



# Enhance Sustainability Through Improved Solids Management

# Our Water Experts



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ENHANCE SUSTAINABILITY THROUGH IMPROVED SOLIDS MANAGEMENT

# You Will Learn About

- Chemically Enhanced Primary Treatment (CEPT)
- Enhanced Sludge Dewatering & Struvite Control
- The Sustainability Benefits of These Techniques





# Chemically Enhanced Primary Treatment



## CHEMICALLY ENHANCED PRIMARY TREATMENT



## PROBLEM

- Increased process flows
- Treatment bottlenecks
- Plant expansion restrictions

## SOLUTION

- CEPT using iron coagulants
- With or without polymers

5 REASONS WHY THIS MAY BE THE SOLUTION FOR YOU

# Benefits of Iron Coagulants for CEPT

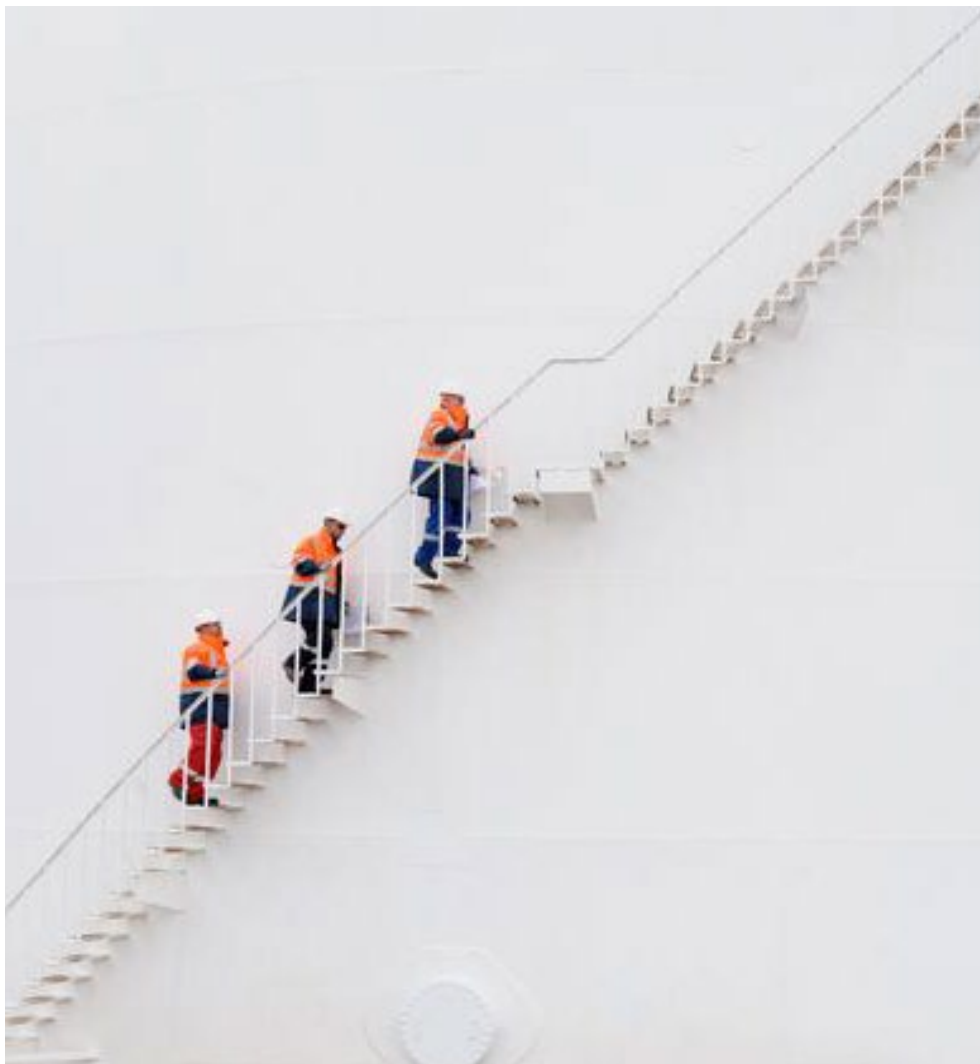


## FIRST OF 5 REASONS WHY THIS MAY BE THE SOLUTION FOR YOU

# Reduces TSS/BOD/P load

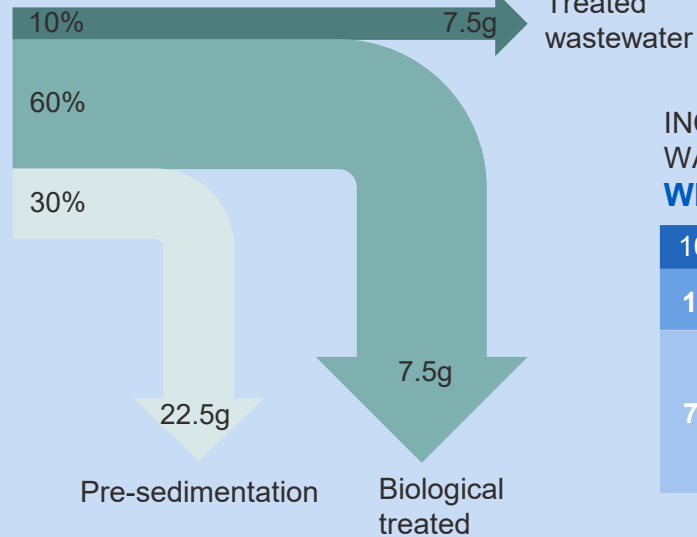
METHOD	BOD	P	SUITABLE PRODUCTS
DIRECT PRECIPITATION	70–80%	>90%	Ferric ( $\text{Fe}^{3+}$ )
PRE-PRECIPITATION	>90%	>90%	Ferric ( $\text{Fe}^{3+}$ )
SIMULTANEOUS PRECIPITATION	>90%	75-90%	Ferrous ( $\text{Fe}^{2+}$ ) Ferric ( $\text{Fe}^{3+}$ )
POST-PRECIPITATION	>90%	>90%	Ferric ( $\text{Fe}^{3+}$ )

## SECOND OF 5 REASONS WHY THIS MAY BE THE SOLUTION FOR YOU

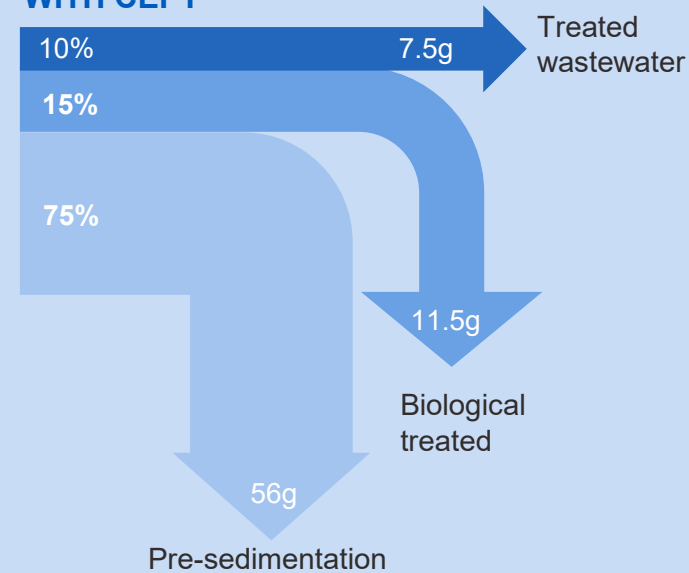


# Increases plant throughput rates

INCOMING WASTEWATER WITHOUT CEPT



INCOMING WASTEWATER WITH CEPT





# Reduces Energy & Dewatering Costs

- Activated sludge tank requires a much smaller volume
- Lower Food:Mass ratio & increased capacity in aeration process
- Reduction in hydraulic retention time
- Produced more primary sludge with pre-precipitation and less biosludge (excess sludge)
- Lower sludge handling costs



## FOURTH OF 5 REASONS WHY THIS MAY BE THE SOLUTION FOR YOU



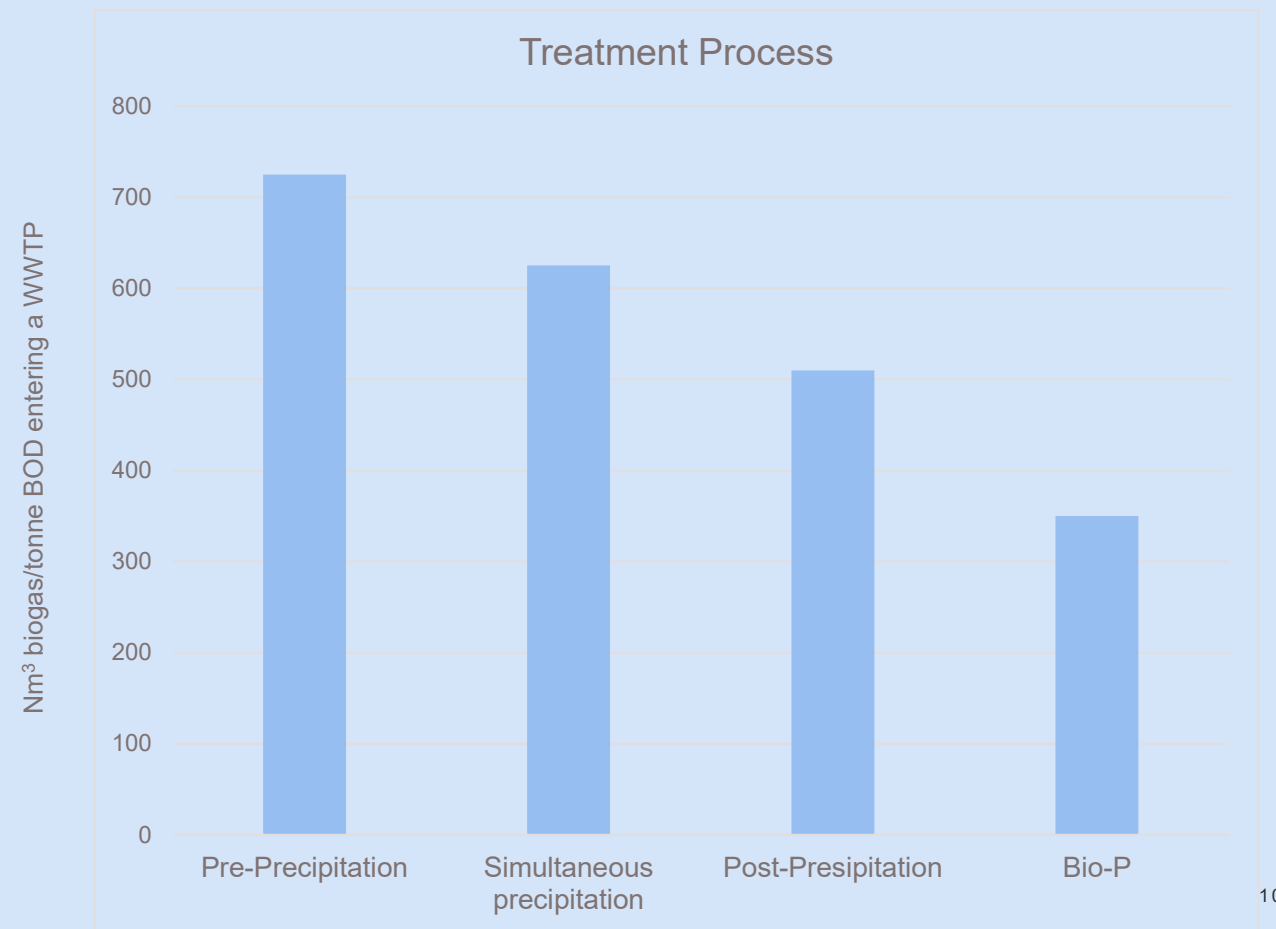
# Increases Biogas Production

### Biogas

→ Pre-precipitation higher biogas potential due to primary sludge



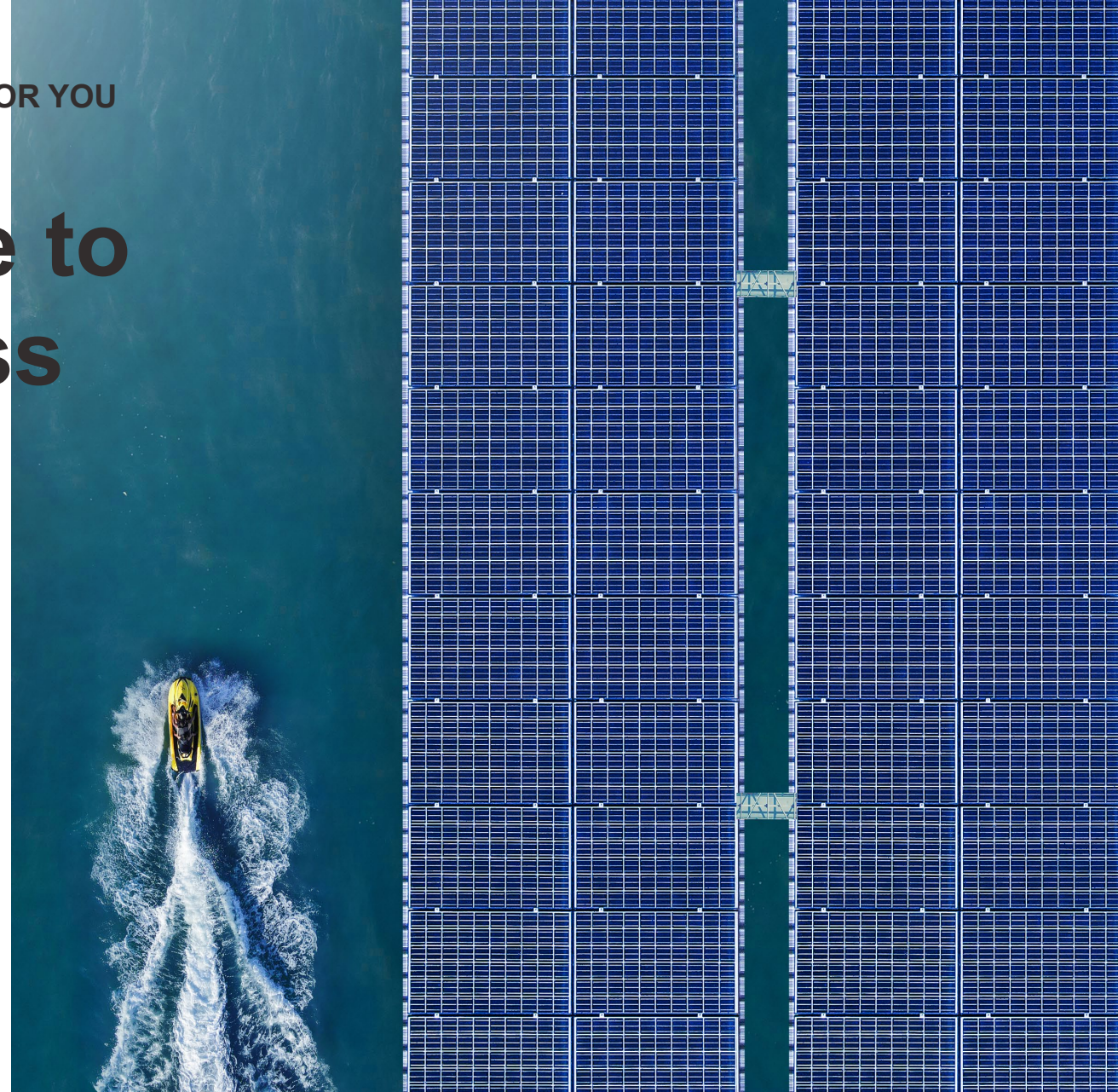
→ New source of bio-energy that can reduce the carbon footprint



FIFTH OF 5 REASONS WHY THIS MAY BE THE SOLUTION FOR YOU

# Reduces Disturbance to the Biological Process

- Act as a barrier before the biological treatment step
- Biological treatment works best when the load is as constant as possible



# Case studies



CASE STUDY

# Southern California WWTP

Primary TSS removal 50% → 85%

Primary BOD removal 50% → 85%

80% primary sludge

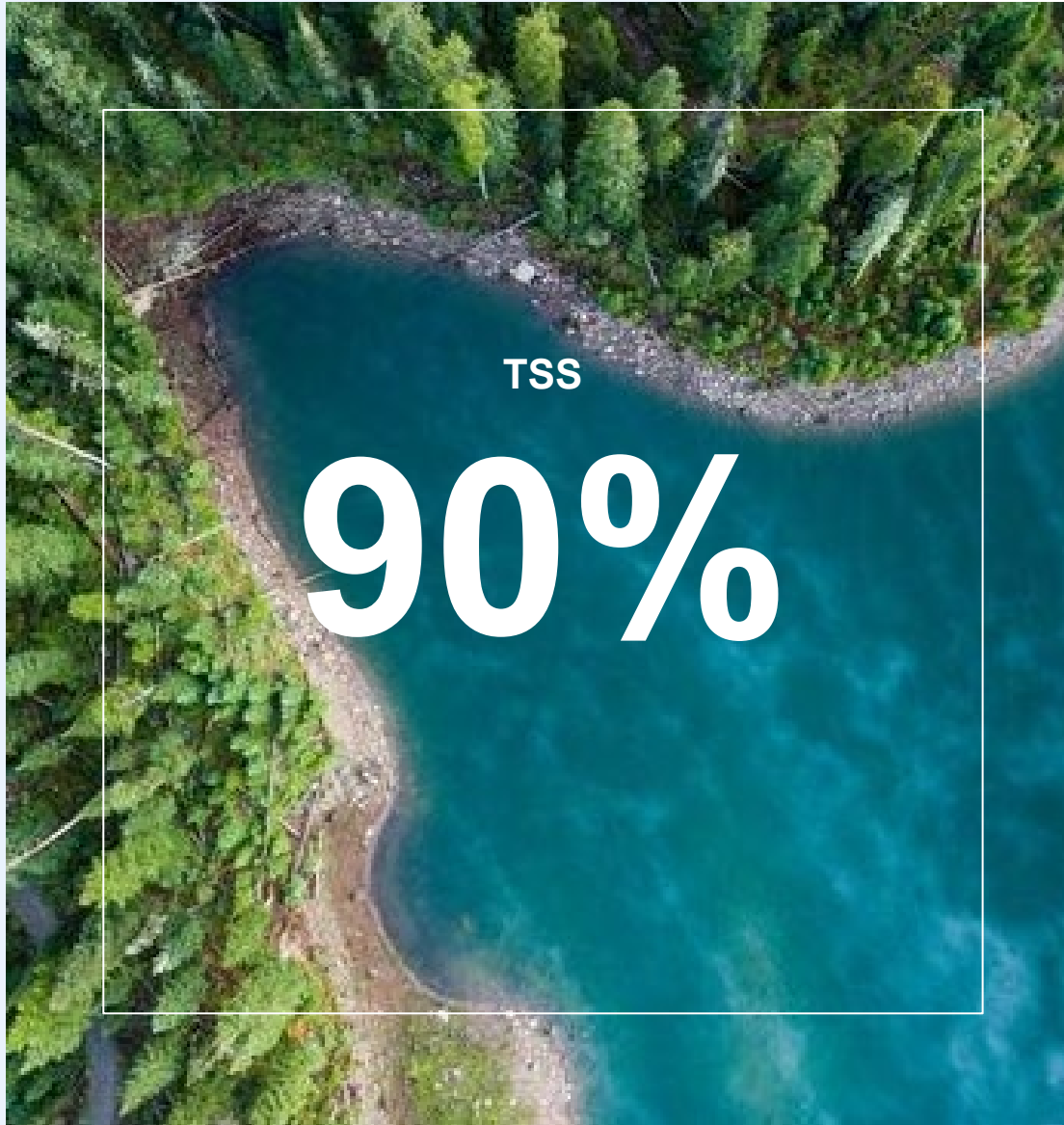
20% secondary sludge

Increased methane production

TSS & BOD

85%

## CASE STUDY



# San Diego - Point Loma, CA WWTP

Primary TSS removal 90%

Primary BOD removal 60%



# Miami-Dade North District, FL

Primary TSS removal

41% → 80+%

Reduced P load to bio process

IMPROVED CO<sub>2</sub> FOOTPRINT & ENERGY CONSUMPTION, SUSTAINABLE SLUDGE DEWATERING

# Enhanced Sludge Dewatering & Struvite Control



# Enhanced Dewatering

## PROBLEM:

- Struvite formation & deposits
- Poor machine throughput
- High water content in solids
- Poor reject water quality

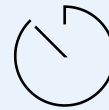
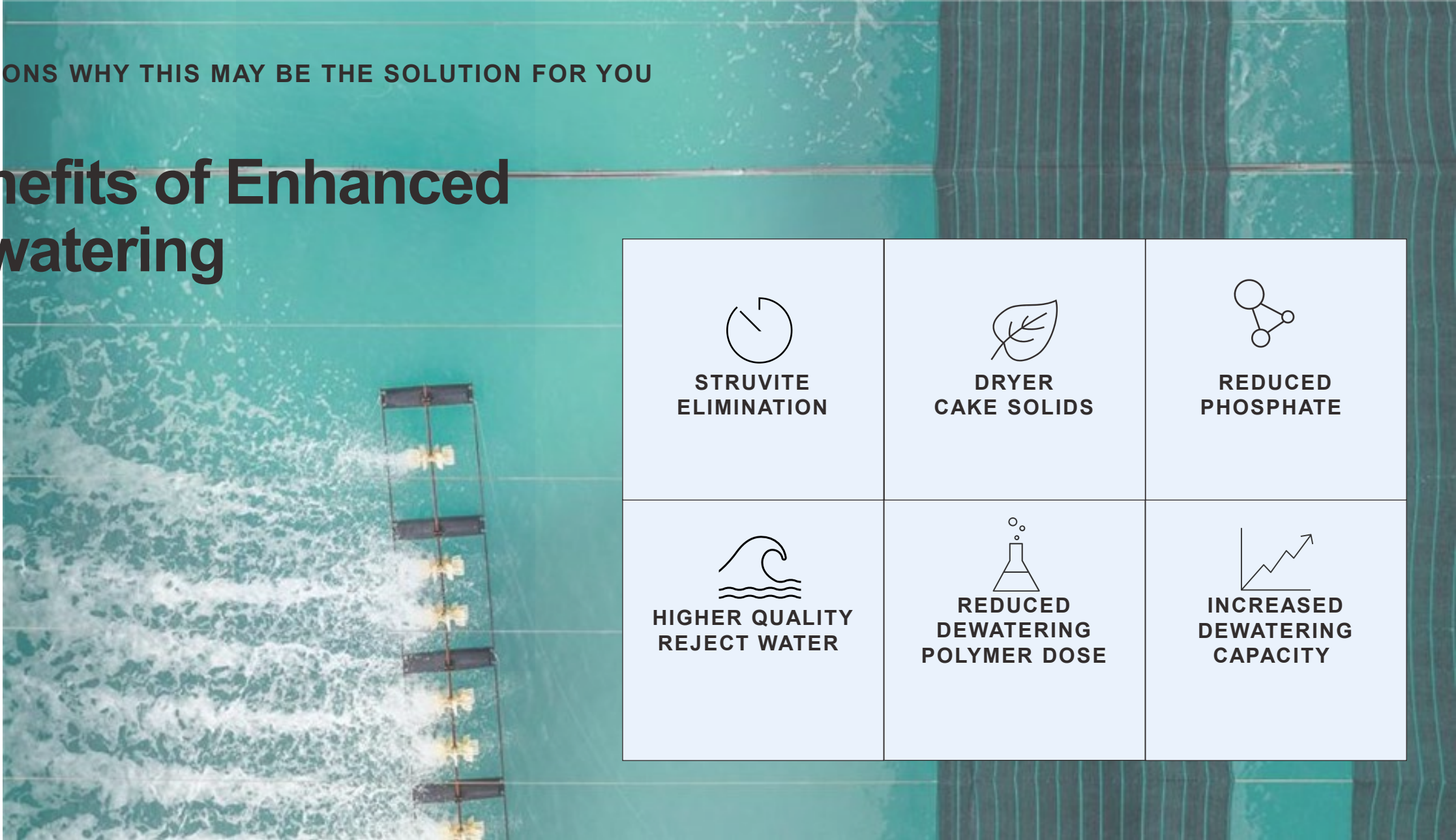
## SOLUTION:

- Sludge conditioning aka enhanced dewatering
- Using iron coagulants



6 REASONS WHY THIS MAY BE THE SOLUTION FOR YOU

# Benefits of Enhanced Dewatering



**STRUVITE  
ELIMINATION**



**DRYER  
CAKE SOLIDS**



**REDUCED  
PHOSPHATE**



**HIGHER QUALITY  
REJECT WATER**

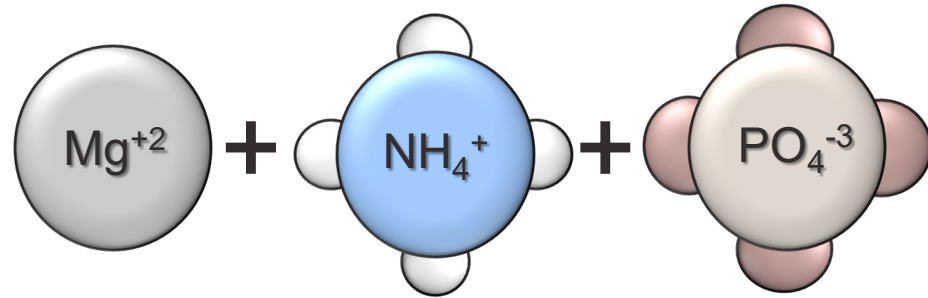


**REDUCED  
DEWATERING  
POLYMER DOSE**



**INCREASED  
DEWATERING  
CAPACITY**

## FIRST OF 6 REASONS WHY THIS MAY BE THE SOLUTION FOR YOU



### Benefits of Enhanced Dewatering

- A nuisance crystal formation
- Magnesium ammonium phosphate hexahydrate ( $MgNH_4PO_4 \cdot 6H_2O$ )
- Reduce machine performance and restrict sludge flows

BEFORE



AFTER

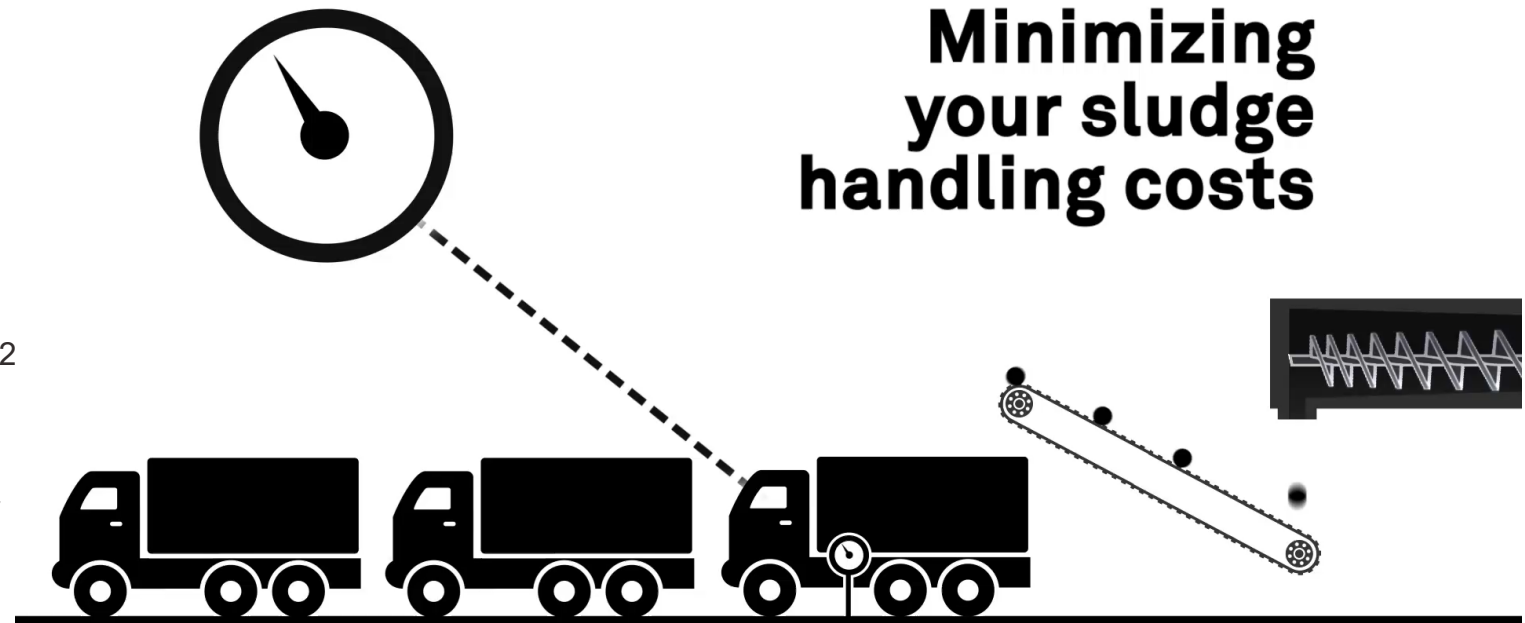


# Benefits of Enhanced Dewatering

## DRYER CAKE SOLIDS



- With addition of iron coagulants
- Reduce energy consumption and CO<sub>2</sub>
- Improve machine throughput
- Lower Transportation Cost with fewer truckloads



THIRD OF 6 REASONS WHY THIS MAY BE  
THE SOLUTION FOR YOU

# Benefits of Enhanced Dewatering

## Reduce Phosphate

- Addition of iron coagulants to achieve phosphorous precipitation
- Impact on dewaterability of sludge



FOURTH OF 6 REASONS WHY THIS MAY  
BE THE SOLUTION FOR YOU

# Benefits of Enhanced Dewatering

- Reduce TSS
- Improved capture rates
- Reduce phosphorus & solids load



HIGHER QUALITY REJECT  
WATER

FIFTH OF 6 REASONS WHY THIS MAY BE  
THE SOLUTION FOR YOU

UP TO  
**55%**

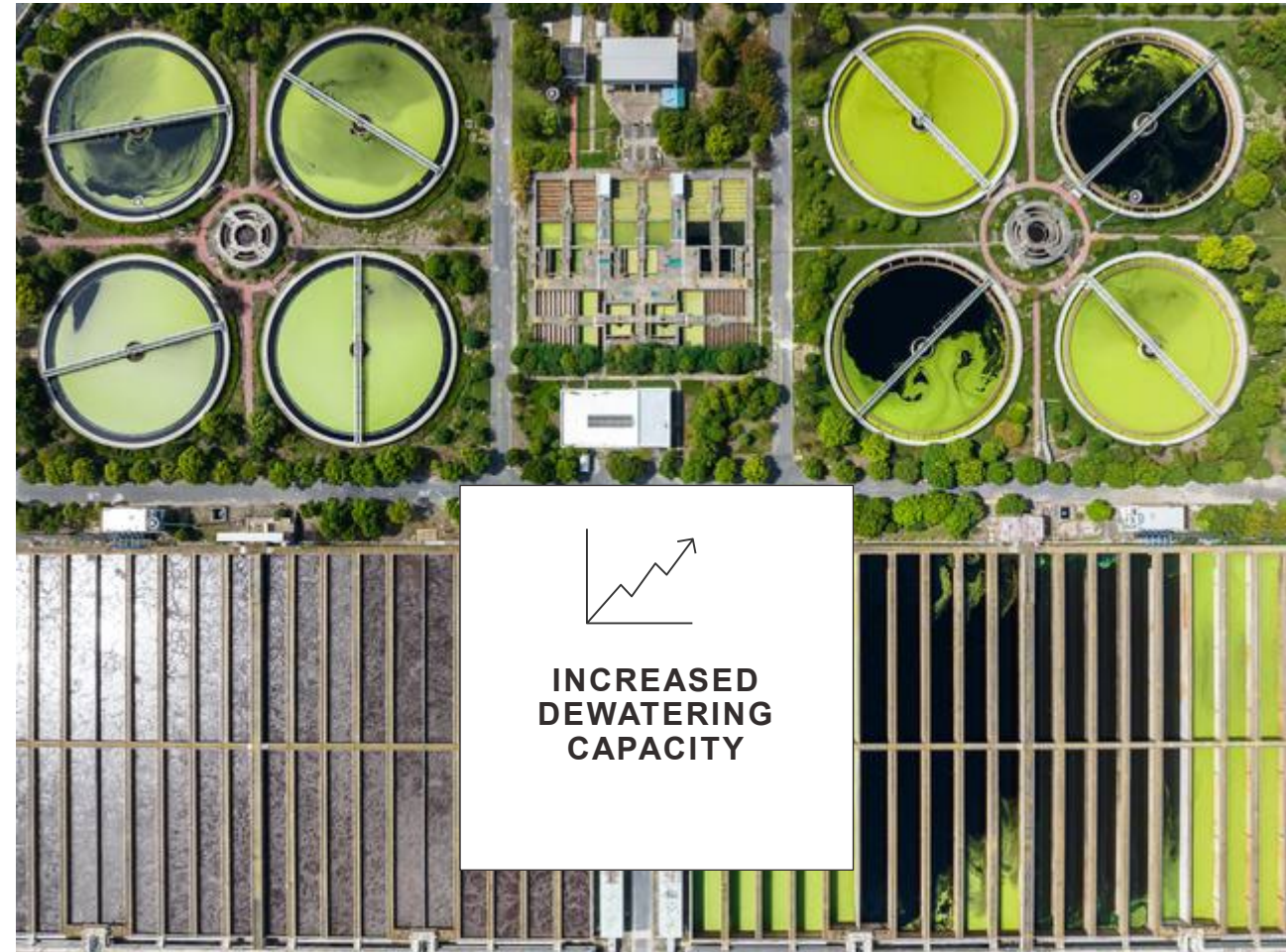


## Benefits of Enhanced Dewatering

→ Reduces dewatering polymer demand, as  
much as 55%

# Benefits of Enhanced Dewatering

- Increase machine throughput rates
- Enhanced liquid/solids separation
- Reduce machine run times
- Reduce number of machines needed





# Sustainability Benefits



CO<sub>2</sub> reduction



Capacity increase



Energy savings



Freight savings



Sludge disposal savings



# Case Study

**50%**  
REDUCTION  
IN  
POLYMERS

**10%**  
PROCESS  
COST  
SAVINGS

**4%**  
TOTAL SOLIDS  
INCREASE IN CAKE  
SOLIDS

**99%**  
NEAR PERFECT  
CENTRATE  
CAPTURE RATE

**100** MILLION GALLONS  
DAILY

**~600** GALLONS/MIN



# ENHANCED DEWATERING

## CEPT

- Enhanced biogas production
- Reduce energy consumption
- Reduce dewatering costs

- CO<sub>2</sub> reduction
- Capacity increase
- Energy savings
- Sludge disposal savings

# To Partner with our Advanced Water Team Please Contact:



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**Kemira**

Chemistry with a purpose.  
Better every day.