Improvements in green technologies

NEW DEVELOPMENTS IN SULPHATE REMOVAL & CONCENTRATION (SRCS) MEMBRANE SYSTEM & RO AND NF MEMBRANES FOR ZERO LIQUID DISCHARGE (ZLD)

Presented By,
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SepraTECH Solutions Pvt. Ltd.

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KEY TOPICS

- New Generation 3 - XSTREME Sulphate Rejection Membranes
- New Generation Reverse Osmosis (RO) Membranes in Zero Liquid Discharge (ZLD)
- Nanofiltration (NF) membrane application in ZLD for minimal sizing of MEE

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NEW DEVELOPMENTS IN SULPHATE REMOVAL & CONCENTRATION (SRCS) MEMBRANE SYSTEM

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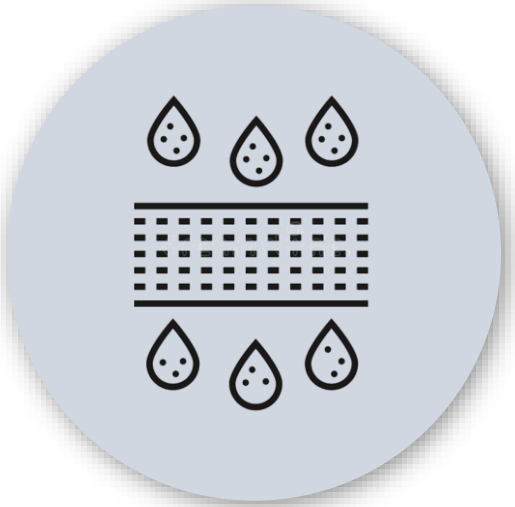
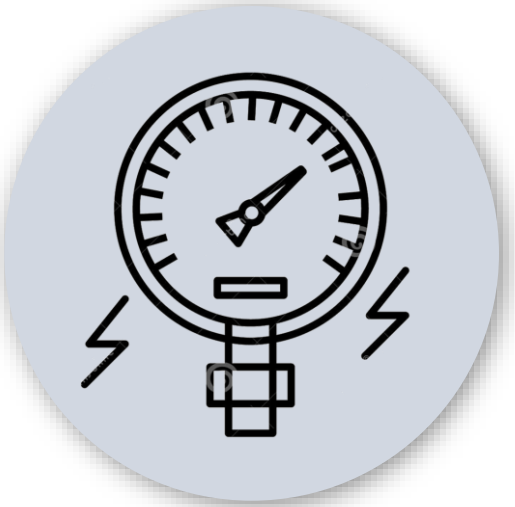
YOUR PROBLEMS



Increase in passage of sulphate salts



Increase in operating pressure

Higher OPEX

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OUR SOLUTIONS

High Sulphate Rejection membranes

Greater flexibility in operating pressure

Lower OPEX

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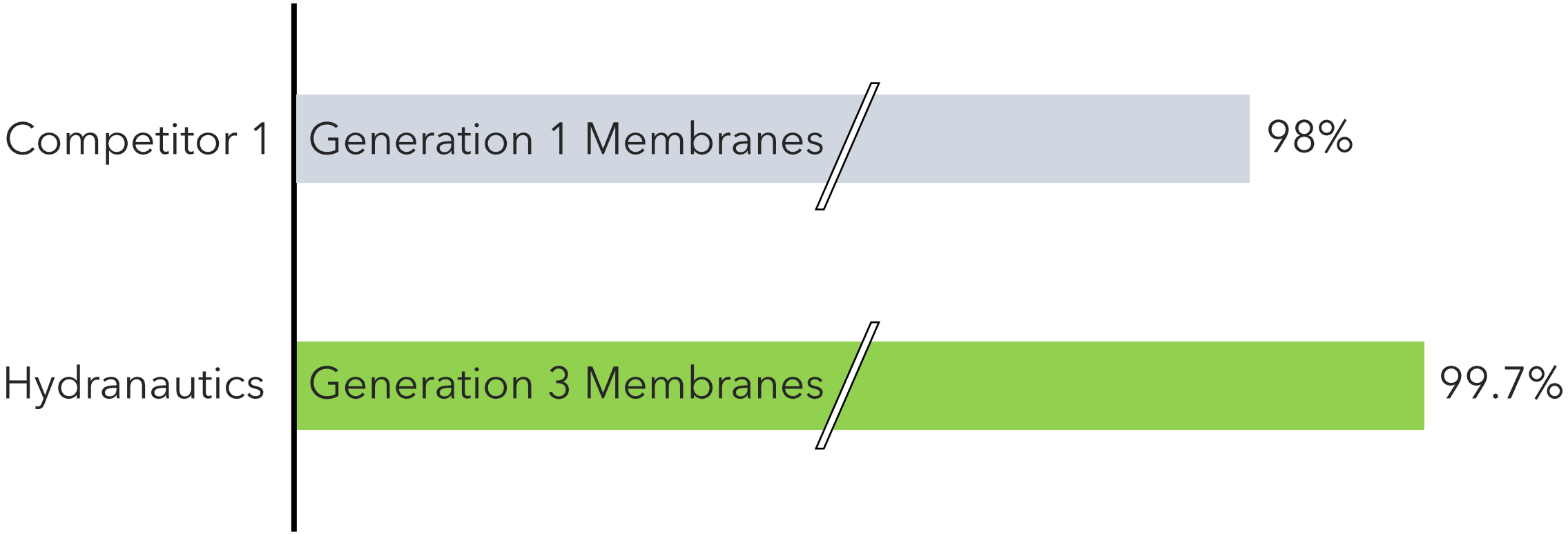
IMPROVEMENTS IN SRCS MEMBRANE SULPHATE REJECTION



Rejection is recorded under Standard Test Conditions of 2,000 ppm $MgSO_4$, 110 psig (0.76 MPa) Applied Pressure, 25 °C Operating Temperature, 15% Permeate Recovery

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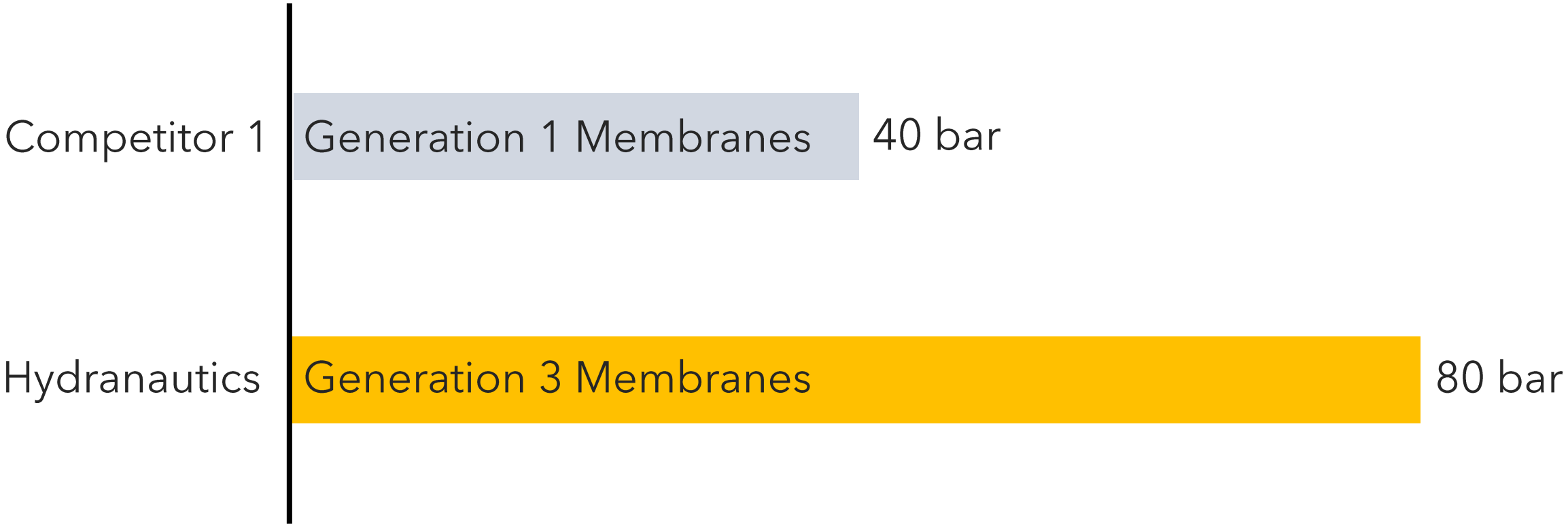
IMPROVEMENTS IN SRCS MEMBRANE OPERATING PRESSURE



Note: For temperature < 35 °C

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IMPROVEMENTS IN SRCS MEMBRANE

OPEX CASE STUDY: APPLICATION IN PURE BRINE

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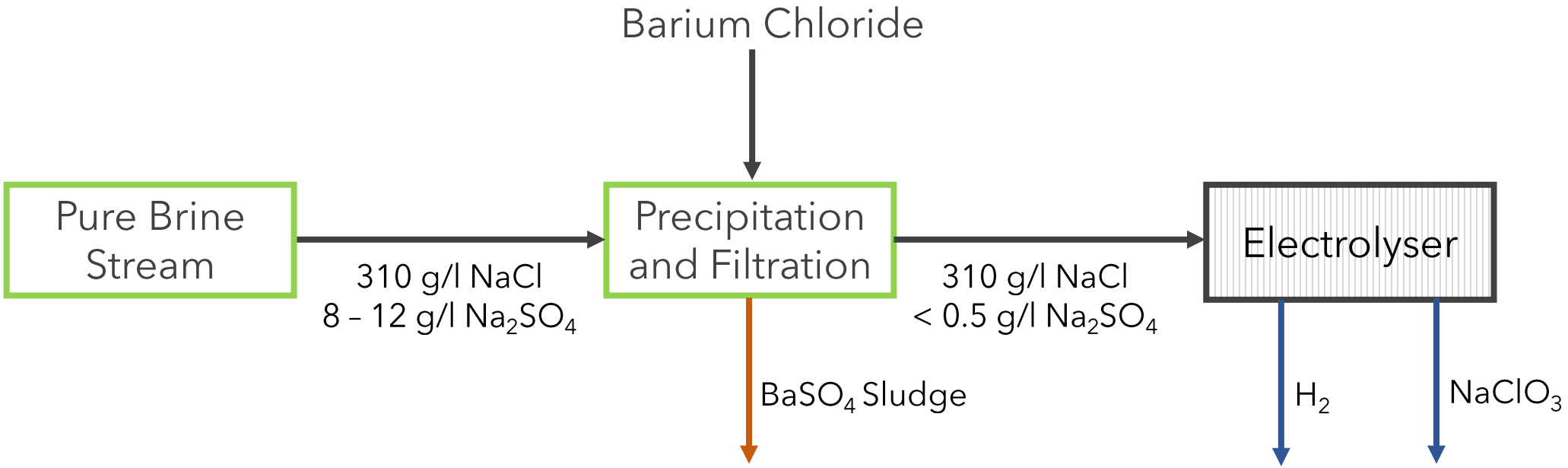
CASE STUDY: PURE BRINE STREAM



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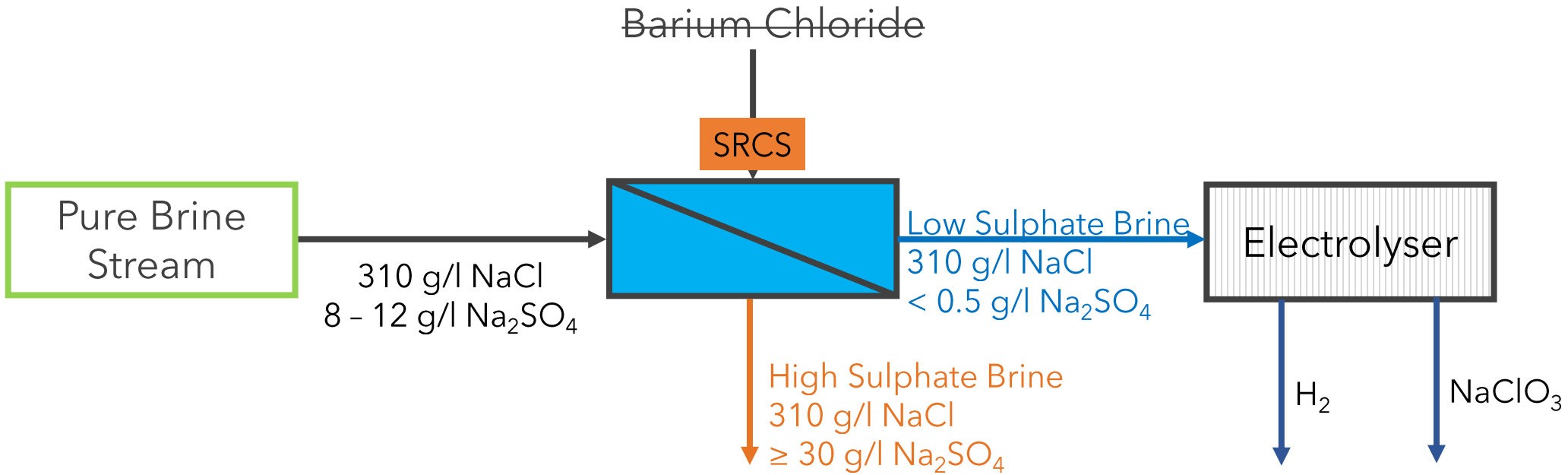

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CASE STUDY: PURE BRINE STREAM

Parameters	Units	With no SRCS in place	With Generation 1 SRCS Membrane	With Generation 3 SRCS Membrane
Feed Na_2SO_4 concentration	g/l	10	10	10
Post Treatment Na_2SO_4 concentration	g/l	0.5	3	0.5
Barium Consumption	Ton/year	820	245	82
OPEX Savings	Rs./year	-	2,74,00,000	3,55,00,000

Note: No of days of operation is 350 days, Cost of Barium Salt Rs. 45 per kg

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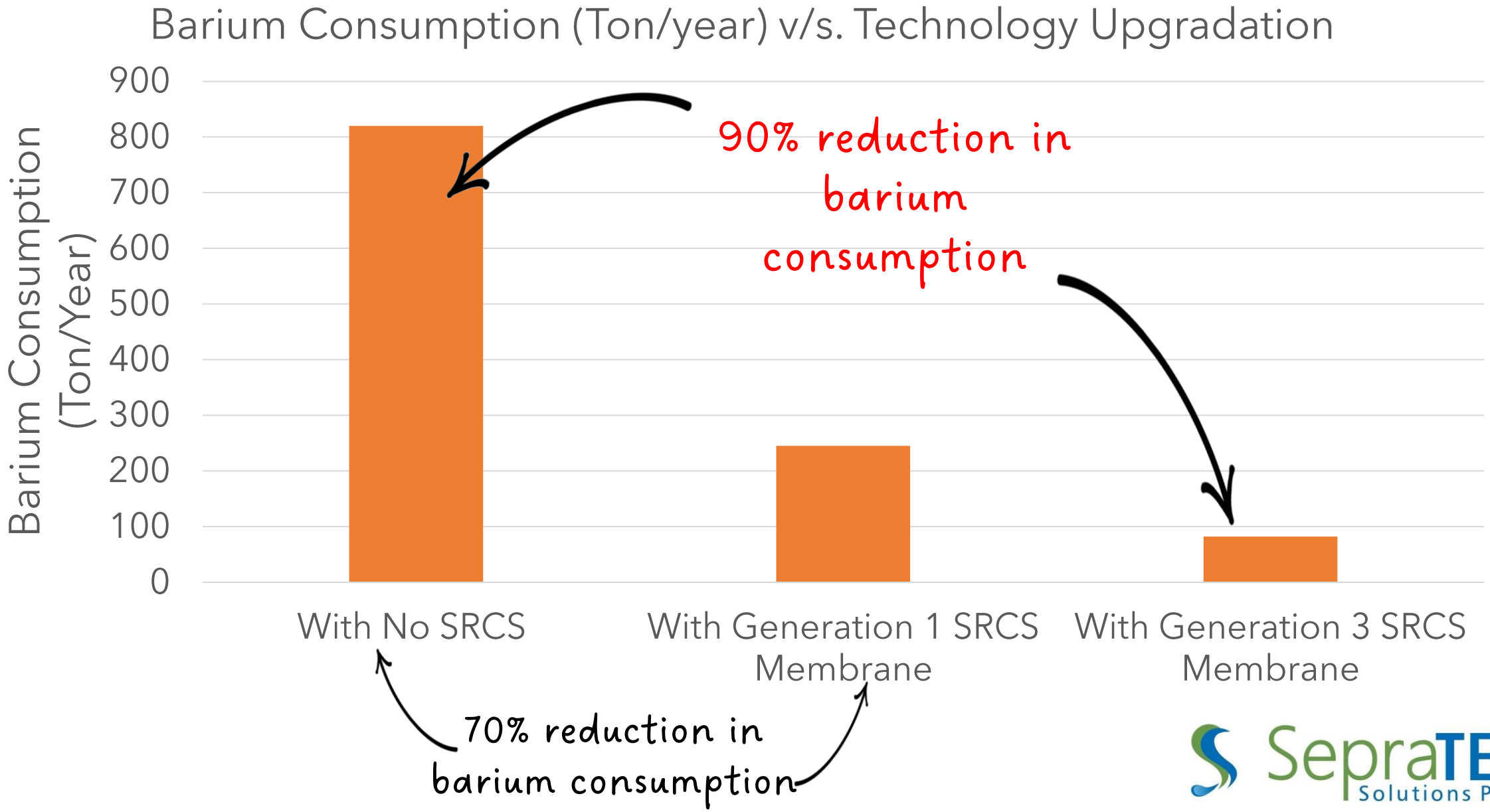
CASE STUDY: PURE BRINE STREAM



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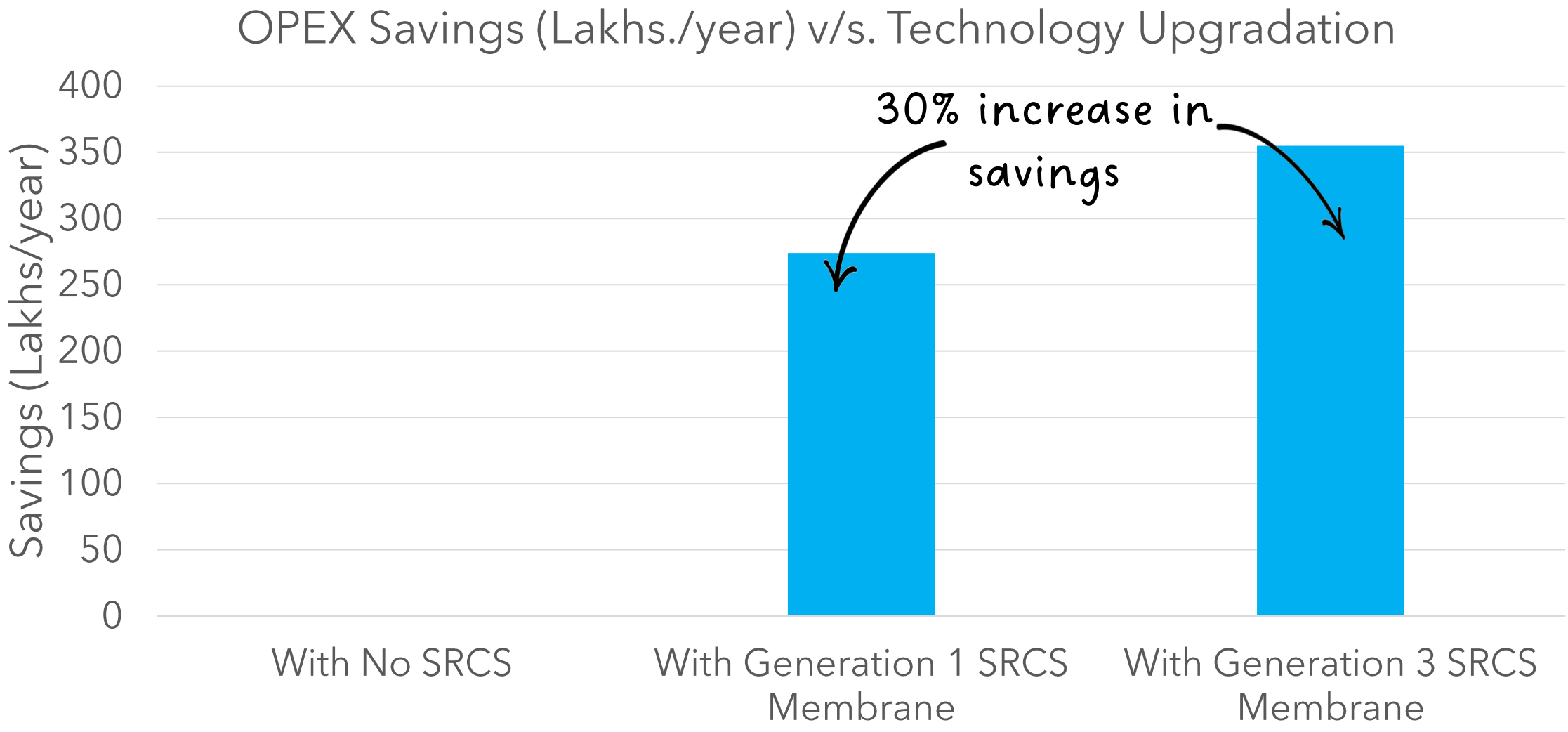
CASE STUDY: PURE BRINE STREAM



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IMPROVEMENTS IN SRCS MEMBRANE

OPEX CASE STUDY: APPLICATION IN DEPLETED BRINE

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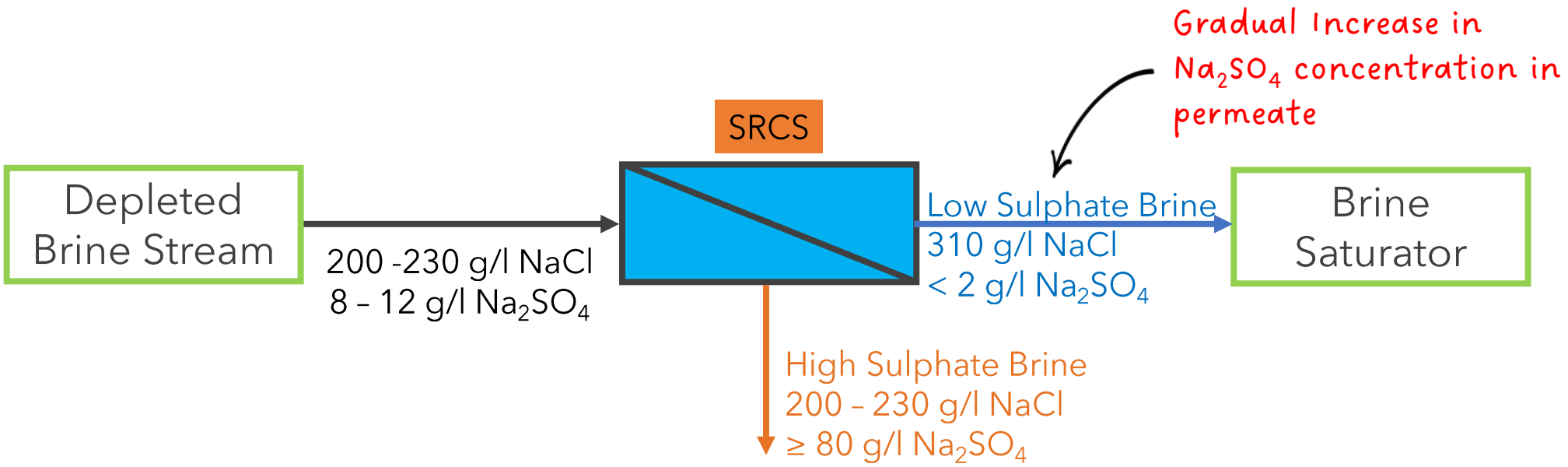
CASE STUDY: DEPLETED BRINE STREAM



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CASE STUDY: DEPLETED BRINE STREAM

Case: Increase in permeate Na_2SO_4 concentration by 0.5 GPL in 8 TPD SRCS

Parameters	Unit	Normal Value	Increase in permeate Na_2SO_4 concentration by 0.5 GPL
When permeate GPL	GPL	2	2.5
Separation Capacity	kg/day	8000	7560
Extra Na_2SO_4 to be removed	kg/day	-	440
Barium to be consumed	kg/day	-	860
Cost of Barium consumption	Rs/month	-	11,58,000/-
Sludge Disposal Cost	Rs/month	-	72,000/-
Total Cost per month	Rs/month	-	12,30,500/-
Savings over 6 months*	Rupees.	-	73,80,000/-

Note: For calculation purposes Sludge Disposal Cost Rs. 2500 per ton, Cost of Barium Salt Rs. 45 per kg, Reaction Efficiency of Barium 75%

*Post 1.5 years of operation

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IMPROVEMENTS IN GREEN TECHNOLOGIES

ZLD APPLICATION IN CHLOR-ALKALI INDUSTRY

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DEVELOPMENTS IN RO MEMBRANE

LOW FOULING, HIGH REJECTION RO MEMBRANE

LOW FOULING, HIGH PRESSURE RO MEMBRANE

ULTRA HIGH PRESSURE RO MEMBRANE

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LOW FOULING, HIGH REJECTION RO MEMBRANE

Low Fouling, High Rejection RO Membranes supplies the best combination of high rejection and high flow capability at low pressures, compared to all commercial low pressure type RO elements.

Key benefits:

- Improved chemical resistance for increased membrane life
- Innovative feed spacer design to reduce cleaning frequency and costs

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LOW FOULING, HIGH PRESSURE RO MEMBRANE

Low Fouling, High Pressure RO Membranes: Spiral wound RO membranes which are neutrally charged and have a hydrophilic coating to minimize fouling while treating high salinity wastewaters. It is ideal for treating high-fouling brine streams generated from the first step of a ZLD system.

Key benefits:

- Neutrally charged surface with hydrophilicity helps to achieve the lowest organic fouling
- Reduces mean time between cleanings, reducing chemical costs and system downtime leading to more productivity

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ULTRA HIGH PRESSURE RO MEMBRANE

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ULTRA HIGH PRESSURE RO MEMBRANE

Ultra-high pressure RO membranes which can operate at pressures up to 1,800 psi (12.4 MPa), exceeding normal RO pressure limits of 1,200 psi (8.27 MPa).

Key benefits:

- Complements BWRO and SWRO by further increasing the solute concentration
- Reduces CAPEX and OPEX by downsizing the evaporator by reducing brine volume
- Increases the overall efficiency of ZLD/MLD systems

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DEVELOPMENTS IN RO MEMBRANE

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IMPROVEMENTS IN GREEN TECHNOLOGIES

CASE STUDY:

ZLD APPLICATION IN CHLOR-ALKALI INDUSTRY

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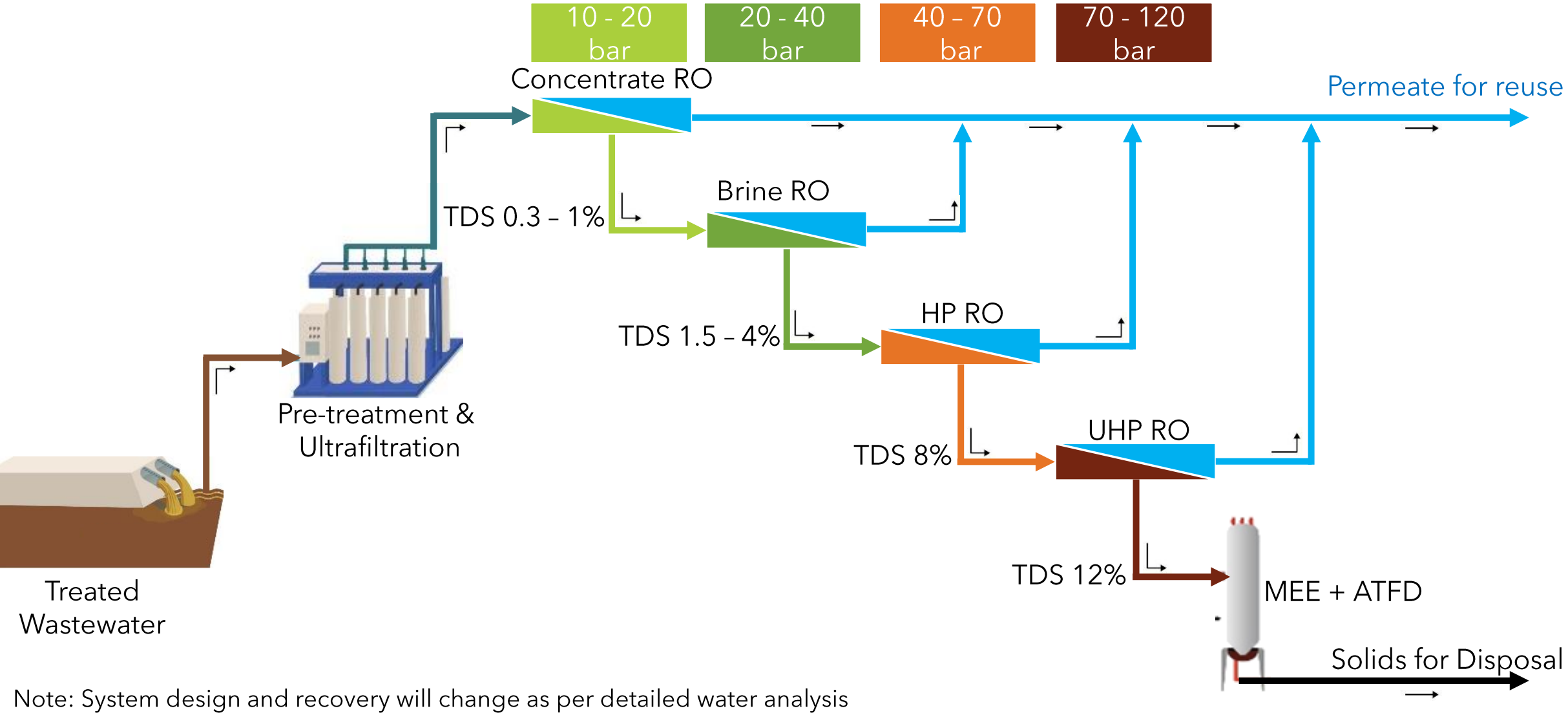
ZLD IN CHLOR – ALKALI INDUSTRY – UHP RO APPLICATIONS



Note: System design and recovery will change as per detailed water analysis

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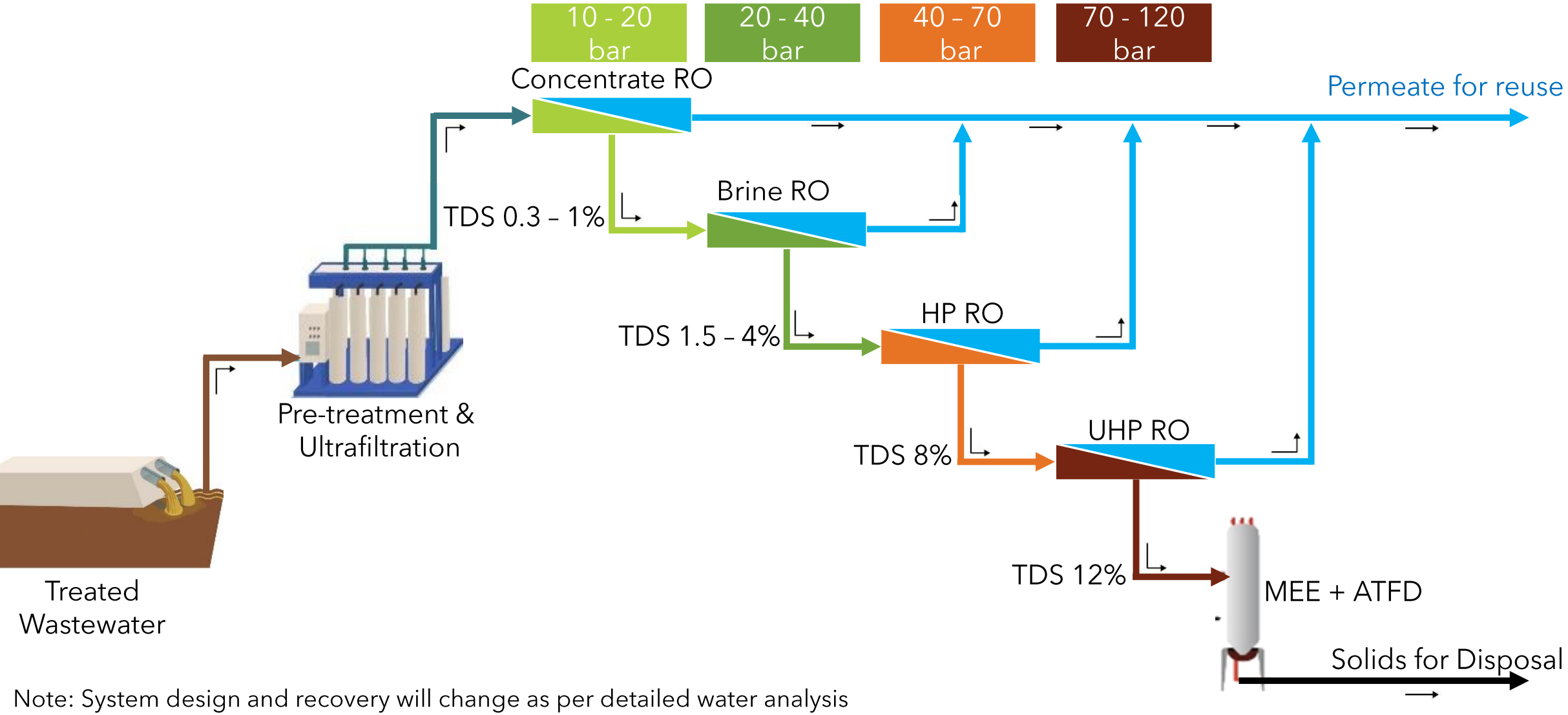
CASE STUDY: ULTRA HIGH PRESSURE RO

Parameters	Unit	Value
Reject flow before installation of UHP RO	m^3	12
Reject flow after installation of UHP RO	m^3	8
Evaporator operating cost per m^3 of feed	Rs./hour	850
Evaporator operating cost before UHP RO installation	Rs./hour	10,200/-
Evaporator operating cost after UHP RO installation	Rs./hour	6800/-
Operating Cost for UHP RO	Rs./hour	70/-
Net Savings	Rs./year	Rs. 1,99,80,000/-
Payback period	.	3 months

ZLD IN CHLOR – ALKALI INDUSTRY – UHP RO APPLICATIONS



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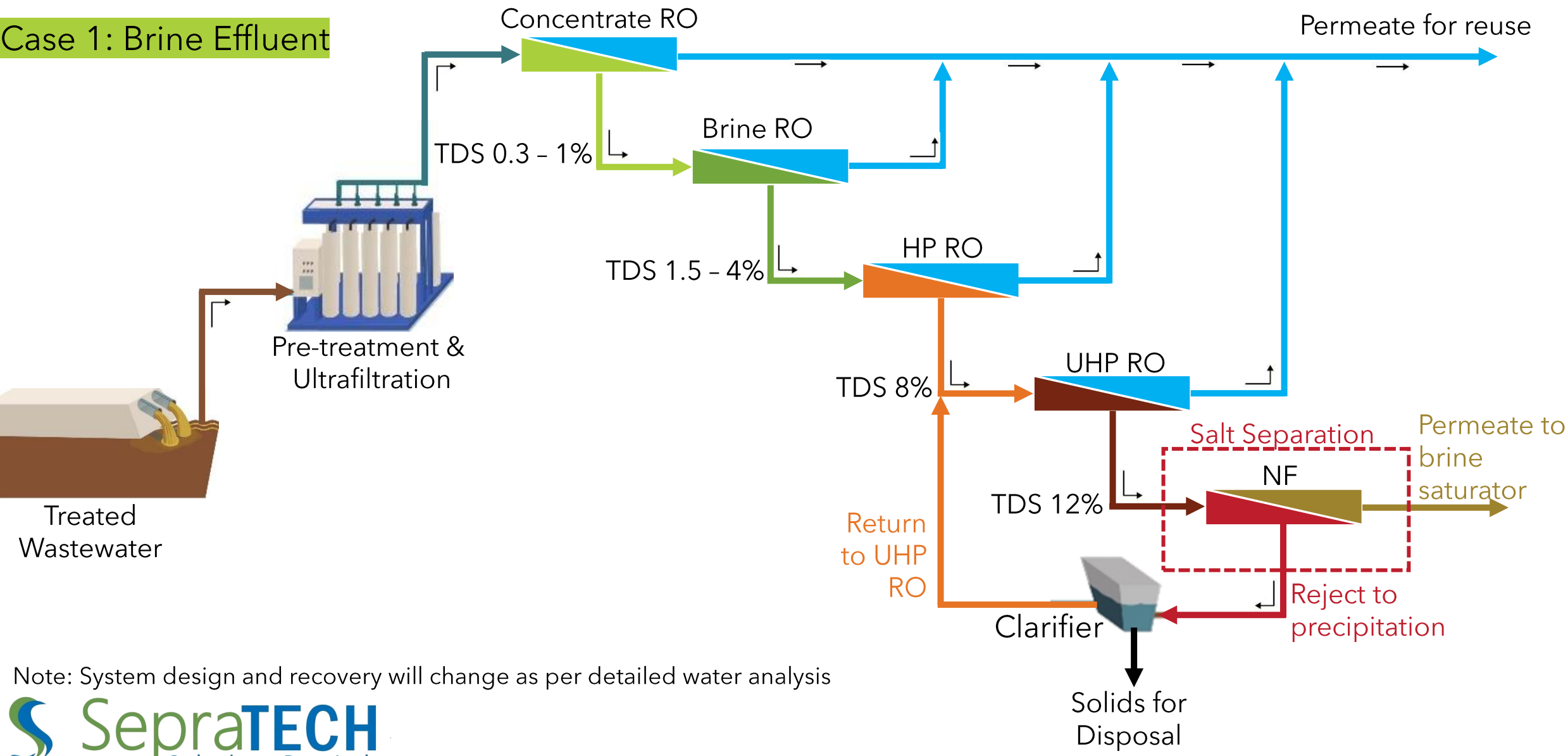
ZLD IN CHLOR – ALKALI INDUSTRY - NF APPLICATIONS

Case 1: Brine Effluent



Note: System design and recovery will change as per detailed water analysis

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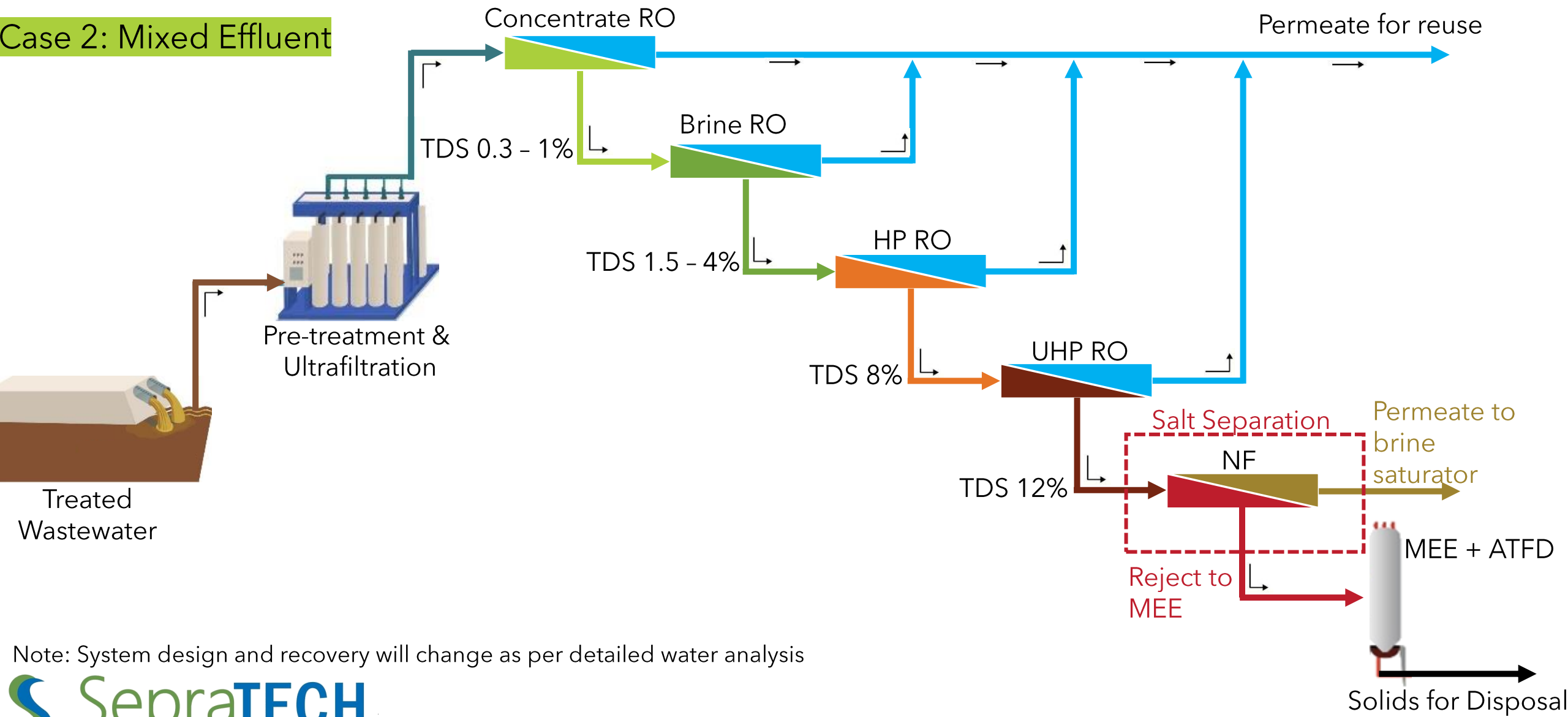
ZLD IN CHLOR – ALKALI INDUSTRY - NF APPLICATIONS

Case 2: Mixed Effluent



Note: System design and recovery will change as per detailed water analysis

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CASE STUDY: ULTRA HIGH PRESSURE RO + NF

Parameters	Unit	Value
Reject flow before installation of UHP RO	m^3/hr	12
Reject flow after installation of UHP RO	m^3/hr	8
Permeate flow of NF	m^3/hr	6
Reject flow to Evaporator (Reject of NF)	m^3/hr	2
Evaporator operating cost per m^3 of feed	Rs./hour	850
Evaporator operating cost before UHP RO + NF installation	Rs./hour	10,200/-
Evaporator operating cost after UHP RO + NF installation	Rs./hour	1700/-
Operating Cost for UHP RO + NF	Rs./hour	200/-
Net Savings	Rs./year	Rs. 5,81,00,000/-
Payback period	.	3 months

#SMARTMEMBRANE SOLUTIONS

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