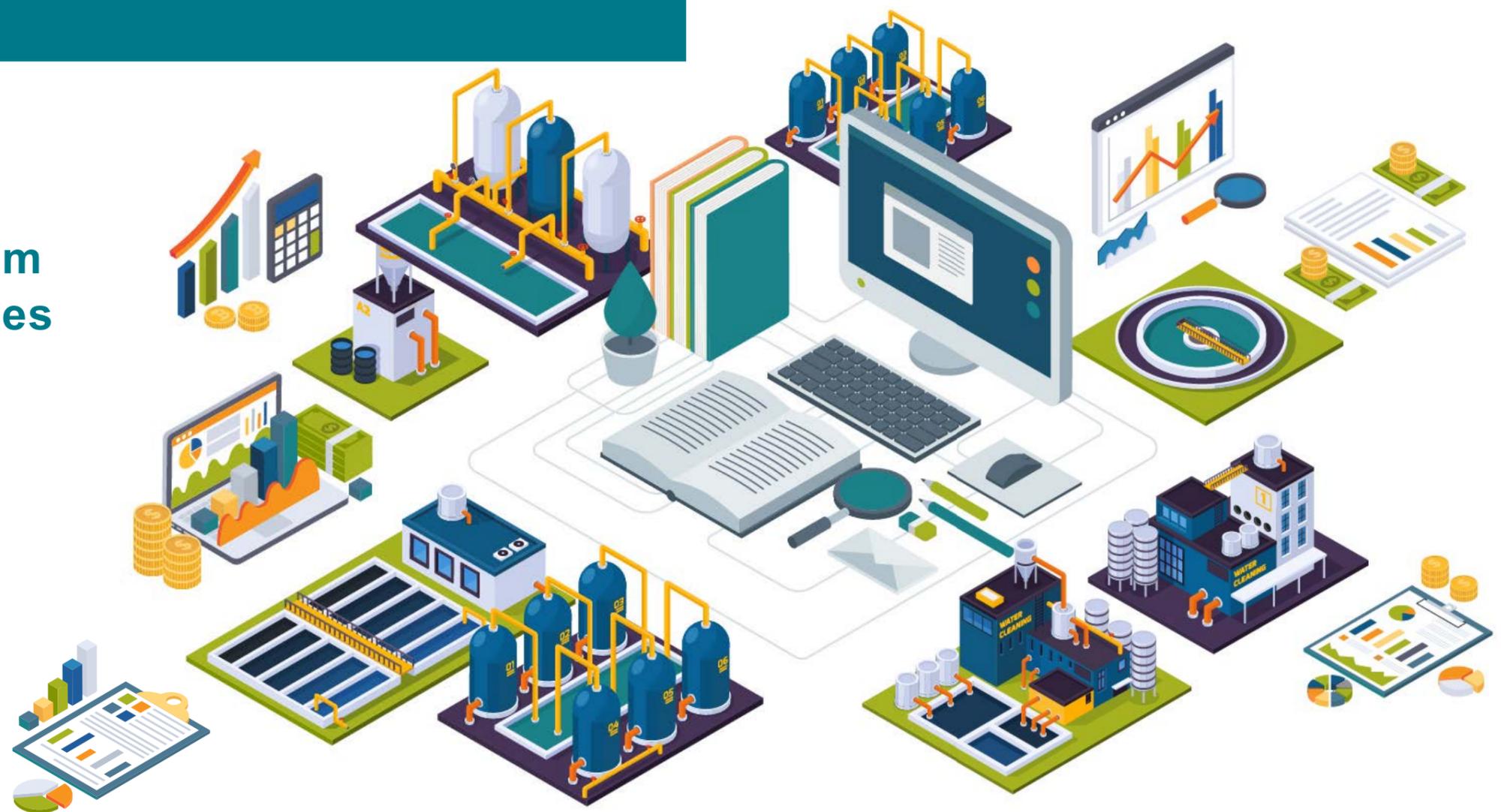


# INDUSTRIAL WATER PLAYBOOK

Case studies and  
success stories from  
industrial businesses  
around the world



# INTRODUCTION

Industrial businesses can be highly water intensive. Water is used not only in industrial processes, but for transport, cooling and cleaning.

Water costs money, however. Water supply is an obvious source of cost, but so is disposal—effluent surcharges are applied to discharged water, and vary based on flow and quality—as well as the missed revenue cost of losing potentially valuable by-products in wastewater.

This eBook will introduce what you need to keep in mind when addressing water treatment, and will show how some businesses have used this option to cut costs.

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## WELCOME TO HYDRO INTERNATIONAL



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## ABOUT US

We are a global company who provide advanced products, services and expertise to help municipal, industrial and construction customers to improve their water management processes, increase operational performance and reduce environmental impact.

With **over 40 years of experience** and a reputation for engineering excellence, Hydro International's solutions have proven themselves consistently in the most challenging environments, removing solids and other contaminants to deliver treated water that can be recycled and reused.



## CORE INDUSTRIAL WATER OBJECTIVES

01

### REDUCE SUPPLY COSTS

Supply of water is an obvious cost to any business, and for water-intensive businesses it can be significant.

Too many businesses view water supply simply as a cost of doing business, however, and fail to identify and take advantage of opportunities to reduce water consumption and drive down supply costs.

Businesses should do whatever they can to extract the maximum amount of value from every drop of water.

02

### REDUCE DISCHARGE COSTS

Discharged water has both a philosophical and a practical cost. On one hand simply the idea of flushing away a resource that you paid to use seems wasteful, but more importantly, discharged water attracts effluent surcharges that can place a significant cost burden on a business.

Effluent surcharges are determined by the quality and quantity of the wastewater discharged, so every business can benefit from cutting the amount of water that it discharges, and from improving the quality of that water.

At a time when regulators are tightening environmental regulations, these surcharges are only likely to increase—so businesses should act in order to prevent costs from spiralling out of control.

03

### IMPROVE EFFICIENCY

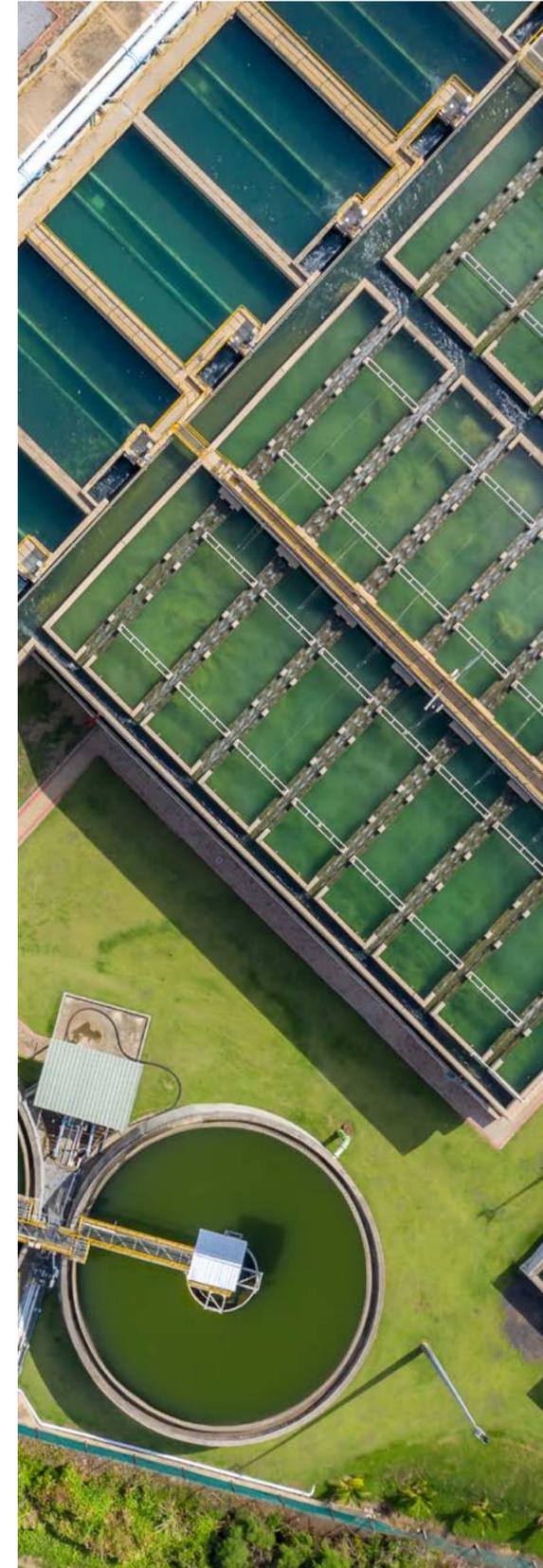
The concept of efficiency is a simple one, yet too many businesses fail to take the steps necessary to tighten their processes and cut wasted time, effort and resource.

The single most effective way for businesses to cut water supply costs and to reduce effluent surcharges is to improve the efficiency of the way they use water.

This typically involves using the water same water for as many purposes as possible—in other words, “pay once, use many times”.

Process water may be recycled and reused for transport, cleaning or irrigation—but it needs to be of a certain minimum quality.

Improved solids removal efficiency will deliver that quality, as well as providing opportunities for other, secondary efficiencies—recovery and reuse of process materials, or onward sale of by-products.



## FIVE THINGS TO REMEMBER



01

### EVERY FACILITY IS DIFFERENT

One size most certainly does not fit all: every plant and facility is different, and performance will depend on operating conditions.

Any equipment supplier that offers definitive performance data probably doesn't understand fully the way that a range of physical and chemical variables can affect influent and the materials within it.

02

### REDUCE YOUR RISK

If you are someone who has to get purchases approved then you'll appreciate that, to a budget holder, every large capital investment is perceived as a risk.

Fortunately there are steps that you can take to mitigate that perceived risk.

Where possible, when evaluating new technologies conduct laboratory testing of your process water on that technology in order to get a preliminary performance indication.

If the preliminary results are encouraging, run real-world trials at your site using representative influent (including side-by-side tests with existing technologies), to determine likely performance and cost effectiveness.

03

### PLAY THE LONG GAME

The "Scope Triangle" common to project management can be applied equally to industrial processes, and in particular to equipment or system replacements, upgrades and refurbishments.

To put it simply, the Scope Triangle shows that a process can typically be done better, faster or cheaper. In the world of project management this triangle is meant to indicate necessary trade-offs, but when it comes to new technologies it is often possible to achieve improvements in all three areas.

Despite this, one trap that many businesses fall into is in placing too much emphasis on the "cost" corner of the triangle, as the initial capital investment can seem large. This shows a misunderstanding of the operational savings that can be made over time, however, and a failure to take the strategic view and look at ROI over the appropriate period.

04

**STAY FLEXIBLE**

When procuring large capital items, be aware of the various procurement options available to you—a single large capex investment will hit your bottom line, and it may be possible to avoid that one-time hit.

Wherever possible, partner with equipment suppliers that will consider spreading payments over a longer period. A good equipment supplier will understand the financial pressures associated with a large investment and will work with you to build the right type of procurement.

Also explore the possibility of equipment rental—this can provide a low-risk temporary option, or an extended trial of a new technology at a lower immediate cost to the business. In addition, more progressive equipment suppliers will offer a discount on the eventual purchase of a unit that is being rented.



05

**THINK ABOUT YOUR ROI...LATERALLY**

Business is about the bottom line, and any investment must generate a return. In many cases the ROI is direct and easily measurable—a new salesperson, for example—but equally there are cases when ROI is less obvious, and opportunities may be missed.

Reduced energy costs, reduced operational costs, increased process efficiency, increased available footprint, the weight of disposal solids and even the distance that a hose will spray irrigation water are all measurable costs—and any business that is serious about boosting ROI will not want to overlook them.

In addition, looking beyond the process itself can provide avenues for ROI improvements. Unexpected benefits may include recovering material for onward sale to secondary markets, for example, or diverting captured by-products for use in energy generation.

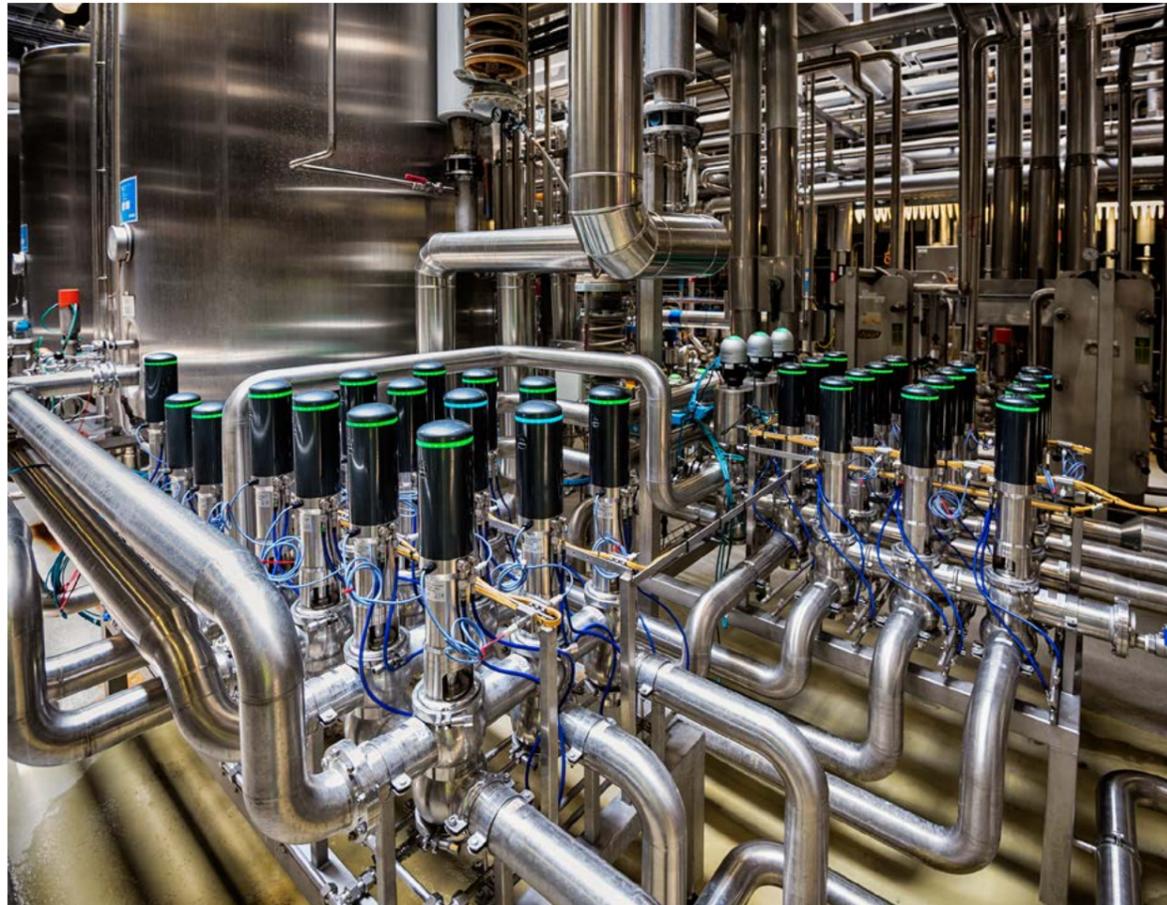
## CASE STUDY

### New England Brewery

#### PROJECT OVERVIEW

A New England brewery used Hydro MicroScreen™ to cut disposal fees by reducing TSS by 82% and COD by 36%.

**82%**  
TSS reduction



#### Problem

- » Expensive anaerobic digestion system
- » Total suspended solids (TSS) inflating disposal fees
- » Secondary issue of chemical oxygen demand (COD) inflating disposal fees

#### Objectives

- » Reduce TSS loading rates in wastewater to cut disposal fees

#### Project details

- » Hydro MicroScreen™ unit installed on site and operated under full operating conditions

#### Outcome

- » TSS removal rate of 82%
- » COD removal rate of 36%



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## CASE STUDY

### Napa Valley Winemaker

#### PROJECT OVERVIEW

A Napa Valley winemaker reduced annual energy costs by \$740,000 and operational and utility costs by \$165,000.

**\$740k**  
Annual energy  
cost saving



#### Problem

- » Inefficient drum screen, aerated lagoon and field irrigation pumps

#### Objectives

- » Reduce wastewater treatment plant operation and cut utility costs
- » Recycle and reuse treated effluent for irrigation

#### Project details

- » Hydro MicroScreen™ MS-28 unit with 158 micron screen demonstration unit  
Installed alongside existing drum screen system
- » Adjacent irrigation lines to test effluent percolation onto fields
- » Operated for a full season
- » Target flow of 220 gpm (14 l/s)

#### Outcome

- » Drum screen effluent stopped percolating into fields after two hours
- » Hydro MicroScreen™ irrigated successfully for entire season
- » 80% reduction in treatment footprint versus drum screen, lagoons and pumps
- » \$740,000 annual energy cost saving
- » \$165,000 annual operational and utility cost saving
- » Recovered organic solids sold on to local animal feed company

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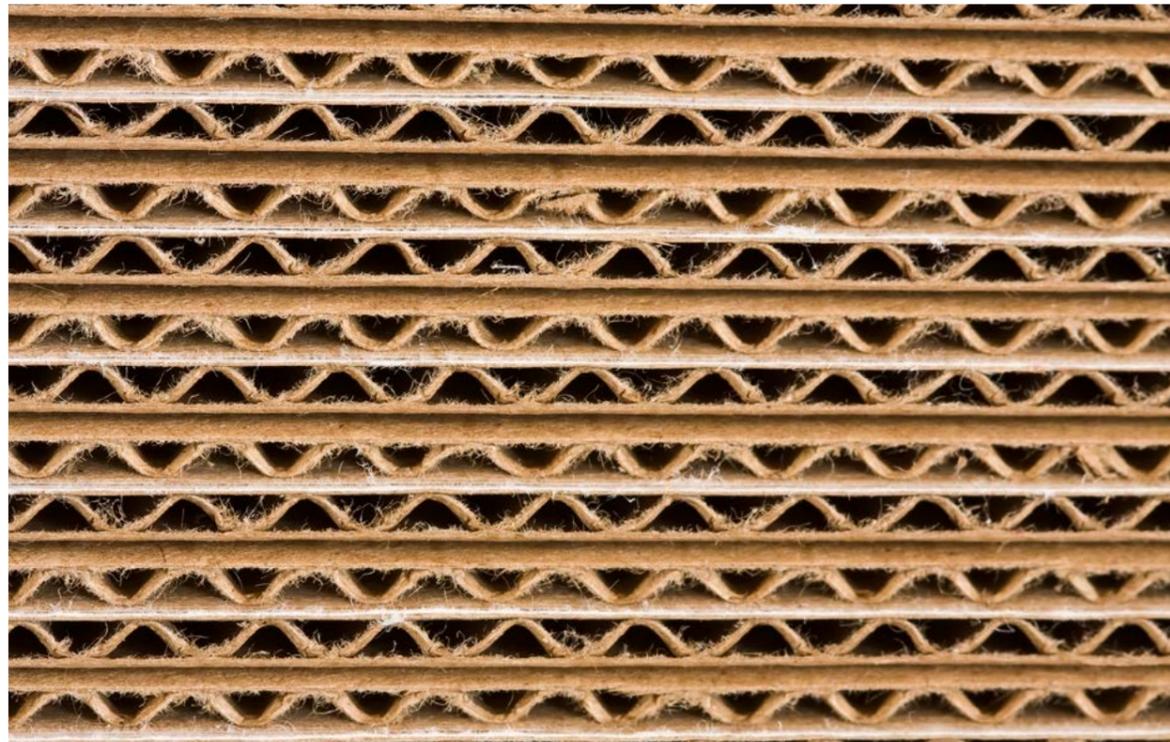
## CASE STUDY

### Oregon particle board manufacturer

#### PROJECT OVERVIEW

A large particle board manufacturer reduced solids loading from industrial wastewater effluent by 77% on average.

**77%**  
Solids load reduction



#### Problem

- » High levels of TSS in effluent (primarily 1/4" wood chips)
- » Three outfalls, covered under a single National Pollutant Discharge Elimination System (NPDES) permit, that presented an expensive environmental violation risk
- » Excessive solids loading during washdown limiting effectiveness of sedimentation system

#### Objectives

- » Treat increased solids loads
- » Reduce required detention time for settling
- » Protect sedimentation system
- » Reduce cleaning frequency

#### Project details

- » One Hydro MicroScreen™ demonstration unit
- » Influent TSS concentration from 288-6,480 mg/L
- » A range of operational flow rates

#### Outcome

- » An average of 77% TSS removal
- » Effluent concentration from 12-1720 mg/L
- » 25% total solids removal
- » Recovered solids fed back into the plant as fuel
- » Reduced landfill costs

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## CASE STUDY

### California pulp and paper plant

#### PROJECT OVERVIEW

A California pulp and paper manufacturer doubled its treatment performance and removed the need to process solids prior to disposal. Following a successful trial the plant chose to purchase the demonstration unit.

**6 months**  
to achieve 100% ROI



#### Problem

- » An inefficient, high-maintenance plate and frame press TSS removal system
- » Cleaning and reassembly took three people one full shift every week
- » 1,200 hours lost every year on keeping the equipment operational

#### Objectives

- » Treat increased solids loads

#### Project details

- » One Hydro MicroScreen™ demonstration unit

#### Outcome

- » Double the TSS capture versus the plate and frame press after a single shift
- » Recovered solids sufficiently dry that no further processing required prior to disposal
- » No associated cleaning, maintenance or downtime
- » Estimated 100% ROI from reduced maintenance costs after around six months of operation

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# CASE STUDY

## South Carolina packaging producer

### PROJECT OVERVIEW

South Carolina paper packaging manufacturer reduces lagoon cleaning requirement by up to 66%.

**441%**  
greater solids  
removal rate



### Problem

- » High solids loading in wastewater treatment lagoon
- » Underperforming drum screen system removing around 22% of solids
- » Frequent dredging required to remove accumulated solids

### Objectives

- » Extend time between expensive lagoon dredging operations

### Project details

- » One Hydro MicroScreen™ demonstration unit
- » Side-by-side test against drum screen

### Outcome

- » 441% greater solids removal rate
- » 0.74 tons more solids captured every day
- » 300% more dry solids output
- » Lagoon dredging times reduced by between 50% and 66%



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# CASE STUDY

## Napa Valley olive oil producer

### PROJECT OVERVIEW

One California olive oil producer achieved 89% TSS removal to improve efficiency and reduce costs.

**89%**  
solids removal rate



### Problem

- » Conventional screening system did not remove sufficiently high levels of pomace from water

### Objectives

- » Improve TSS removal efficiency and effectiveness

### Project details

- » One Hydro MicroScreen™ demonstration unit

### Outcome

- » System achieved 89% removal of bulk suspended solids
- » Improved effectiveness of clarification systems
- » Enabled reuse of valuable water assets
- » Drier solids output increased value of trucked pomace volume



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# CASE STUDY

## New Jersey jalapeño processor

### PROJECT OVERVIEW

A large fruit and vegetable processing plant in southwestern New Jersey doubled its jalapeño process water solids removal.

**Double**  
TSS removal rate



### Problem

- » Plant needed to upgrade its primary treatment system

### Objectives

- » Reduce TSS loading
- » Reduce BOD loading

### Project details

- » One Hydro MicroScreen™ demonstration unit
- » Tested side-by-side against existing Hydrosieve system

### Outcome

- » Jalapeño process effluent tested by independent laboratory
- » Hydro MicroScreen™ removed equivalent levels of BOD but double the TSS



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## CASE STUDY

### Southern California chimichanga factory

#### PROJECT OVERVIEW

A chimichanga production facility in southern California cut effluent surcharge fees and created a new secondary revenue stream through onward sale of recovered by-product. Following a successful trial the plant purchased the demonstration unit.

**79%**  
TSS removal rate



#### Problem

- » Ever-increasing effluent surcharge fees
- » An inadequate multi-stage grease trap that would not cope with planned production growth

#### Objectives

- » Reduce surcharge costs
- » Increase process water treatment capacity to keep pace with production growth

#### Project details

- » One Hydro MicroScreen™ MS52 demonstration unit

#### Outcome

- » 100% ROI within 7 months through reduced effluent surcharge costs
- » System drastically improved process water removal rates:
  - 79% removal of TSS
  - 52% removal of fat, oil and grease (FOG)
  - 37% removal of COD
- » 32% dry solids output provided by-product onward sale option



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## CASE STUDY

Pennsylvania deli meats producer

**Improved** TSS and FOG removal

### PROJECT OVERVIEW

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A Pennsylvania producer of deli meats found a way to replace conventional rotary drum screen and DAF technology to deliver comparable performance at a fraction of the cost.

#### Problem

- » Ever-increasing effluent surcharge fees
- » Average BOD of over 2,000 mg/l, around 34% soluble
- » A complex, expensive rotary drum screen and dissolved air flotation (DAF) treatment system

#### Objectives

- » Cut effluent surcharges
- » Reduce the complexity of the treatment process on the roast beef processing line

#### Project details

- » One Hydro MicroScreen™ demonstration unit
- » Side-by-side test against existing rotary drum screen and DAF system

#### Outcome

- » Improved removal rates of TS and FOG
- » Comparable removal of BOD
- » New dry solids output
- » Comparable performance at lower cost and in much less footprint

## CASE STUDY

### Michigan breakfast cereal producer

#### PROJECT OVERVIEW

Large cereal manufacturer saves \$2M in construction costs and cuts effluent surcharges by 30%. Following a successful trial the plant purchased the demonstration unit.

**\$2M**  
construction costs  
saved



#### Problem

- » Facility needed to expand its on-site wastewater treatment system to meet growing demand
- » Existing drum screen system was old and effluent surcharge fees were increasing

#### Objectives

- » Replace existing treatment technology at comparable or better performance

#### Project details

- » One Hydro MicroScreen™ demonstration unit

#### Outcome

- » Hydro MicroScreen™ met or exceeded removal for TSS, BOD and COD
- » Quotes from alternative technologies came in at \$1.5M over budget
- » Small-footprint treatment saved \$2M in construction costs
- » Effluent surcharge costs reduced by 30%
- » Completely eliminated the cost of disposing of wet solids from primary screen

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## CASE STUDY

### California chicken plant

#### PROJECT OVERVIEW

A large California chicken kill plant prevented 3.8 tons of solids from hitting its wastewater treatment plant every single day.

**3.8 tons**  
of solids removed  
every day



#### Problem

- » Secondary drum screen failing to protect equalization basin
- » Basin 70% filled with solids, preventing the operation of mixing equipment
- » Dissolved air flotation (DAF) and biological nutrient removal (BNR) systems not in compliance

#### Objectives

- » Replace failing drum screen with high-performance alternative

#### Project details

- » One Hydro MicroScreen™ unit
- » Installation downstream of drum screen

#### Outcome

- » 3.8 tons of solids removed every day
- » 83% FOG capture
- » 32% dry solids output reduced cost of solids disposal and provided by-product onward sale option
- » Estimated 100% ROI in around one year



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# CASE STUDY

## Missouri pork processor

### PROJECT OVERVIEW

Large pork processing plant improves treatment performance and cuts solids handling and disposal costs.

**90%**  
FOG removal rate



### Problem

- » Underperforming drum screens, DAF and aerobic sludge lagoons

### Objectives

- » Improve TSS, BOD and FOG removal performance

### Project details

- » One Hydro MicroScreen™ unit

### Outcome

- » Improved TSS removal rate to 92%
- » Improved BOD removal rate to 79%
- » Improved FOG removal rate to 90%
- » Delivered 39% dry solids output, cutting solids handling and disposal costs



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## CASE STUDY

### California pepper processor

#### PROJECT OVERVIEW

Pepper processing plant successfully achieves 50% BOD reduction and 70% TSS reduction under heavy solids loading conditions.

**0.5**  
yd<sup>3</sup> of solids per  
hour removed from  
combined influent



#### Problem

- » Underperforming drum and shaker screen
- » Excessive solids loading straining the capacity of the digester

#### Objectives

- » Reduce solids load sent to digesters in order to keep plant operating at full capacity
- » Capture solids larger than 200 microns

#### Project details

- » One Hydro MicroScreen™ demonstration unit
- » Unit tested at four different locations and with influents of varying characteristics
  - After the drum screen
  - After the shaker screen
  - After blanch water
  - Combined flow from all processes

#### Outcome

- » Captured 0.96 yd<sup>3</sup> per hour of solids downstream of the drum screen
- » Captured 0.53 yd<sup>3</sup> per hour of solids downstream of the shaker screen
- » Captured 1.6 yd<sup>3</sup> per hour of solids from blanch water
- » Captured 0.5 yd<sup>3</sup> per hour of solids from combined influent

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# CASE STUDY

## California corn processor

### PROJECT OVERVIEW

California corn processor saved \$158,000 in annual hauling costs.

**\$158K**  
saving on hauling costs



### Problem

- » Inefficient wastewater treatment line—twelve 10,000-gallon settling tanks and eight acre lagoon
- » Around \$250,000 hauling costs to dispose of high-moisture sludge

### Objectives

- » Reduce sludge hauling costs

### Project details

- » One Hydro MicroScreen™ unit
- » Situated ahead of the settling tanks and lagoon

### Outcome

- » 66% particulate BOD removal rate
- » Removing solids, preventing them turning into sludge
- » Reduced frequency of solids removal pumper truck deployment
- » Hauling costs reduced by \$158,000



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## CASE STUDY

### Bakersfield carrot processor



## PROJECT OVERVIEW

A California carrot processor doubled its solids removal rate and reduced pulp solids output by 30%.

**100%**  
improvement to  
solids removal

### Problem

- » Poorly performing disc screen
- » Solids content in effluent reducing effectiveness of recycled water irrigation spray system
- » Wet solids increasing handling and disposal costs

### Project details

- » One Hydro MicroScreen™ MS28 demonstration unit with 158 micron belt
- » Testing on both influent and disc screen effluent

### Outcome

- » 240 ft<sup>3</sup> of solids missed by disc screen captured every eight hours
- » 90% TSS removal rate
- » 100% improvement to overall solids removal
- » 30% reduction in effluent solids by weight

# CONTACT US

If you're interested in learning more about how screening and treatment technologies can help your business improve profitability in the same way as those in this playbook, visit [hydro-int.com/contact-us](https://hydro-int.com/contact-us) to find your nearest expert.



Turning Water Around ...®

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