

Transforming Our Resources, Transforming Our World.

| www.renix.ca





What Does Renix Do?

Ingredients,
Biofuels &
Biochemicals

Mining
Metals & Materials

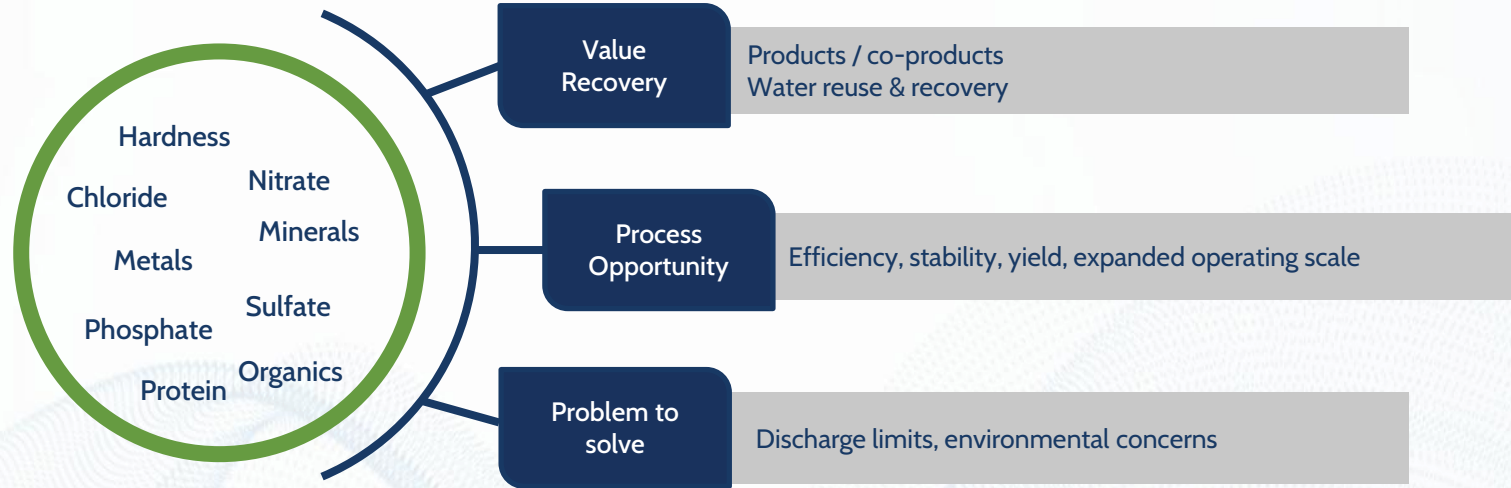
Liquid
Separation
&
Purification

Fuel & Power

Water

MOTIVATIONS FOR SEPARATIONS

Remove Target Impurities, Recover Valuable Compounds





PLATFORM TECHNOLOGY



ION EXCHANGE

Ion Exchange is one of the most effective methods for removing dissolved compounds such as metals and minerals from solutions.

It operates on a simple principle:
trading unwanted compounds for
desired ones.



ION EXCHANGE & SORPTION BASICS

Reversible chemical reaction.

Dissolved ions in liquid are captured on solid particle.

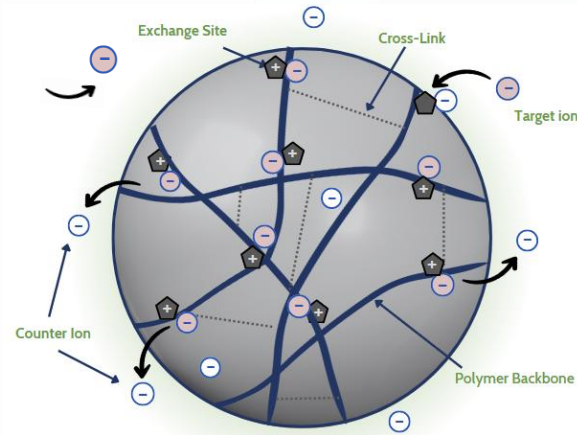
2 Key Parts to Create a Successful Process:

1. Sorbent/Resin

Performs the Chemistry.

Important characteristics:

- Selectivity
- Capacity
- Durability
- Regenerable



ION EXCHANGE & SORPTION BASICS

Reversible chemical reaction.

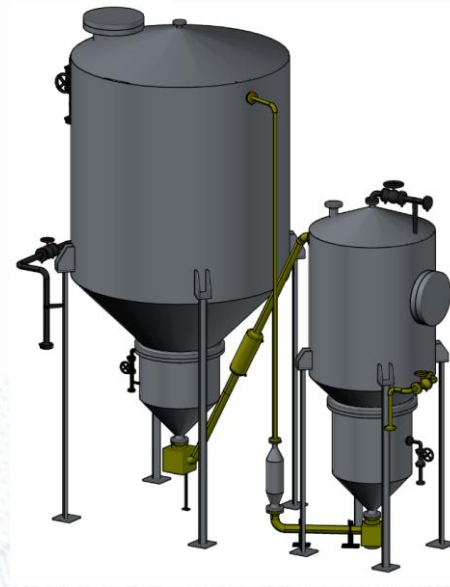
Dissolved ions in liquid are captured on solid particle.

2. Equipment Platform

Provides the physical environment to enable Sorbent/ Resin to Perform the Chemistry.

Important features:

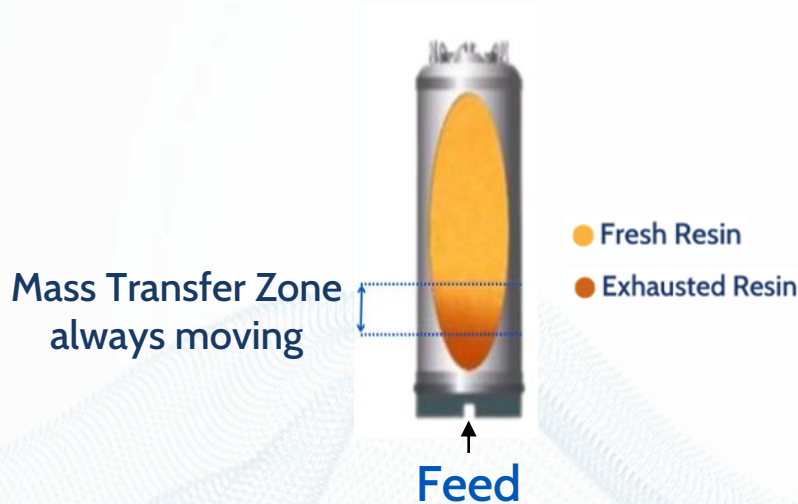
- Facilitate efficient mass transfer
- Controlled, automated process
- Tunable, configurable, modular
- Robust under normal process variations
- Low operator intervention; low maintenance



BATCH-BASED ADSORPTION & REGENERATION

Traditional resin usage

ADSORPTION



REGENERATION

Regenerant



Packed

High energy
High pressure; high crush energy
High maintenance

Batch

Inefficient systems
Not tunable to process
Not adjustable in operation
Mechanically complex/ operator
intense

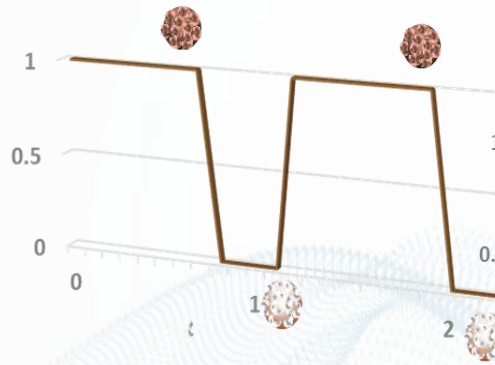
Static Solids

Microbial risk
Plugging / Clogging

OPERATING PROFILE OF ION EXCHANGE PLATFORMS

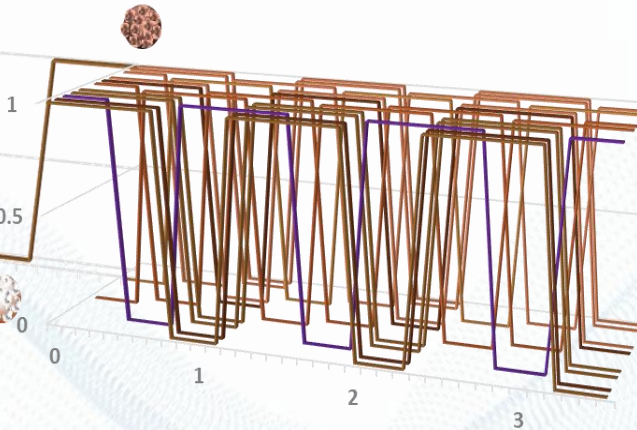
Batch

Single Fixed Bed



Continuous

Multiple Fixed Bed (CIX)

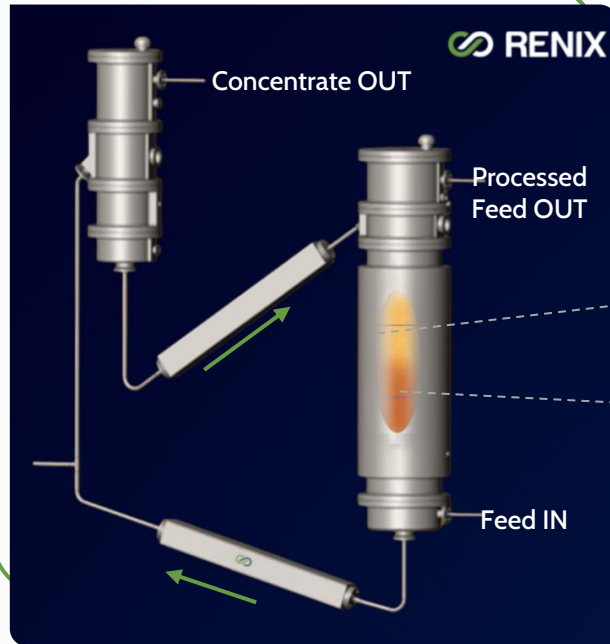


Steady-State

RenixUIX™



STEADY STATE PLATFORM



Expanded

Low pressure, low crush energy
Low maintenance; robust

Steady State

High system efficiency
Predictable, stable chemistry
Tuneable “on-the-fly”
Mechanically simple; low intervention

Moving Bed

Reduced microbial risk
Reduced plugging/ clogging risk

SAVINGS



> 50% total OPEX savings



> 35-50% resin & chemicals savings



Smaller physical footprint



80% higher water recovery

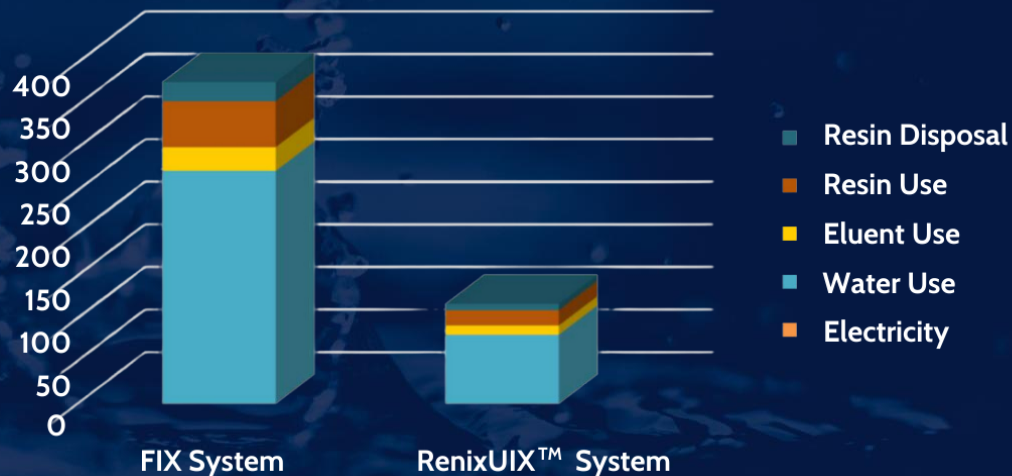


Up to 10X higher target ion load



Less operator intervention & maintenance

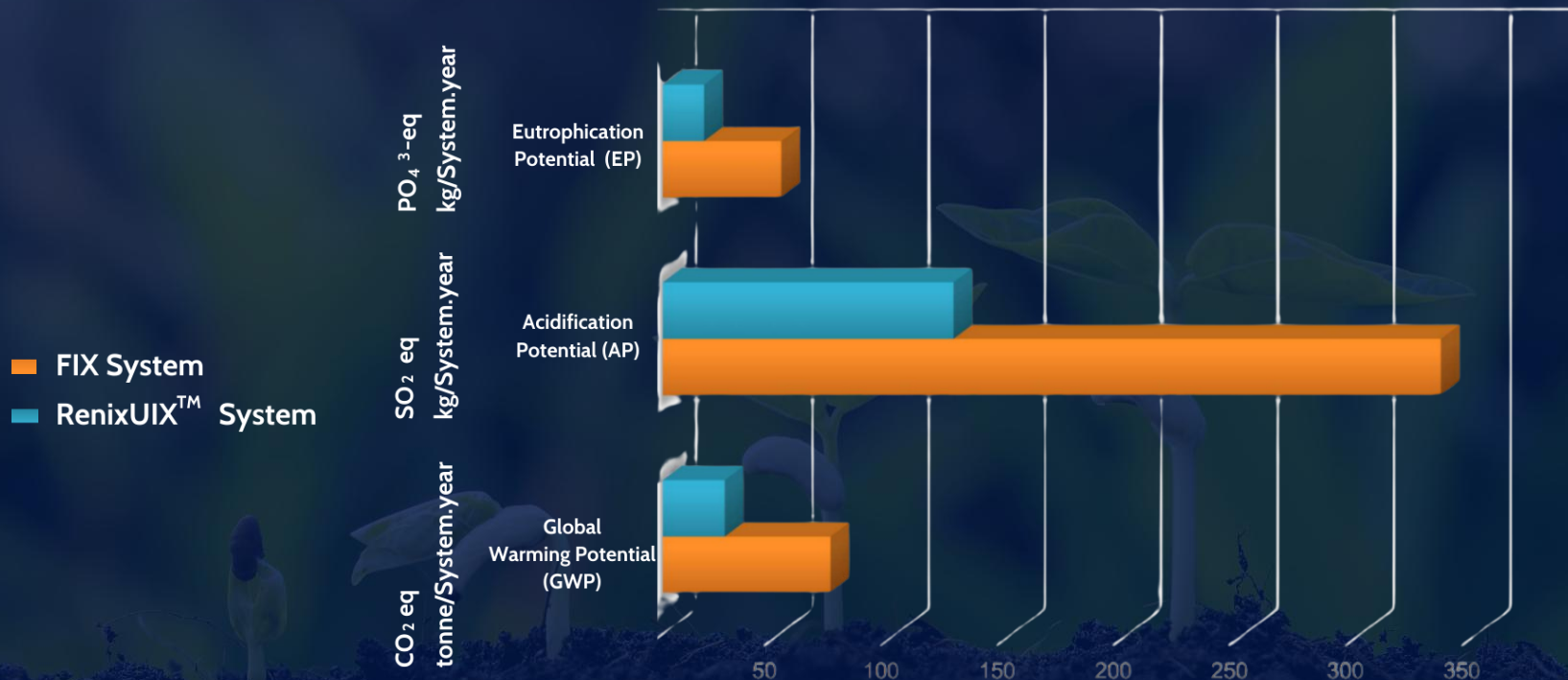
Annual OPEX Differences
\$ 1.000 / System



STEWARDSHIP

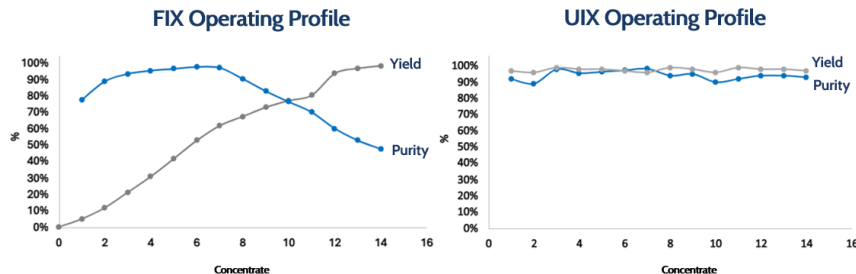


>50% EP, AP, GWP LIFECYCLE REDUCTION



SOLUTIONS

Maximize Yield & Purity
with no tradeoff.



Treatment Load
(ion concentration)

RENIXUIX™



10,000
mg/L

FIX



1,000 mg/L

New Operating Range
making it newly feasible in
complex applications.

RENIXUIX™ SYSTEM ADVANTAGES

Solves Complex Problems

Stable process chemistry

Tunable Selectivity

Variable process control without reconfiguration

Suspended solids tolerance

Reduced Costs

Reduced resin inventory and longer resin life

Less auxiliary fluid handling

Less operator intervention & maintenance

Increased throughput

Reduced Footprint

Smaller physical footprint

Lower water use

Lower chemical use

Small environmental & lifecycle footprint



How Does Renix Work With Customers?

COMFORT & ASSURANCE

From start to finish, we handle every detail with professional care.

Bench Testing & Modeling



Lab Scale
0.25-1 L/min

2-4 MONTHS



Site Piloting



Automated Pilot
1-10 L/min

3-6 MONTHS

Industrial Rollout



Installed
(Ingredient Purification)
6m³/hr

In Progress
(Biofuels Co-Product
& Water Reuse)
200m³/hr

12-24 MONTHS

CONFIDENTIAL



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