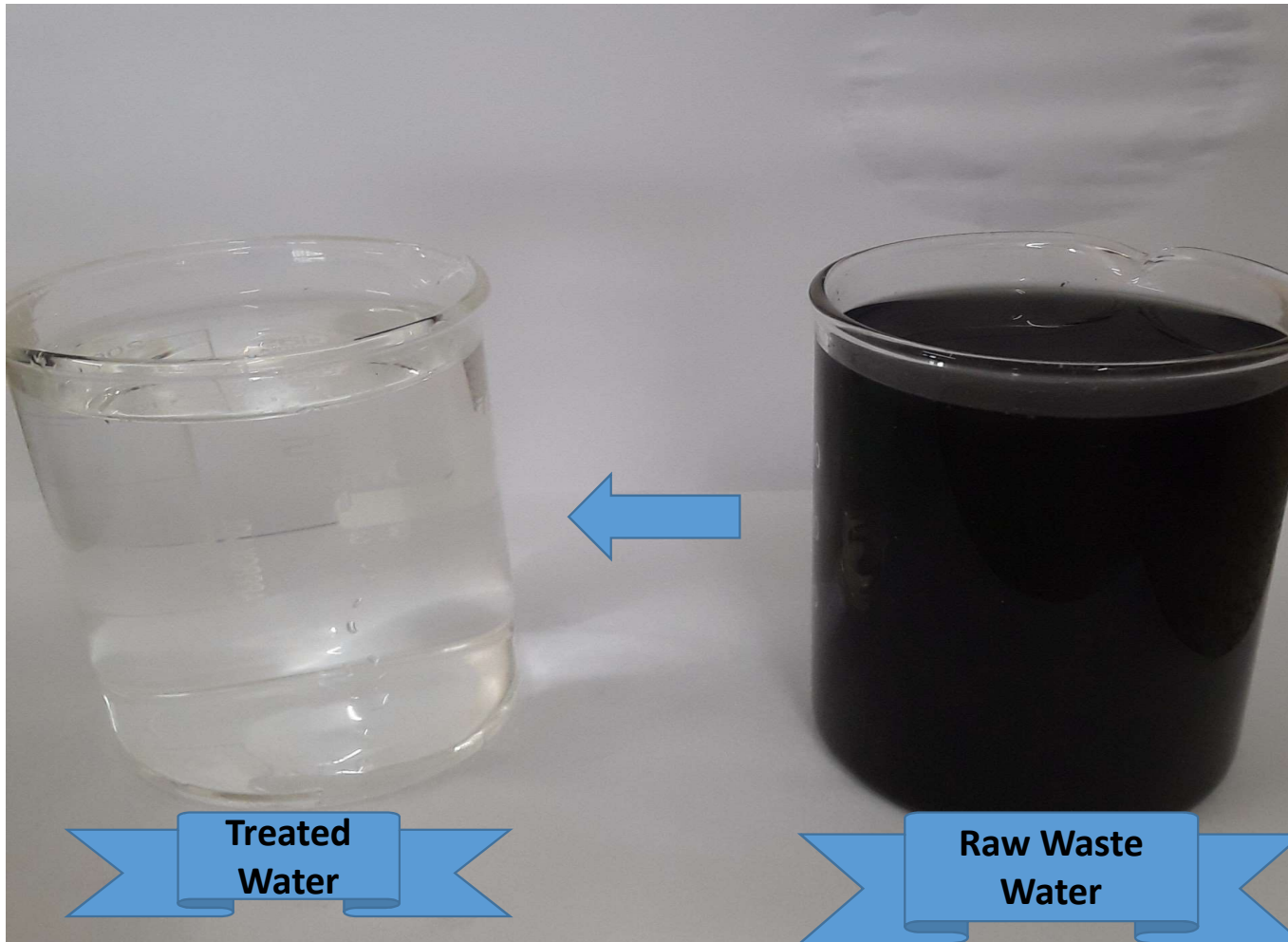
Filter Press



Belt Press

## How Water Looks After & Before Treatment ?

➔ Zero Liquid Discharge Treatment Plant Water Samples



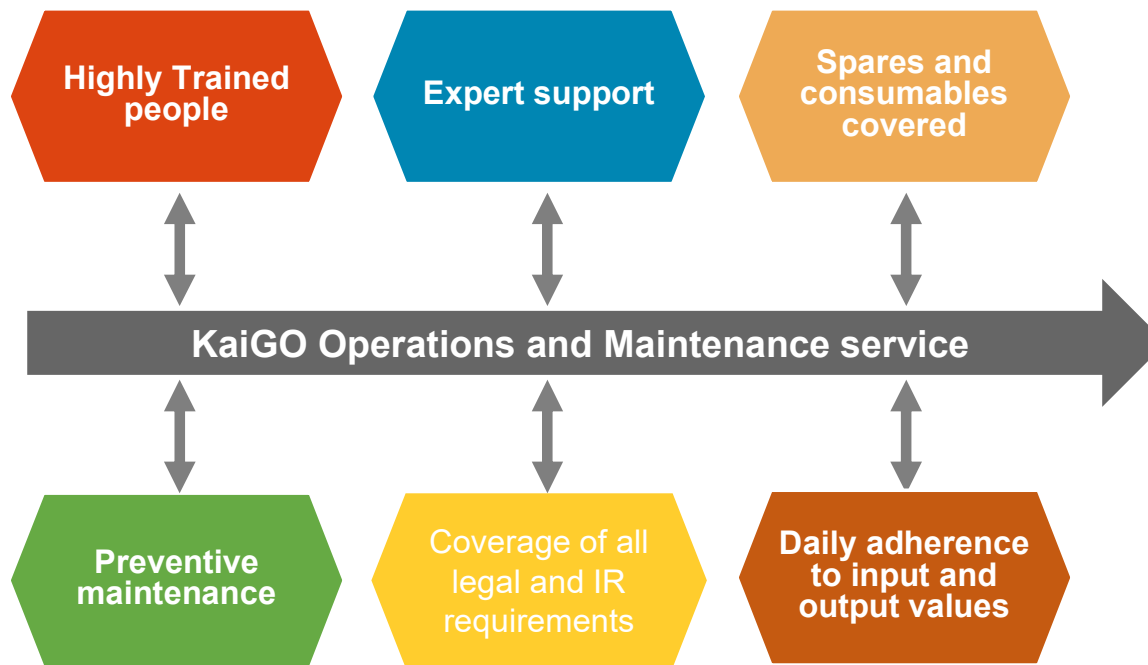


## How We Can Sync?

➔ We Offer Efficient Operations and Maintenance Services after Installation




Your plant



- ① Zero downtime
- ② Reduced Opex
- ③ Long life of capital equipment
- ④ Keep updated with latest technology
- ⑤ Compliance to safety norms
- ⑥ No budgetary risk

## What Makes Envisol a Preferred Partner ?

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- 1. One stop place for all type of water and waste treatment related customer requirements – Projects, Spares, Services**
  - 2. Single window for best globally available technologies across entire water treatment spectrum (either through own patents or licensed partners)**
  - 3. An extensive technology portfolio along with in house R&D Center**
  - 4. Proven process know how and experience**
  - 5. Experience as a reclamation plant operator**
  - 6. Multinational experience, which ensures an understanding of different local needs**
  - 7. Strong team of over 400 people ; Industry veterans, respected by customers, vendors and competitors**
- 

# How Do You Benefit? → You Will Get Best Class Solutions From KaiGO **Envisol** POWERED BY ARVIND



## RO, UF and NF Membranes

KaiGO is an authorized distributor for Hydranautics membranes. It is highly energy saving and low fouling on account of its composite polyamide membrane.



## FRP tanks

KaiTANKs, used to hold filter media, are manufactured with high quality FRP resin, suitable for drinking water, light in weight and 100% hydro tested with certificate.



## MBR (Membrane Bio Reactor)

KaiMBR is a combination of membrane processes like UF with the ASP process. It has a small footprint, easy retrofit and enables upgrade.



## Motorized Dosing pump

KaiDOSE motorized dosing pumps are suitable for larger volume dosing application. Mechanical, hydraulic & plunger options available.



## Pressure tubes

KaiTUBE FRP pressure vessels are membrane housings for industrial and commercial water treatment applications such as desalination and reverse osmosis (RO).



## High pressure pump

KaiPUMP can be used for both positive and negative displacement application. USPs include pump casing thickness of 1.5 mm, top and bottom casings of SS304, cartridge & split type mechanical seal etc.

## How Do You Benefit?



You Will Get Best Class Solutions From KaiGO

**Envisol**  
POWERED BY ARVIND



### Electronic dosing pump

KaiDOSE is a positive displacement pump. It pumps a very precise flow rate of a chemical into a tank. USPs – Air relief valve, solid PTFE diaphragm, Double NRV check valves, min SPM of 120



### Filter press

KaiPRESS is specially designed to de-water sludge. It has various plate MOCs (PP/CI/SS), range of sizes, option for manual/hydraulic operation.



### Valves

KaiVALVES control the flow and pressure within a system or process. Available from 1" to 40" in size and 150# to 2500# Class. Types available Gate/ Glove/ Check/ Butterfly/ Ball/ NRV/ Diaphragm



### Belt press and thickeners

KaiBELT is rapidly turning out to be a good alternative to the manual Filter press. Fully automatic with option for thickener, it gives upto a 30% solid consistency at outlet.



### MBBR

KaiMBBR has 3 variants – PVA, Biochip and PU media, with surface areas ranging from 3000 m<sup>2</sup>/m<sup>3</sup> to 47000 m<sup>2</sup>/m<sup>3</sup>. Reduces tank footprint, life > 5 years, highly resistant to wear and tear.



### ETP and RO Chemicals

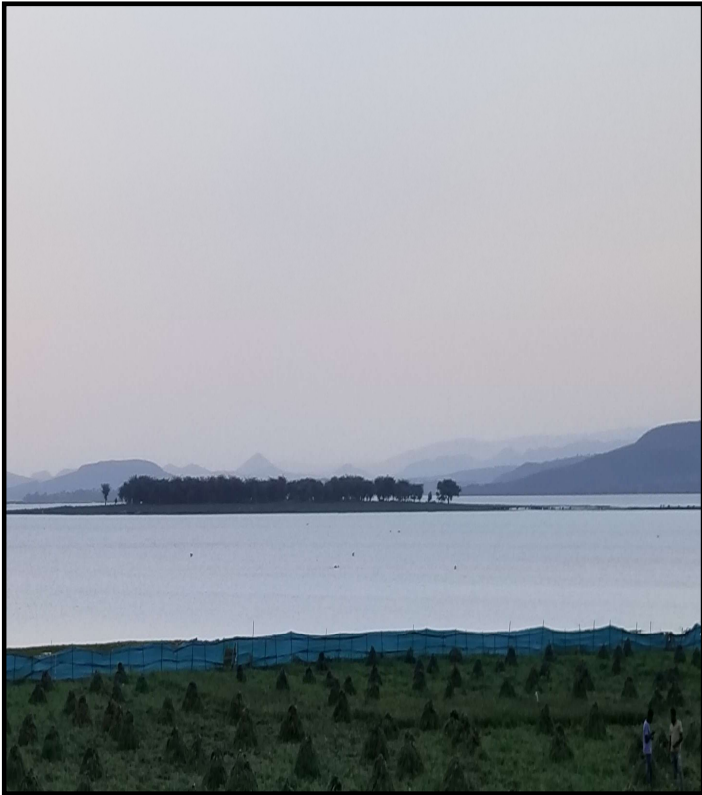
KaiCHEM offers several chemicals for water treatment

- Color removing chemicals
- Coagulants
- Polyelectrolytes
- RO antiscalants, cleaning and biocides



# Finally What Precious Products You Will Get?

## Treated Water



## Recovered Salt



## Sludge





# What Additional Benefit You Can Expect?



## Water audit and consulting

- Project management consulting and assessment
- Review of existing design parameters and quality of source
- Recommendation to enhance the performance and longevity of the existing plant.
- Regular scorecard to accredit compliance to best practices



## Water testing

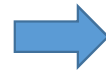
- Envi – Lab facility to test the customer's source water
- Effluent and report the required parameters.
- Spectrometer



## Training, R&D and skill development

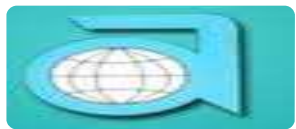
- Training packages and courses
- Government approved training centers
- Studies cover both theoretical and practical knowledge applications
- R&D facilities to help you design new offerings

Who are already benefitted?



Some of our valued Customers

Envisol  
POWERED BY ARVIND



# Infra Practice : Executed EPC Projects for Wastewater Treatment, Recycle-Reuse, Zero Liquid Discharge, is varied sectors Globally

Industry Sector	No of Projects	ZLD	WWR	WWTP	STP
Textile / Tanneries / Dyes / Pigments	82	49	25	16	8
Auto / Engg / Metal / Steel / Mining	24	21	2	2	1
Pharma / Chemicals	22	12	7	6	0
Municipal / Govt.	11	6	0	0	5
F&B / Dairy / Sugar	11	5	5	0	1
Petroleum / Power / Infra	8	3	2	2	2
Paper	4	3	1	1	0
<b>Grand Total</b>	<b>162</b>	<b>99</b>	<b>42</b>	<b>27</b>	<b>17</b>

International Projects	# of Projects
Ethiopia	6
Finland	4
USA	2
Sweden	2
Japan	2
S. Arabia	2
Spain	1
Canada	1
China	1
France	1
Netherlands	1
Hungary, Europe	1
Malta, Europe	1
Marshall Islands	1
South Africa	1
Singapore	1
Taiwan	1
<b>Grand Total</b>	<b>29</b>

ZLD = Zero Liquid Discharge, ERS = Effluent Recycling System, ETP = Effluent Treatment Plant, STP = Sewage Treatment Plant

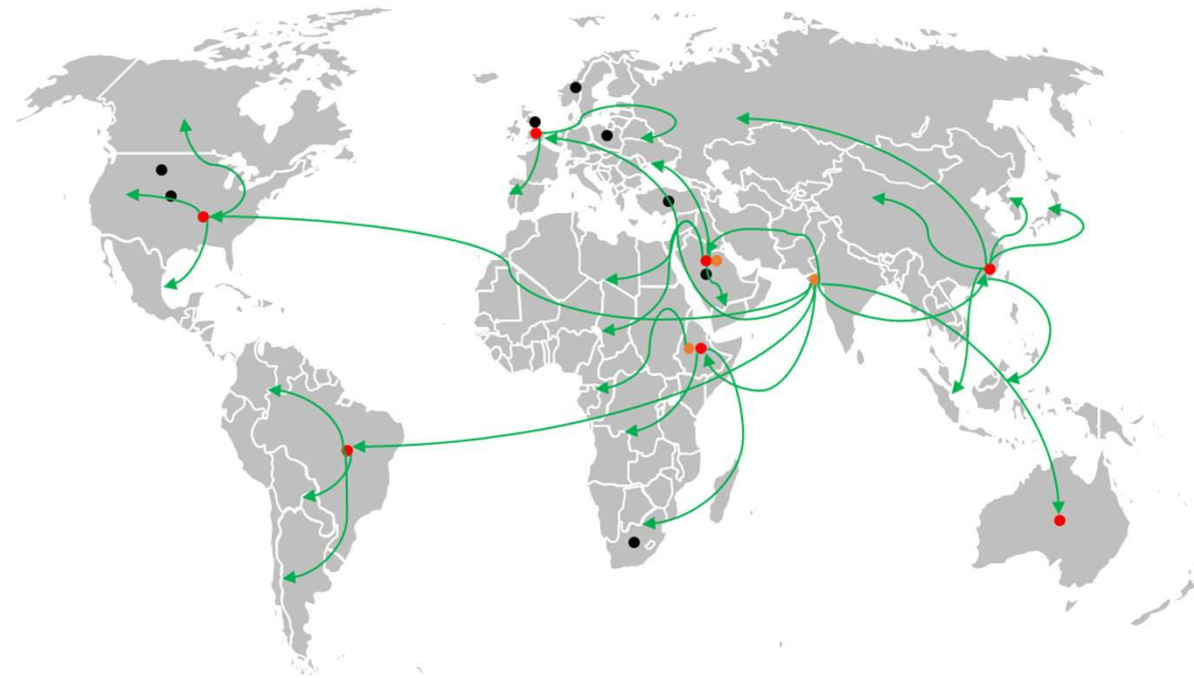
## Where You Can Contact Now

Envisol has a global footprint with a modern supply chain and offices spread across 6 continents

India footprint



Global footprint



- Offices / Partner locations
- Warehouse
- Manufacturing



# Thank you

For Kind Attention!!!

Email id :- [support.envisol@arvind.in](mailto:support.envisol@arvind.in)

Contact :- **18008439988 (toll free), +917930136056, +251-91 250 4308**

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