



KEP ENGINEERING SERVICES PVT. LTD.



**Technology Provider in the Waste Water and Effluent Treatment Systems to
Achieving Zero Liquid Discharge With MVR Technology**

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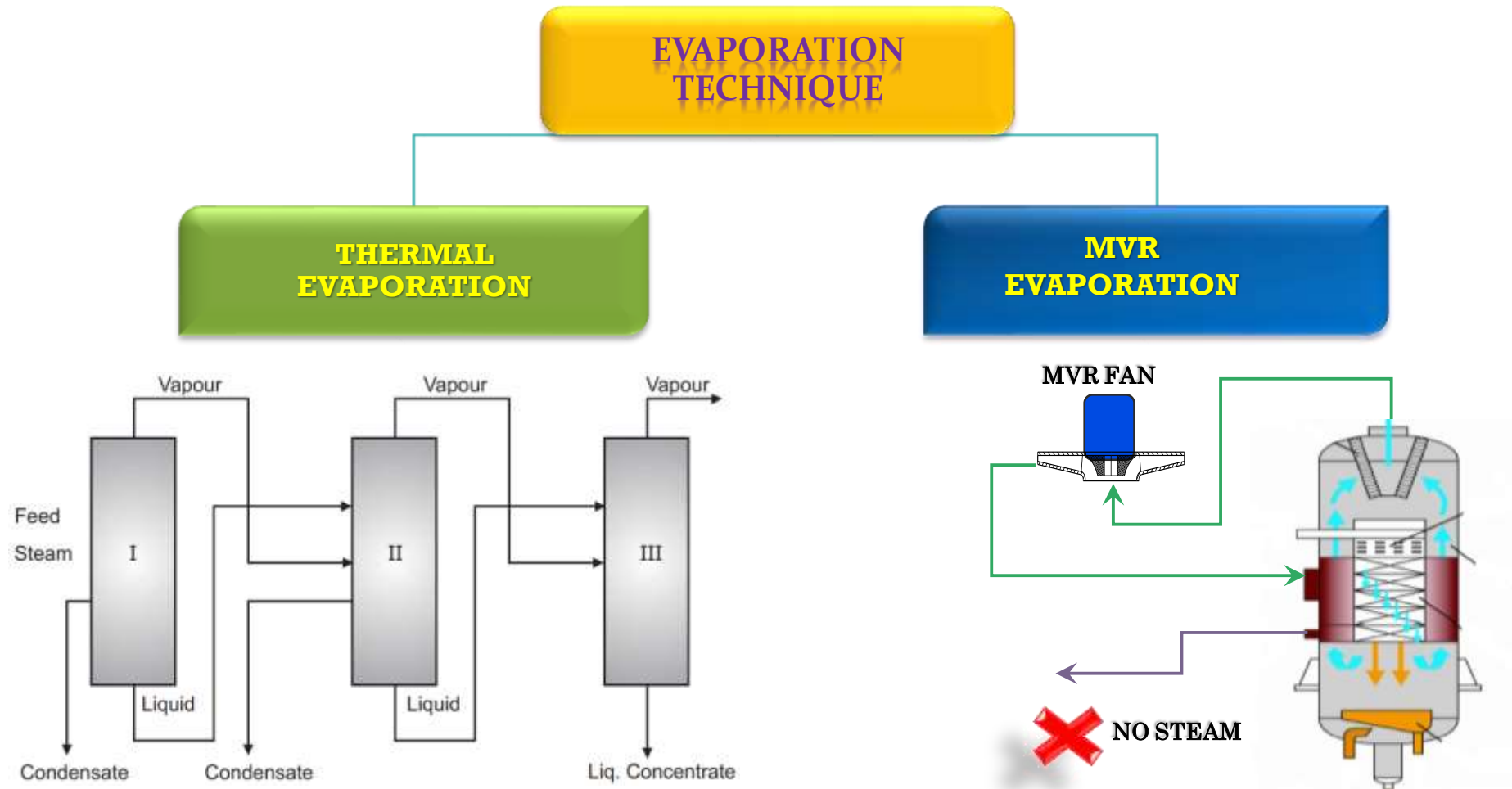
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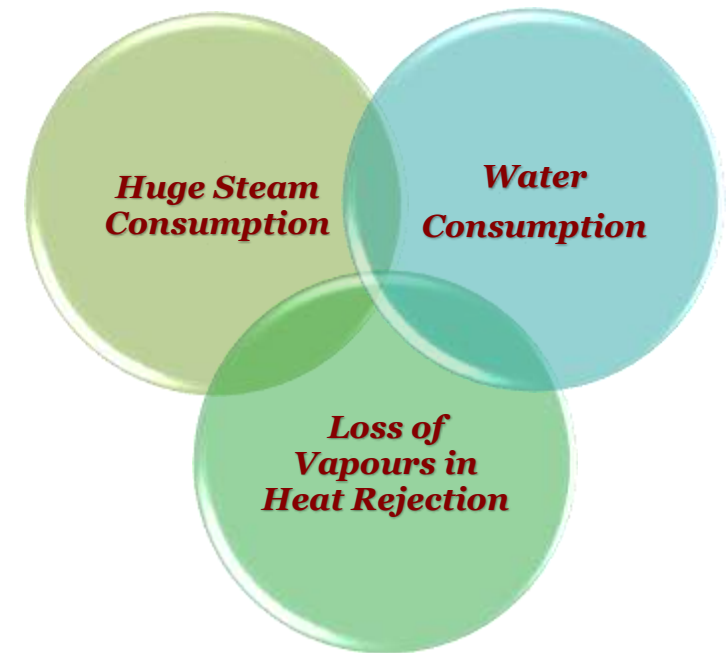
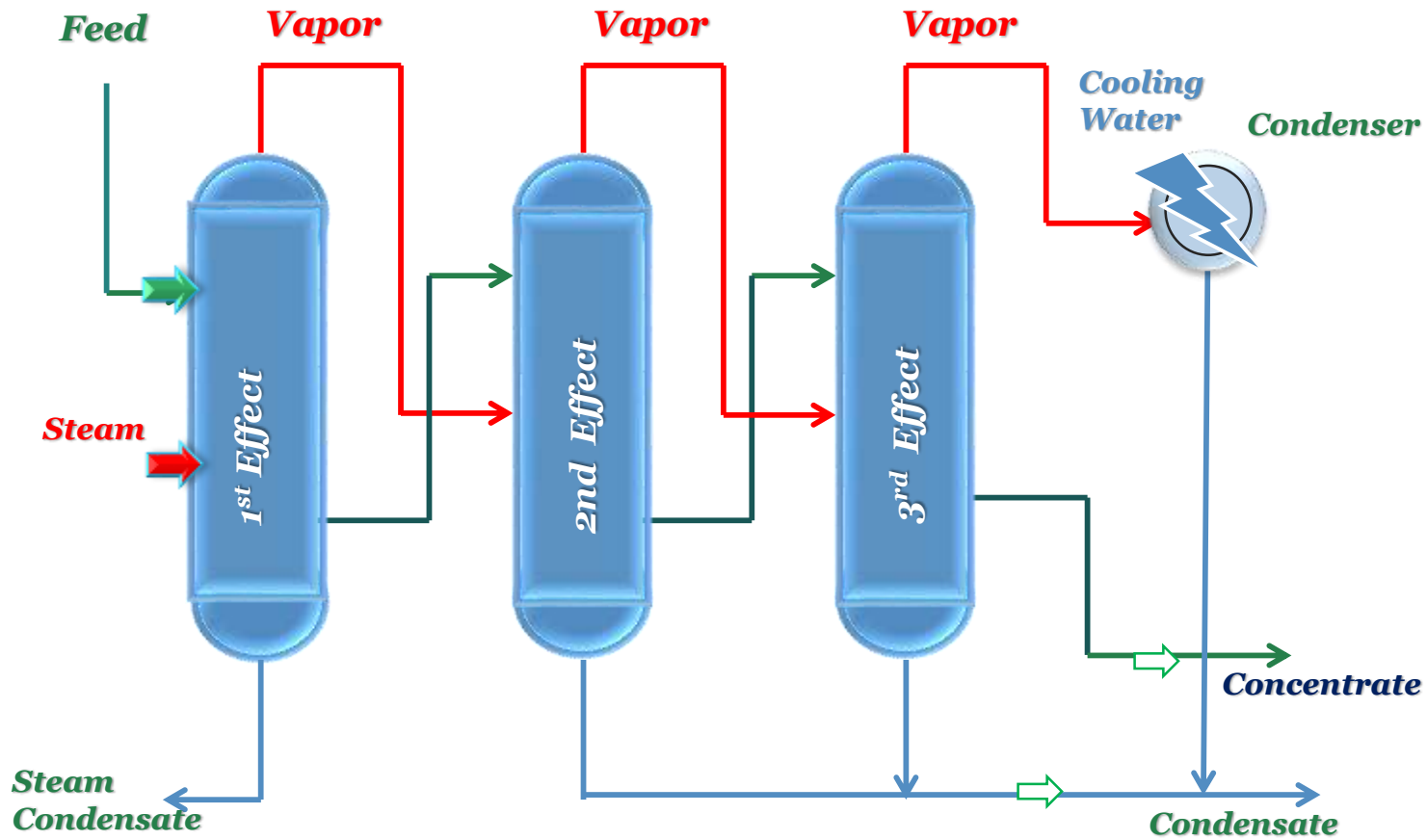
Introduction

☆ Various evaporation techniques are used to concentrate fluids or to achieve Zero Liquid Discharge (ZLD).

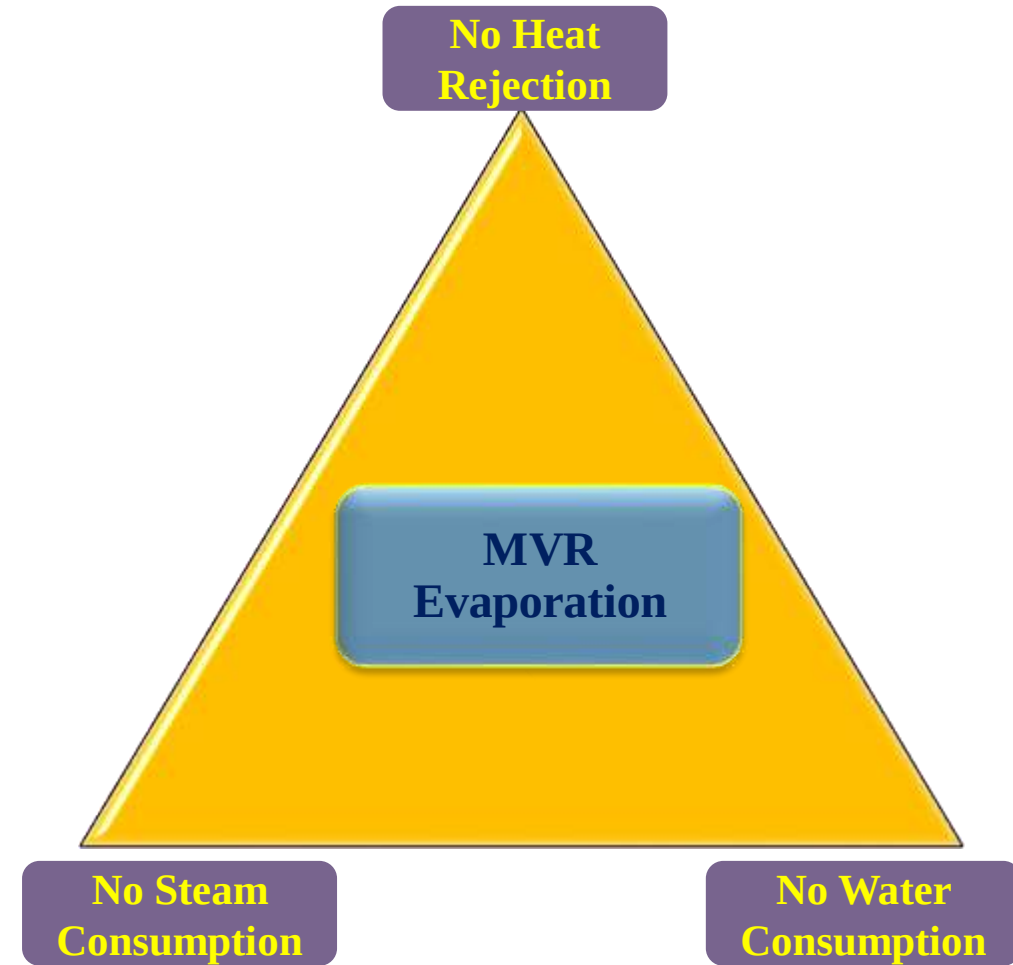
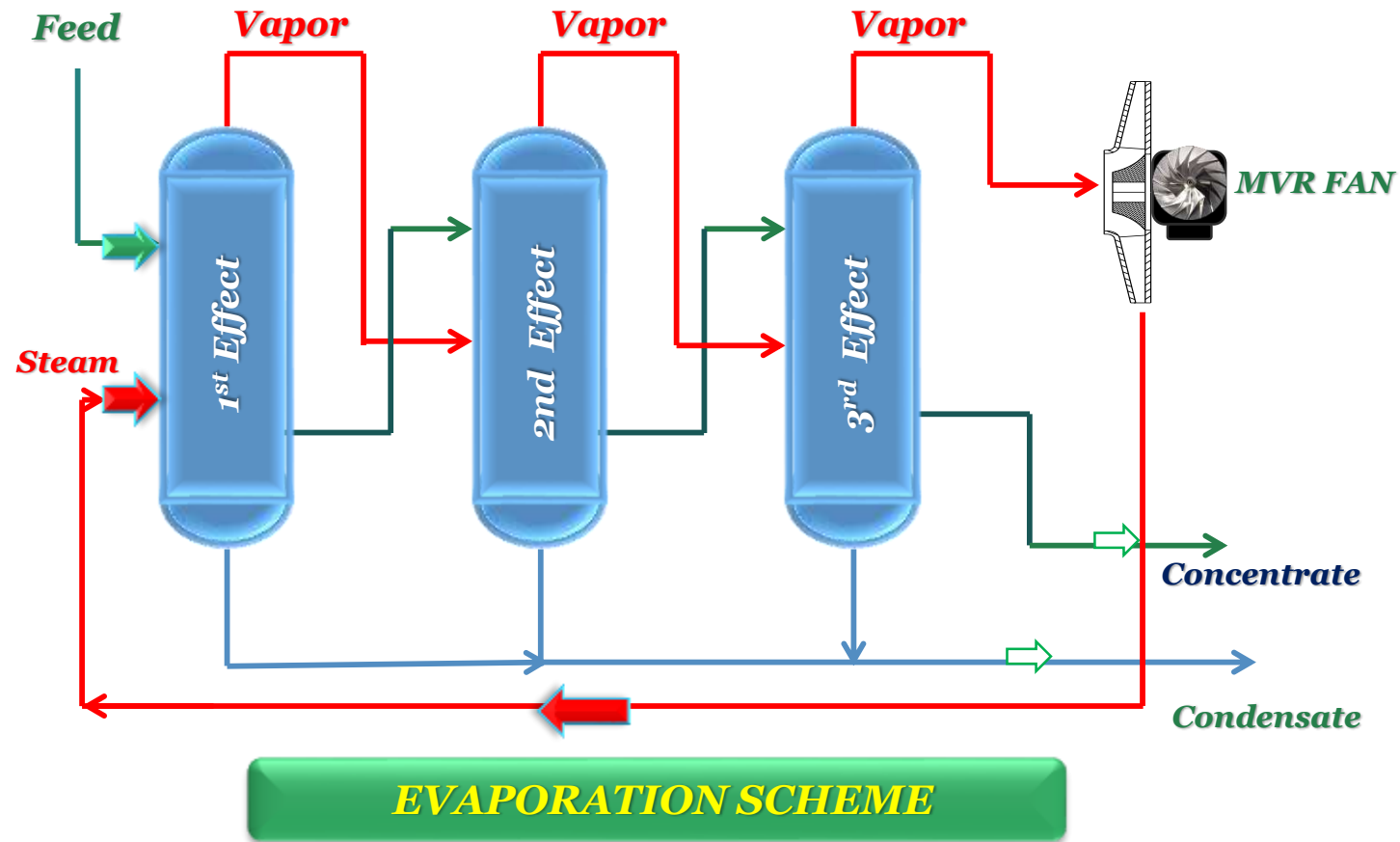


Current Evaporation Scenario

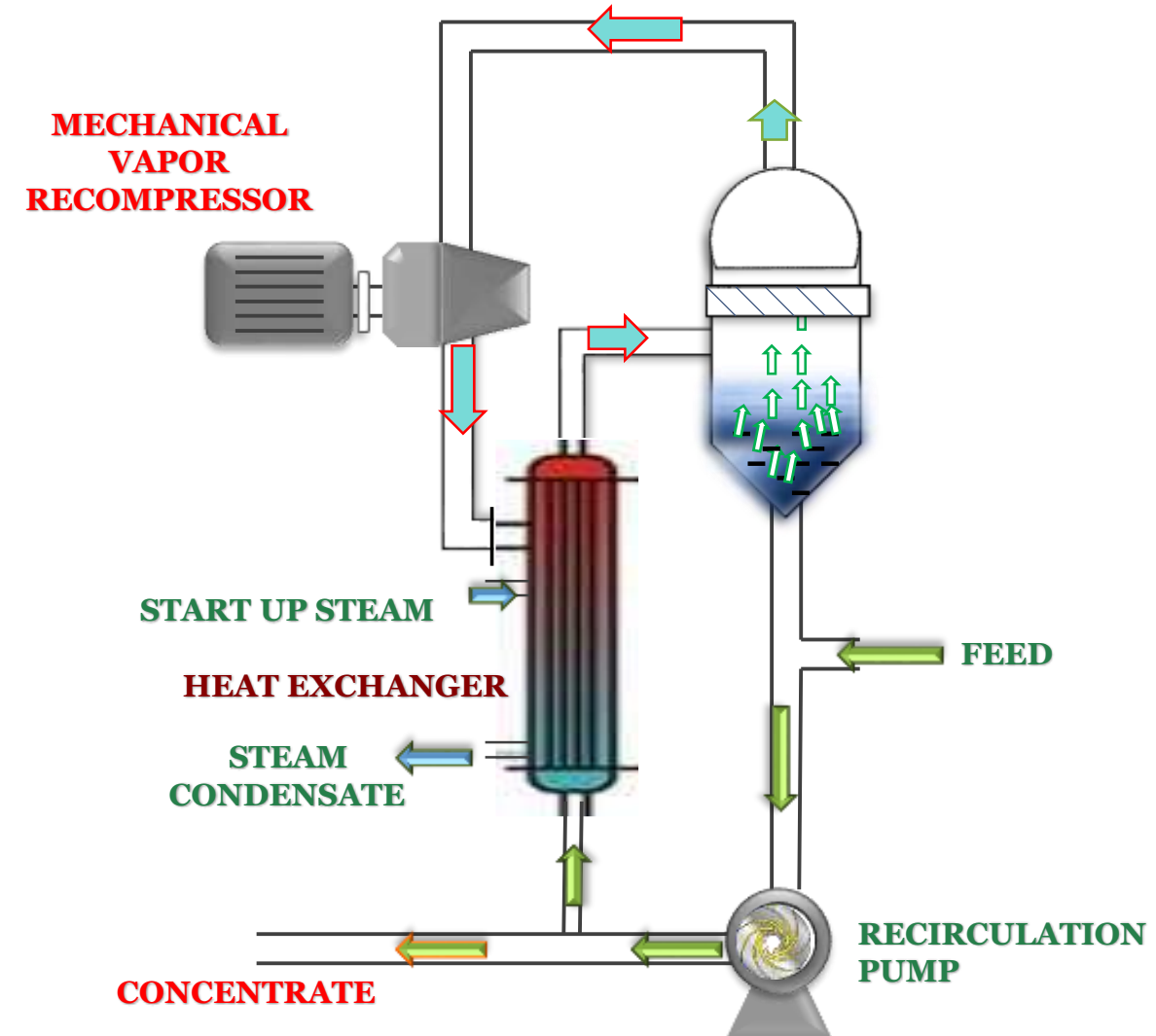
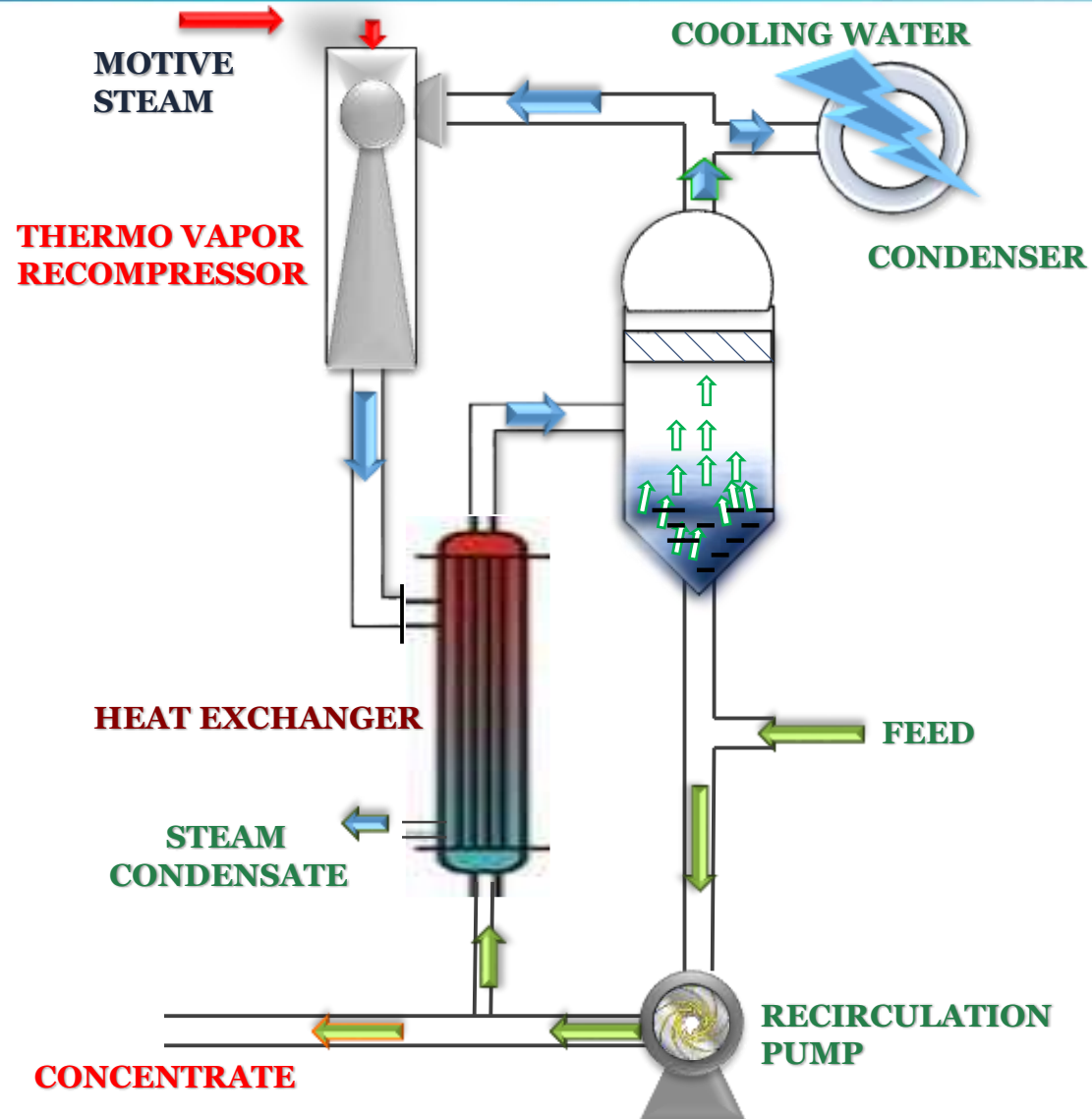
MEE EVAPORATION SCHEME



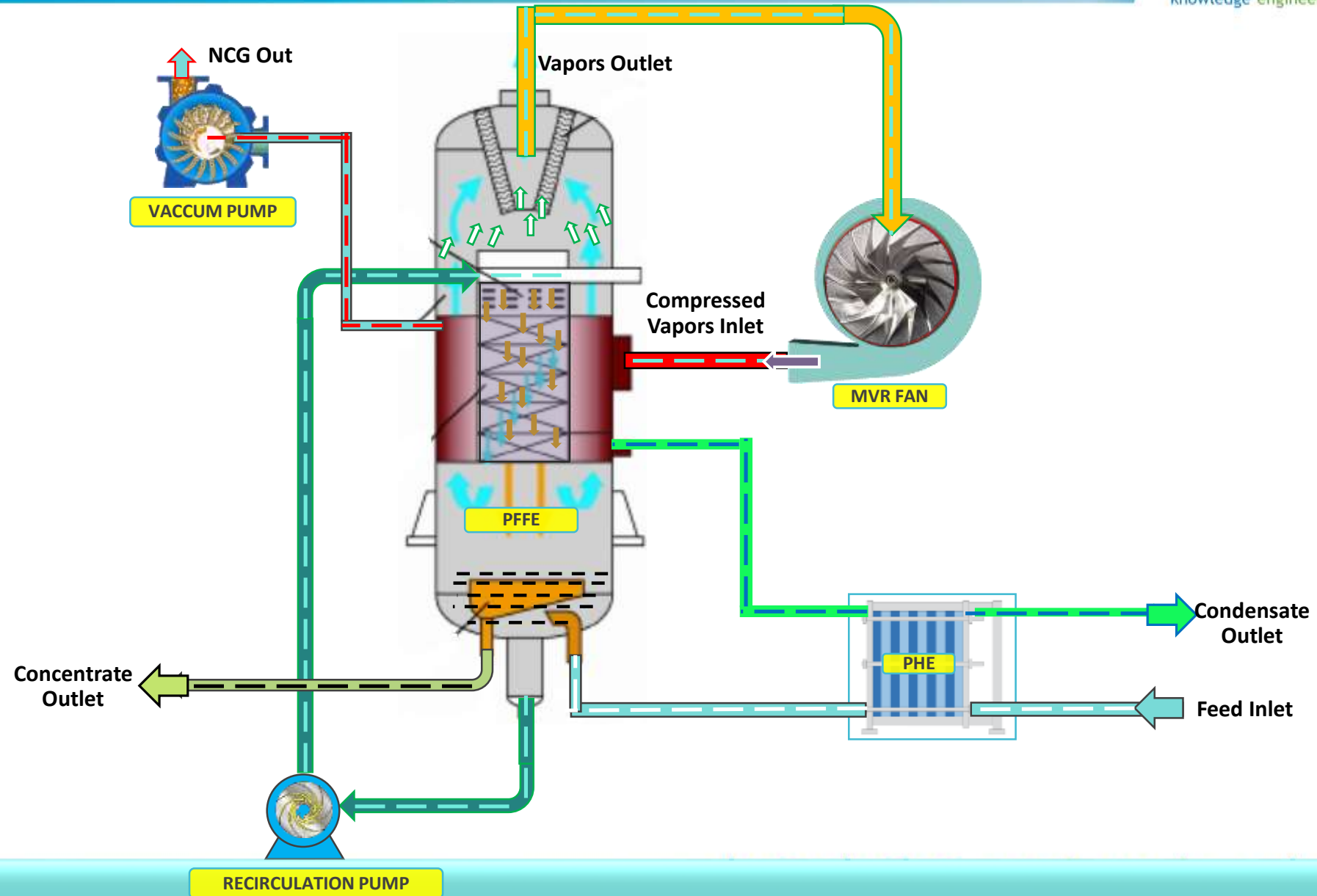
MVR Evaporation Process



TVR vs MVR



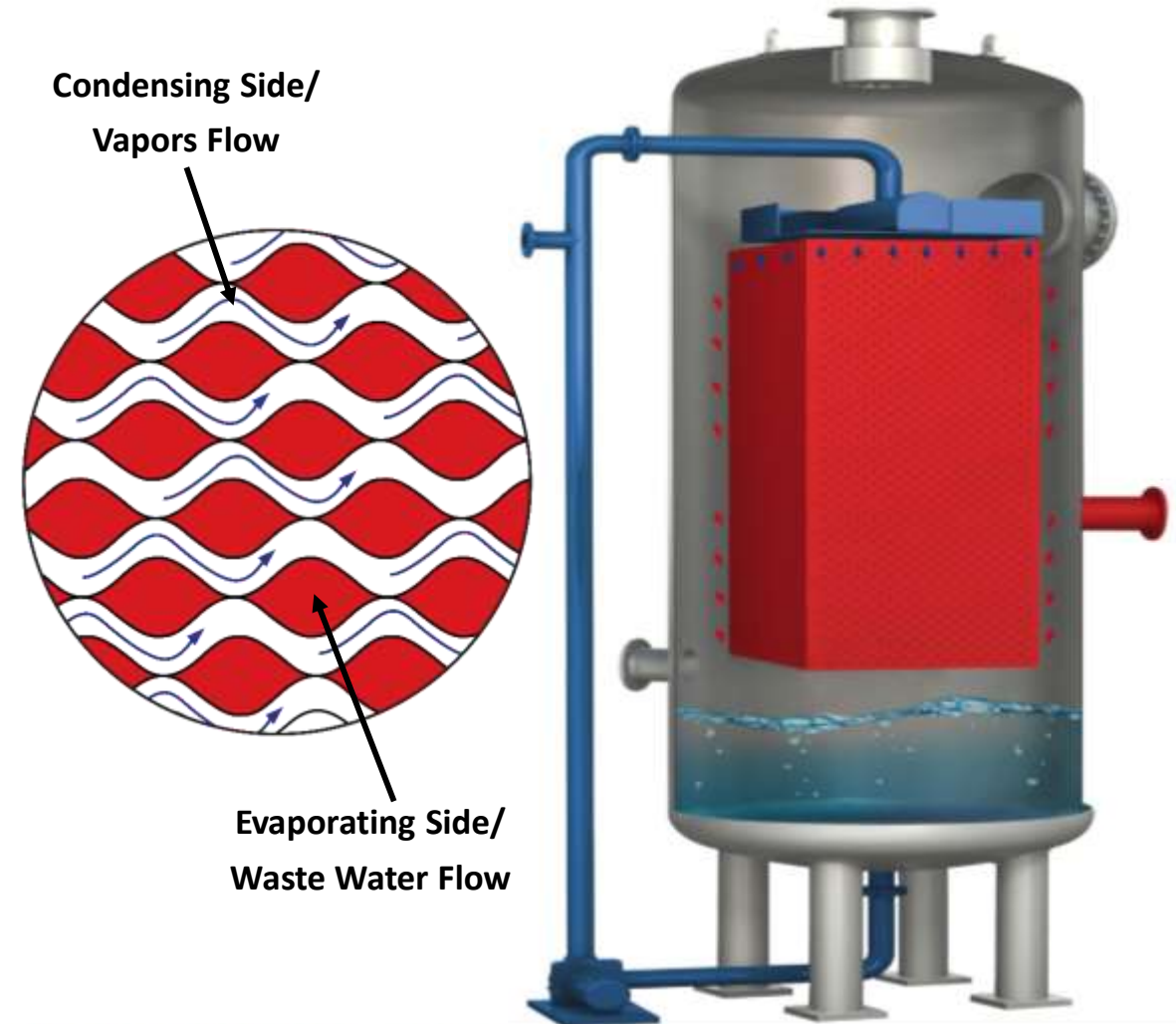
MVR Evaporator Working Principle



Thin Film Plate Technology

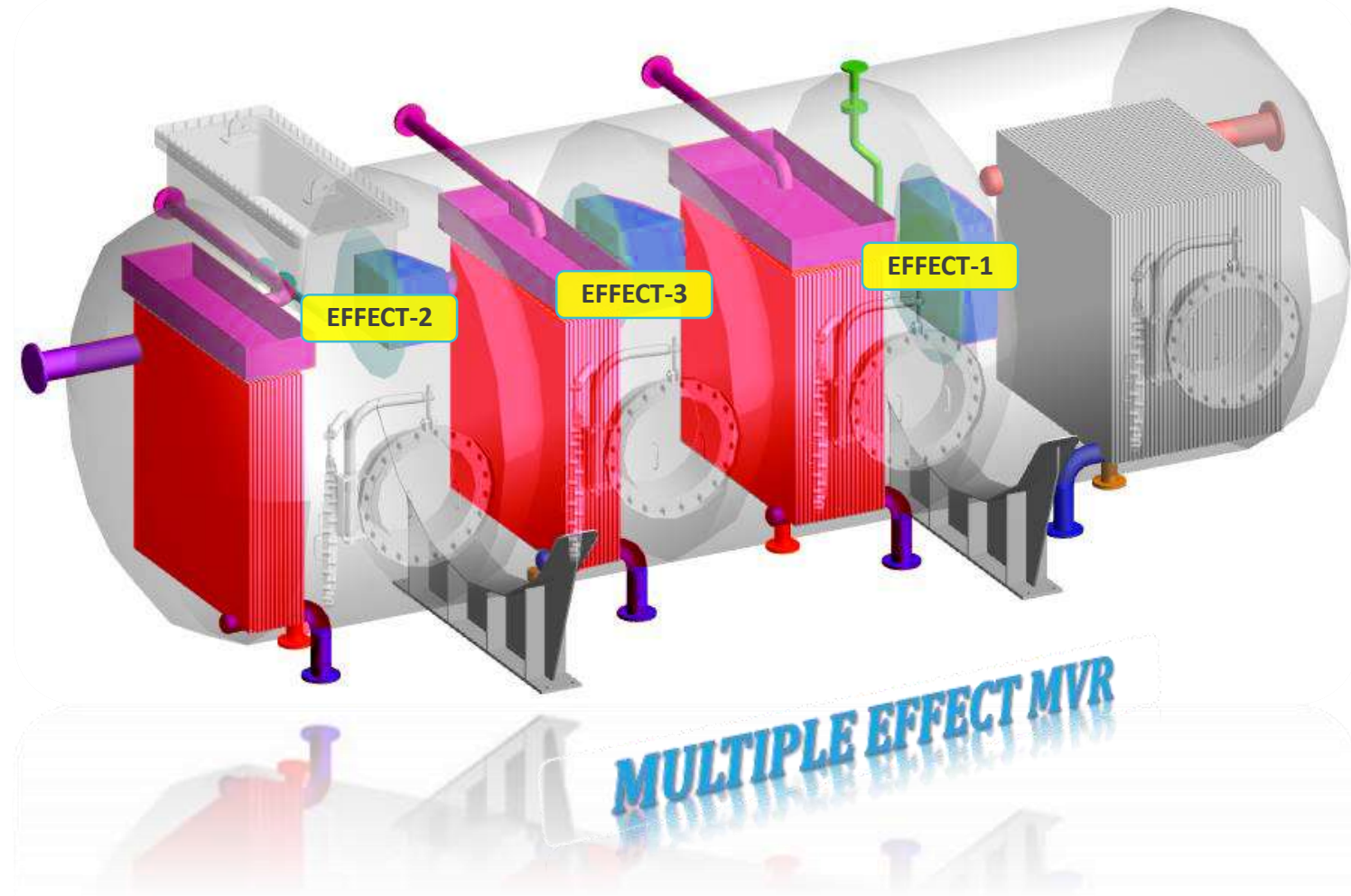
SINGLE EFFECT MVR

- ✓ Compact Design takes less installation space to process high capacities of streams.
- ✓ High heat transfer performance thus specific energy consumption is low.
- ✓ Low Fouling Potential.
- ✓ Lower capital cost requirements, easier and less costly to commission, operate & service.
- ✓ Completely Modular & Scalable design in many applications.
- ✓ Skid Mountable in many applications.



Horizontal Module Thin Film Plate Evaporator

- ✓ Low fouling potential reduces Clean-In-Place (CIP) requirements.
- ✓ Highly serviceable heat transfer bundle which can be easily removed due to horizontal orientation.
- ✓ Designed for highly effective CIP operation.
- ✓ Physically low foot print per unit flow rate.
- ✓ Lower capital cost per unit surface area of heat exchanger.



MVR FAN “Heart of the System”

- ✓ High Speed Centrifugal Turbo Fan is the heart of the MVR Evaporator, which is used to recompress the vapors generated by Evaporator at higher pressure using Electrical power.
- ✓ In MVR, these same vapors are used again in evaporator as a heating medium. This eliminates the use of fresh steam. Overall specific energy requirements are dramatically reduced in comparison to conventional distillation/Evaporation systems.
- ✓ Robust Design.
- ✓ Easy to maintain and Operate.
- ✓ Water Cooled bearing system.
- ✓ VFD operation to achieve the desired ΔT across Heat Exchanger for various duties.
- ✓ Equipped with special bearings with provision of online Temperature measurement & Vibration Monitoring system.
- ✓ Constructed with Special High Strength & High Grade Material Suitable for food & Chemical applications.



MVR TURBO FAN





Cost Economics

Waste Water Feed Rate	5000 kg/hr	
Initial Conc.	3%	
Total Water Evaporated	4571 kg/hr	
Operating Cost Comparison		
Parameters	KEP MVR Evaporator	Multi-effect Evaporator
Evaporator Capacity	4571 kg/hr	4571 kg/hr
No. of effect	Three	Three
Steam Consumption	Nil	1300 kg/hr
Electrical Energy for Vapor Compression/Pumps	141 KW	105 KW (pumps)
Operating Hours in a day	20	20
Operating days in a month	30	30
Cost of Steam per kg	Rs 2.0	
Cost of Electricity per kw	Rs 7.5	
Cost of Electrical energy consumed Annually	Rs 76.10 Lakhs	Rs 56.7 Lakhs
Cost of Steam consumed Annually	Nil	Rs 187.20 Lakhs
Total Cost of Operation	Rs 76.10 Lakhs	Rs 243.9 Lakhs
Net Cost Saving with MVR	Rs 167.8 Lakhs	

MVRE- Advantages

- **Low Operational Cost**- Utilizes only electrical energy which is clean, cheap and easily available among all energy sources.
- **No Steam & Cooling Water Requirement** – Eliminates Boiler thus reduces investment & Fuel cost for steam generation And Eliminates Cooling Tower for heat rejection.
- **Light Weight**-Easy installation & low Transportation cost.
- **Low Capital Cost**- Investment per unit surface area of heat exchange equipment is low as compared to MEE.
- **Less Fouling** - Fouling is 10-25% that of MEE with Tubular Exchanger.
- Easy to Inspect and Clean, and Less Maintenance as compared to MEE.
- **Compact Design**- Saves Space & Servicing Time and fits into an area one-fifth to one-half that required for a comparable MEE with tubular heat exchanger.
- Quick Process Control & Less Operational Problems.
- High Heat Transfer Performance.

MVRE Clients

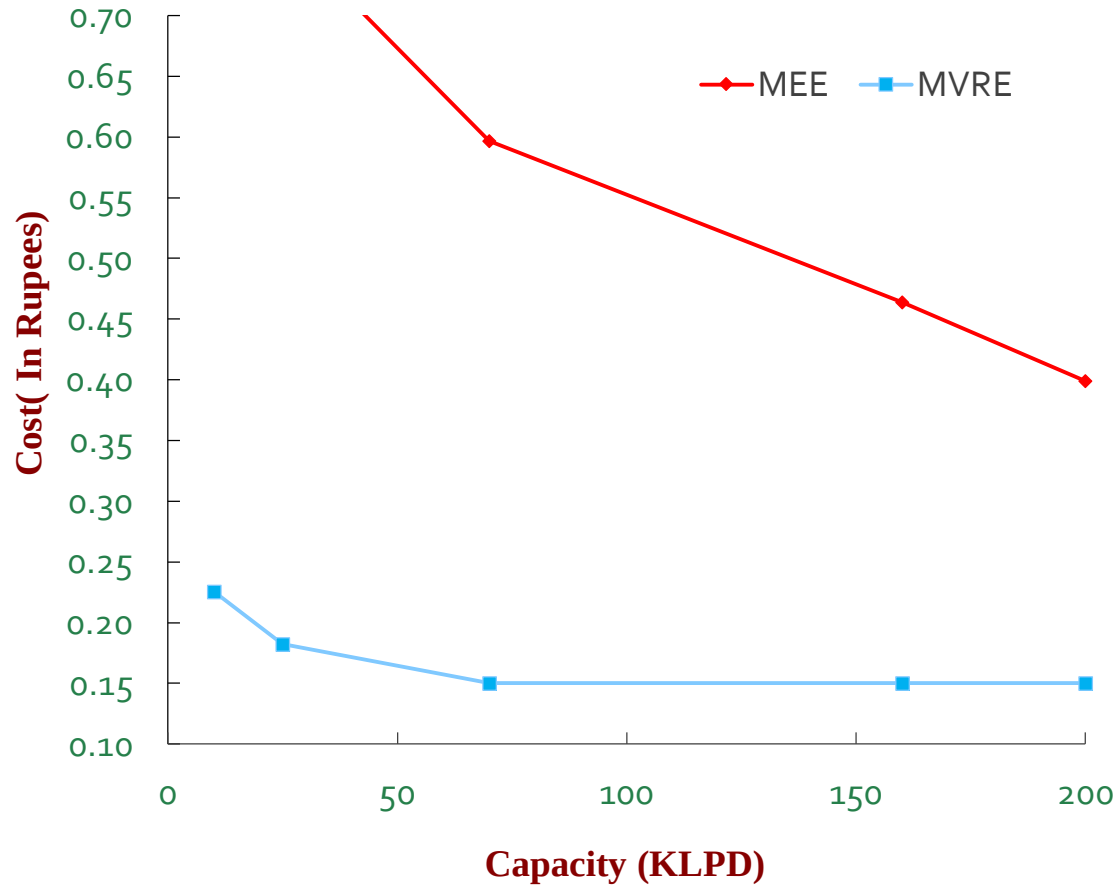


MVRE Client List

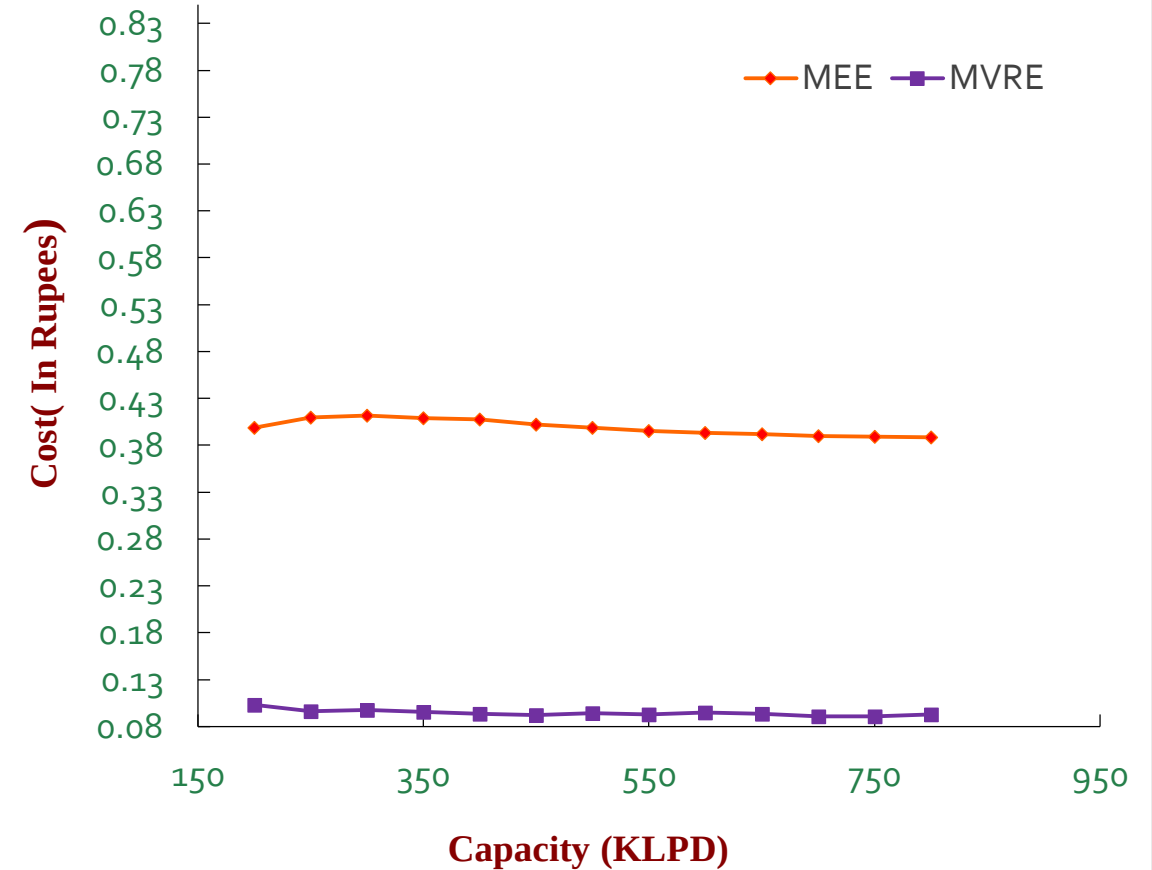
Sr. No	PROJECT NAME	TYPE OF INDUSTRY	STATE	SYSTEM	CAPACITY KLPD	YEAR OF INSTALLATION
1	Eesavyasa Technologies Pvt Ltd	Consultant	Karnataka	Stripper+MVRE	150KLPD-2nos	2020
2	Punjab Chemicals	Chemical	Punjab	ETP+Tubular FFE+3 EFF Forced circulation Evaporator	260KLPD	2022
3	CROP CARE ORGANICS LLP	Chemical	UP	ETP, BTP, UF&RO, Stripper,MVRE and ATFD	100KLPD	2022
4	Membrane	Consultant	Haryana	MVRE and ATFD	100KLPD	2022
5	Galva Deco	Automotive	Gujarat	MVRE	70KLPD	2021
6	PGP Pvt Ltd	Glass	Gujarat	MVRE + PC	55KLPD	2021
7	Econian Engineers and Consultants Ltd.(ManKind Pharma)	Pharma	New Delhi	Stripper, MVR,MEE,ATFD	40KLPD	2022
8	Membrane India	Consultant	Haryana	TFE-MVR with ATFD	35KLPD	2022
9	Permionics Membranes Pvt Ltd	Consultant	Gujarat	MVRE	22KLPD	2020
10	Enhanced WAPP Systems India Pvt Ltd	Sello Wrap	Gujarat	MVRE system	20KLPD	2020
11	Aero Agro Chemical industries Ltd	Chemical	Gujarat	MVRE system	20KLPD	2020
12	Aquatech System (Asia) Pvt Ltd	Consultant	Maharashtra	TFE-MVR with ATFD system	20KLPD	2022
13	21st Century Enviro Engineers Pvt Ltd.	Consultant	Chhatisgarh	MVRE+PC	16KLPD	2020
14	SriChakra polyplast (INDIA) Pvt Ltd	Plastic	Telangana	ETP+MVRE	10KLPD	2021
15	Karmatara Engineering Pvt Ltd	Metal	Maharashtra	MVRE with ATFD	10KLPD	2021
16	Therachem Research Medilab (india) Pvt Ltd	Bulk Drug	Rajasthan	Stripper column, TFE-MVR, ATFD	10KLPD	2022
17	Ramky-(TMWML)	CETP	Tamil Nadu	TFE-MVR system	5KLPD	2022

Comparison Between MEE and MVRE

Opex for 1 Litre v/s Capacity



Opex for 1 Litre v/s Capacity





Highlights of Installations



System: Primary Treatment, Stripper Column, Tubular Falling Film Evaporator with MVR Fan, Triple Effect Forced Circulation Evaporator (MEE) with Agitated Thin Film Dryer (Existing).

Capacity: 200KLPD

Location: Milestone-18, Ambala-Kalka Road, Village & P.O. Bhankharpur, Derabassi, Distt. SAS Nagar, (Mohali), Punjab-140201, India.



System: TFE-MVR , Filter Press, FCE-MVR & ATFD System.

Capacity: 160 KLPD

Location: Hyderabad.



System: TFE-MVR , Filter Press, FCE-MVR & ATFD System.

Capacity: 100 KLPD

Location: Gurgaon, Haryana.



***System:** MVRE & ATFD*

***Capacity:** 20 KLPD*

***Location:** Gujarat*

Piramal Glass



System: MVRE with Pusher Centrifuge

Capacity: 22 KLPD

Location: Gujarat



**Electrically
Driven
Zero Steam Plant**

OPPO F10 Pro+
@Harish@ Valsad, Gujarat 2022.02.24 11:56

MVRE Pilot Plant



- *Capacity: 10 KLPD*
- *Feed Rate: 500 Kg/hr.*
- *Dimensions: 9.14 m X 2.45 m X 3.35 m (L*B*H) .*



Thank You For Your Attention