

A close-up photograph of water cascading over a bed of small, light-colored pebbles. The water is clear and creates a series of white, frothy streams as it falls. The background is a soft, out-of-focus light blue and white, suggesting a natural setting like a waterfall or a stream. The overall tone is clean and refreshing.

# **Innovative solutions for *Energy Efficiency & Digitalization***

Marius CHIRIC – Sr. Application Engineer  
XYLEM WS Romania

# Xylem at a Glance



Collaborating with customers to tackle water scarcity, quality, resilience, and affordability with innovative solutions around the world.



**100+**

years of innovation, leadership, and service to customers with leading brands



**5,100+**

patents and trademarks



**350+**

locations around the world



**\$8.1B**

2023 revenue\*



**>23,000**

colleagues with diverse water expertise



**~150**

countries where Xylem solutions solve water

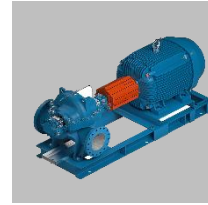
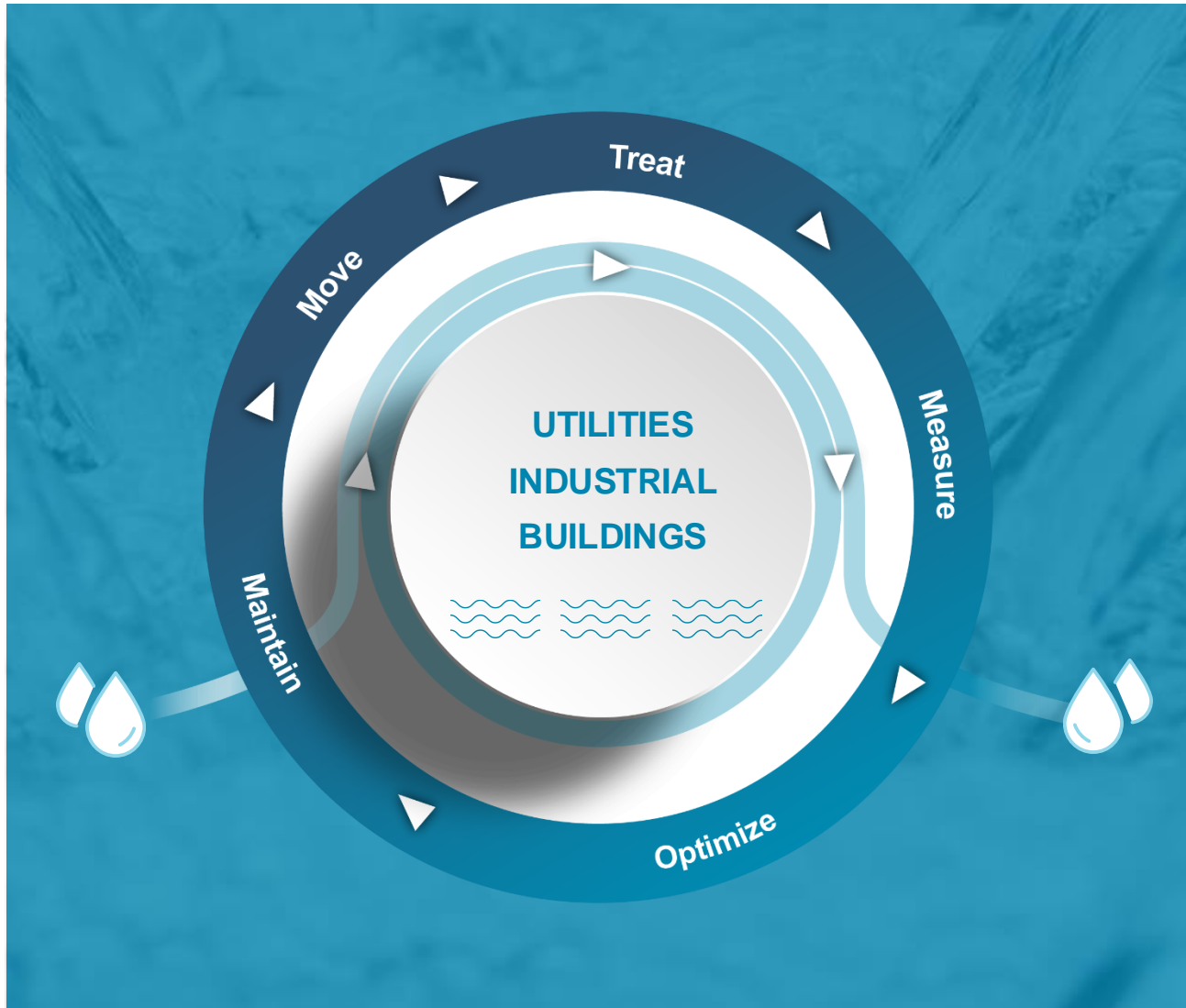


**NYSE: XYL**

**Local Presence Since 2021**

\*combined 2023 pro forma revenue

# We Support The Lifecycle of Water...



## MOVE

Moving water on its entire journey, efficiently and safely.



## TREAT

Transforming water quality to meet exacting standards, sustainably.



## MEASURE

Sensing, monitoring and measuring what matters to water managers and communities.



## OPTIMIZE

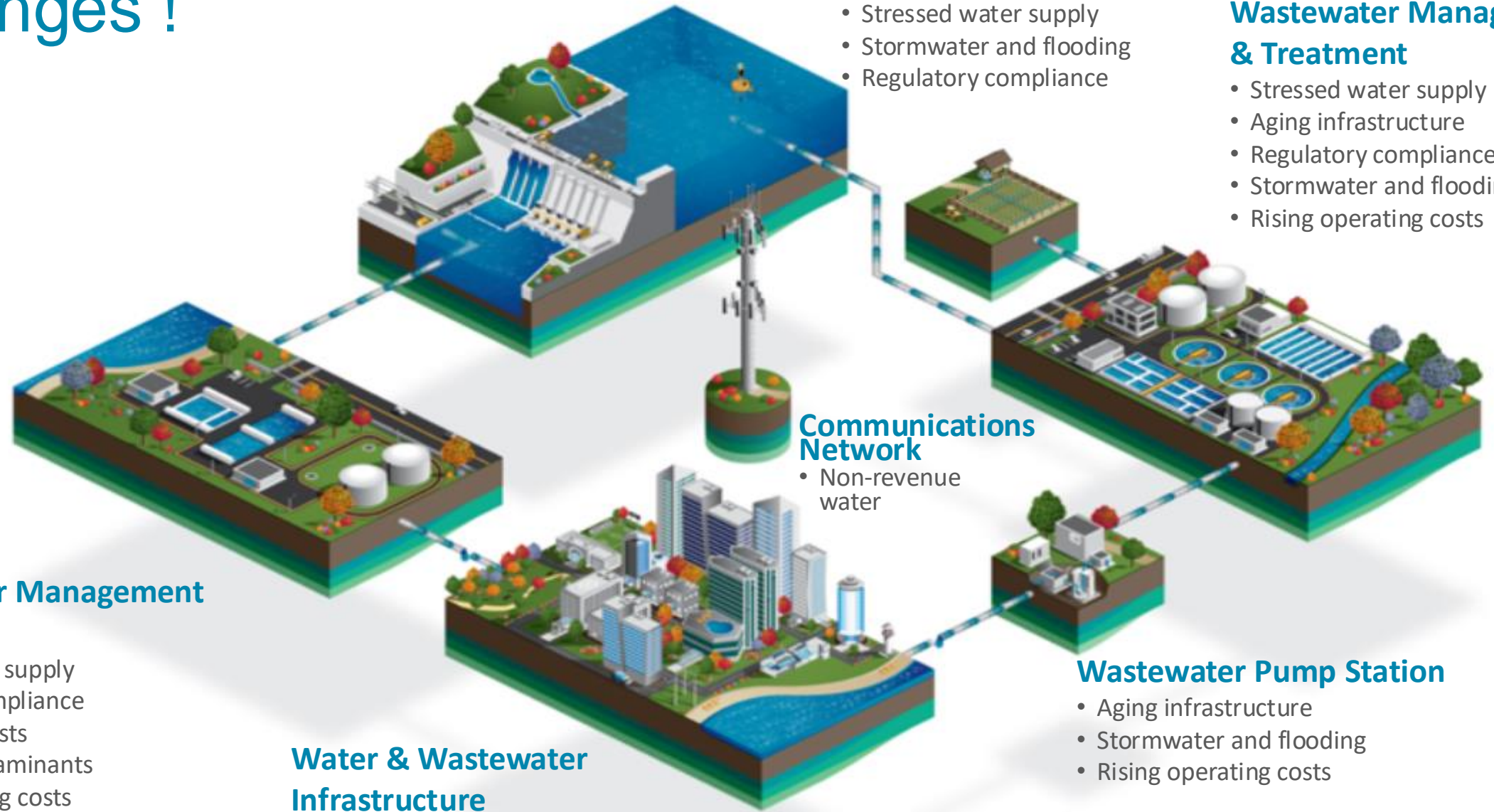
Providing insights that optimize water networks and protect water assets.



## MAINTAIN

Improving operational performance and delivering precise water outcomes.

# Challenges !



# Knowledge of All relevant elements Makes the Difference

Diffused aeration



Mixing and pumping solutions

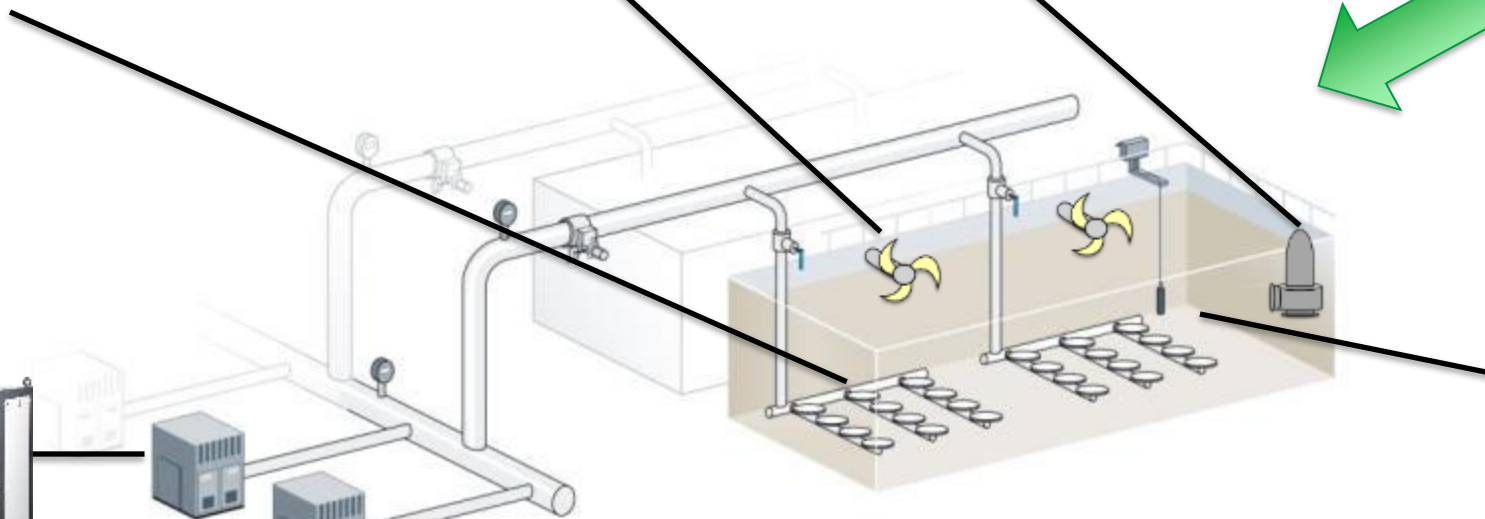


Advanced Treatment Control and Optimization Module



aquatune

Blowers



Analytic Instrumentation



"You can't manage what you can't measure."

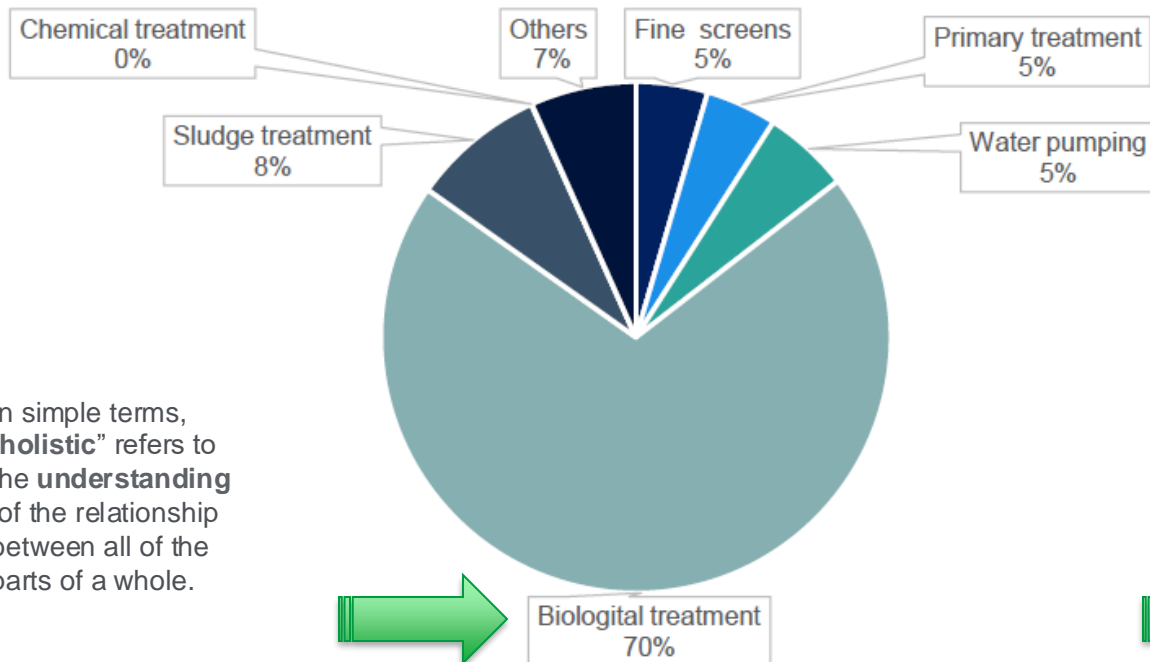
*Peter Ferdinand Drucker, Management Consultant*

# General Structure of Energy Consumption ...

HOLISTIC LEVEL

## ...by Active Treatment Stage:

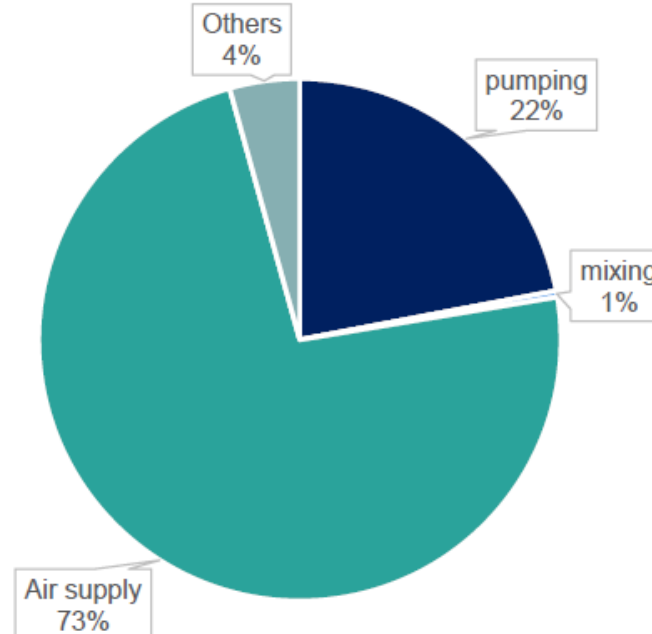
- Water pumping (5%)
- Fine screens and Grease removal (5%-7%)
- Primary treatment (5%)
- Biological treatment (60% - 70%)
- Sludge management (8% - 15%)



ASSEST LEVEL

## ...by Active Process:

- Pumping (22% – 25%)
- Mixing (1%-3%)
- Air Supply (~ 70%)
- Others (4% - 6%)



In simple terms, "holistic" refers to the understanding of the relationship between all of the parts of a whole.

# Efficiency measurement on rotating machines

## Our objectives

- Reduce Energy
- Optimize Maintenance
- Improve Resilience

## Our advantage

- Onsite-Efficiency Measurement
- High Accuracy < 1%
- Advanced Analytics
- Robust recommendations

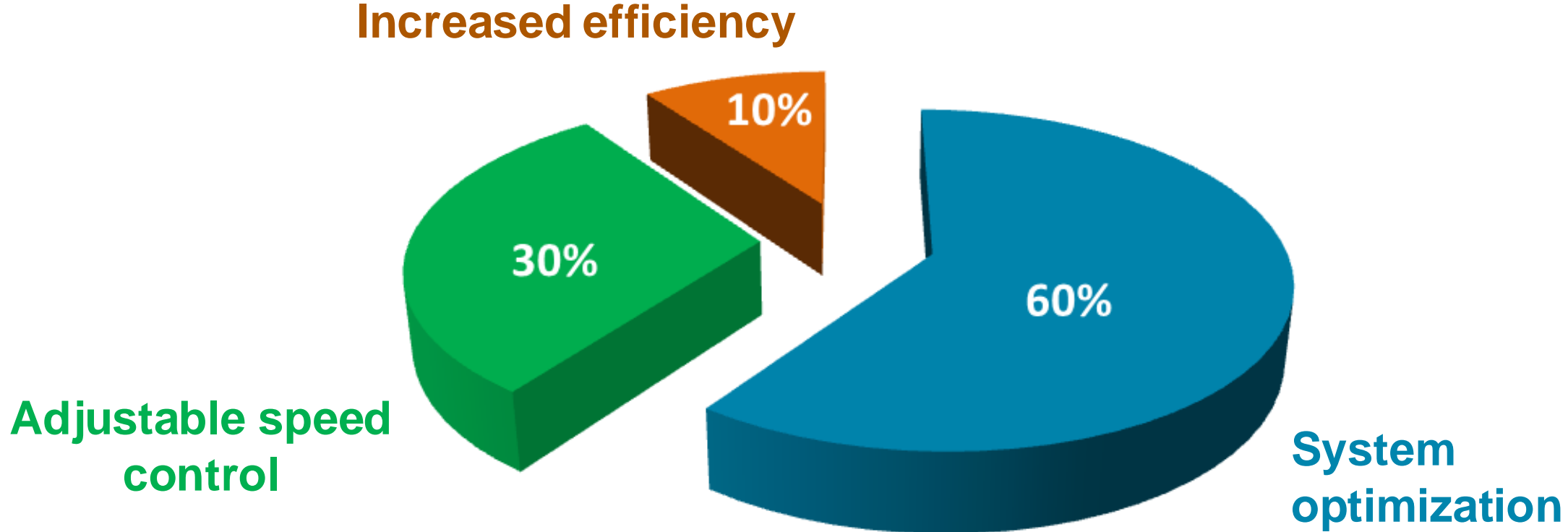


**Pumps**

**Blowers**

**Turbines**

# Potential saving in a pumping system



*The 40% of the potential saving in a pumping system could be reached through a high efficiency equipment and the use of a VSD*

# Concertor<sup>®</sup>

Most intelligent  
wastewater pumping  
system we've ever  
made

Reduction of cabinet size vs conventional cabinets

**50%**

Energy saving vs conventional pumping

**70%**

Inventory reduction

**80%**



# Putting sustainability first with Hydrovar X



# hydrovar® X and Avensor® - better together !



Avensor is a digital service that provides alerts and data-driven insights from a device connected to your pump stations or other water infrastructure assets.

# BLOWERS – Sanitaire® Turboblowers

*Permanent magnet high efficiency  
high speed turbo blower*

- Non-contact air foil bearing
- Built-in VFD and PLC
- High-efficiency, high-speed PMSM motor (permanent magnet motor)
- No gears = direct coupled impeller on motor shaft – minimal mechanical losses
- Built-in sensors (airflow, temperature, pressure etc.)
- High-efficiency machined, aluminum alloy impeller
- Minimal maintenance – almost filter replacement only



Blower and motor assembly



Electrical cabinet



Full color Touch screen HMI



VFD



Controller

# Xylem's Solution: Mobile Liquid Cleaning Service

Mobile and lightweight liquid cleaning units are easily maneuvered by hand around any treatment works



After

vs.

Before

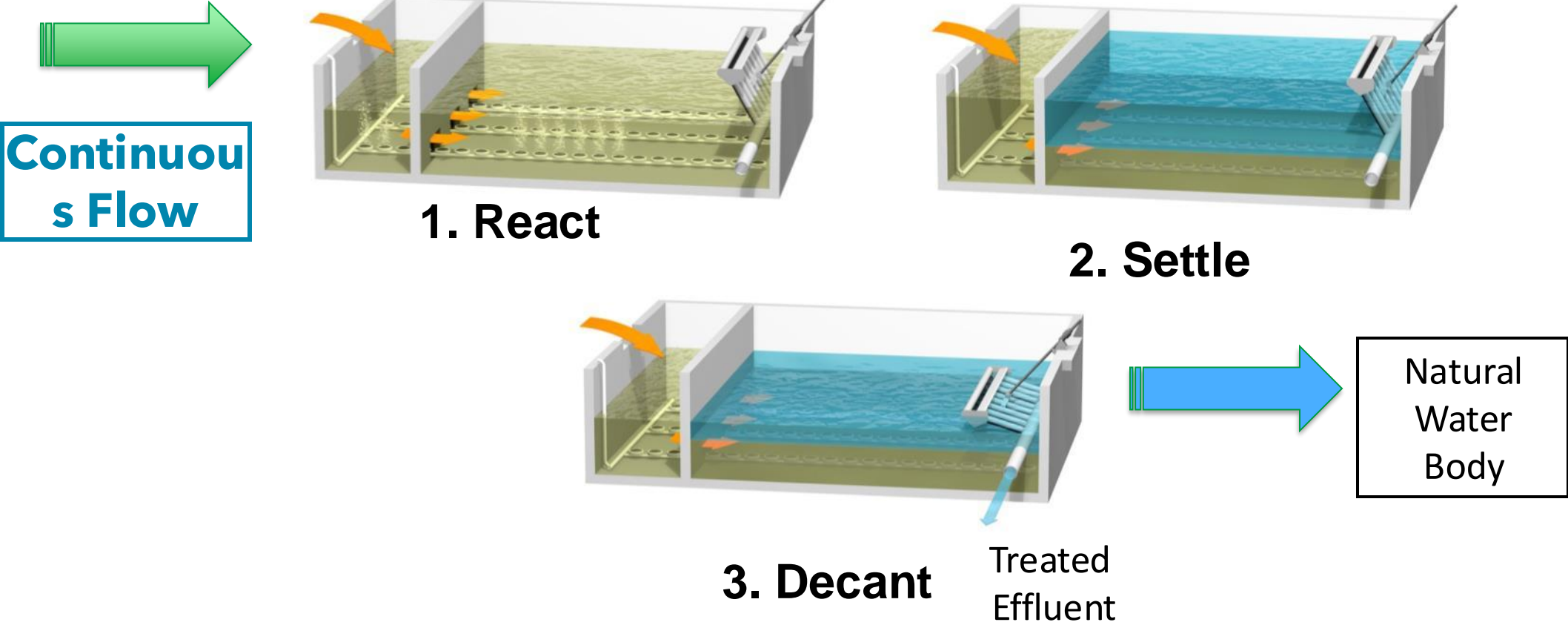


Aeration systems typically consume 50 – 60% of total energy at a WWTP.  
*Diffuser Liquid Cleaning can reduce aeration energy consumption by more than 30%*

HOLISTIC LEVEL

# ICEAS Treatment Technology from XYLEM

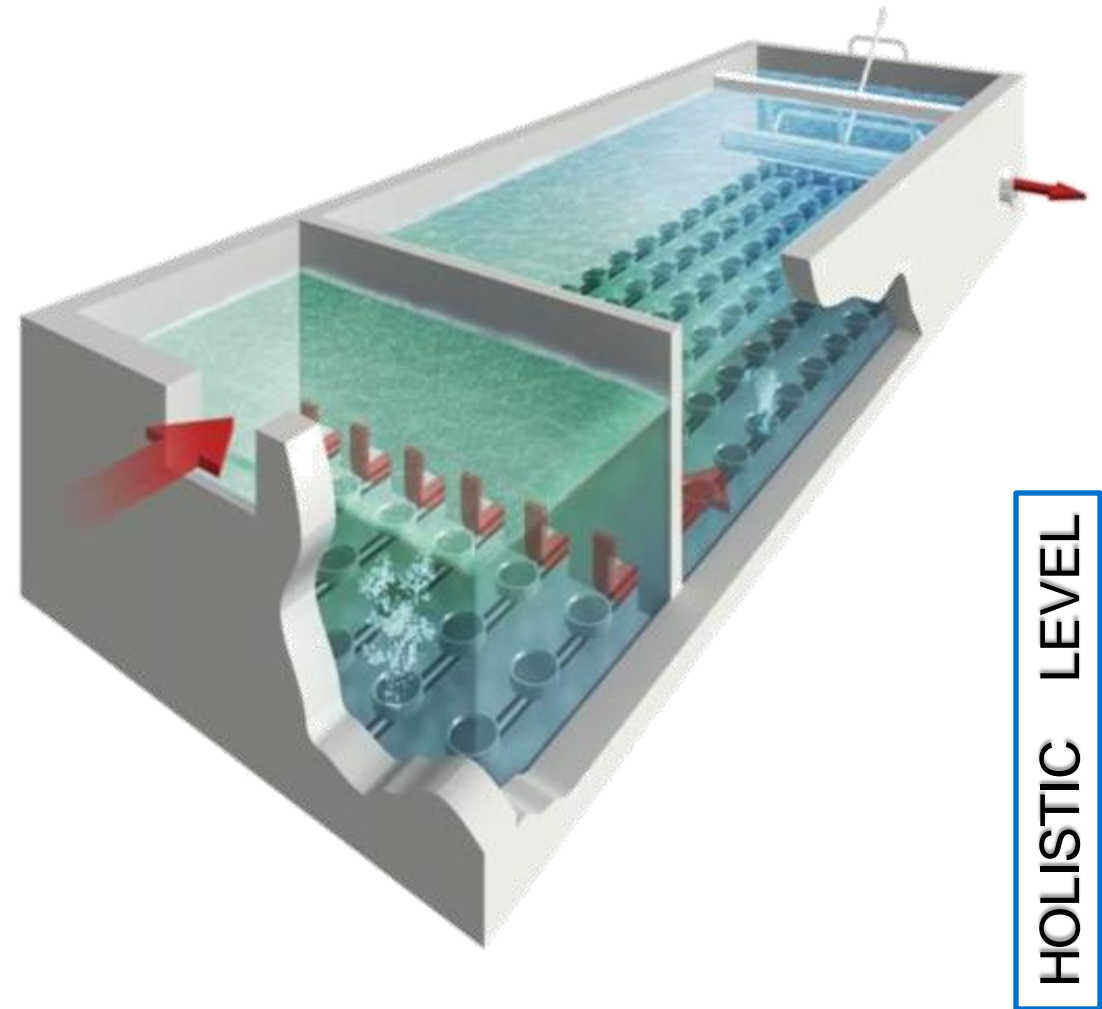
## Operating Cycle



# ICEAS Treatment Technology from XYLEM

## Un-Paralleled Performance

- Continuous flow
- Equal flow and load to ALL basins at ALL times
- Diurnal variations received by ALL basins
- Biomass characterized the same in ALL basins
- Simplifies process adjustments
- Allows for single basin operation during times of maintenance or periods of low flow
- Pre react sized to give selection effect
- Consistent, higher quality effluent  
(10 BOD/ 10 SS/ 1 Amm/ 10 TN/ 1 P average)
- High flows can be accommodated



HOLISTIC LEVEL

# Aeration Process Optimization

Blower Performance Insights  
XDM – Xylem Digital Maintenance

## Challenge

Up to 60% of the energy consumption at a sewage treatment plant is used by the aeration process.

The client wanted have factual proof how Xylem could optimize the process within an attractive Return of Investment.

## Solution

Xylem provided the discovery service by installing “digital twin” TSO, SAM PRO, Xylem Digital Maintenance and WTW IQ sensor net system to monitor the aeration process and existing PD blowers performance.

In real time the insights where provided that the existing blower system was operating at only at the efficiency between 40 and 50%. These insights did support the action to benchmark the existing blowers with Xylem’s high efficiency Turbo Max blowers and predict the outcome of potential savings.

## Outcomes:

- Replacement of Competitor Blowers
- Digital Maintenance as a Service
- Up to 35% Energy savings

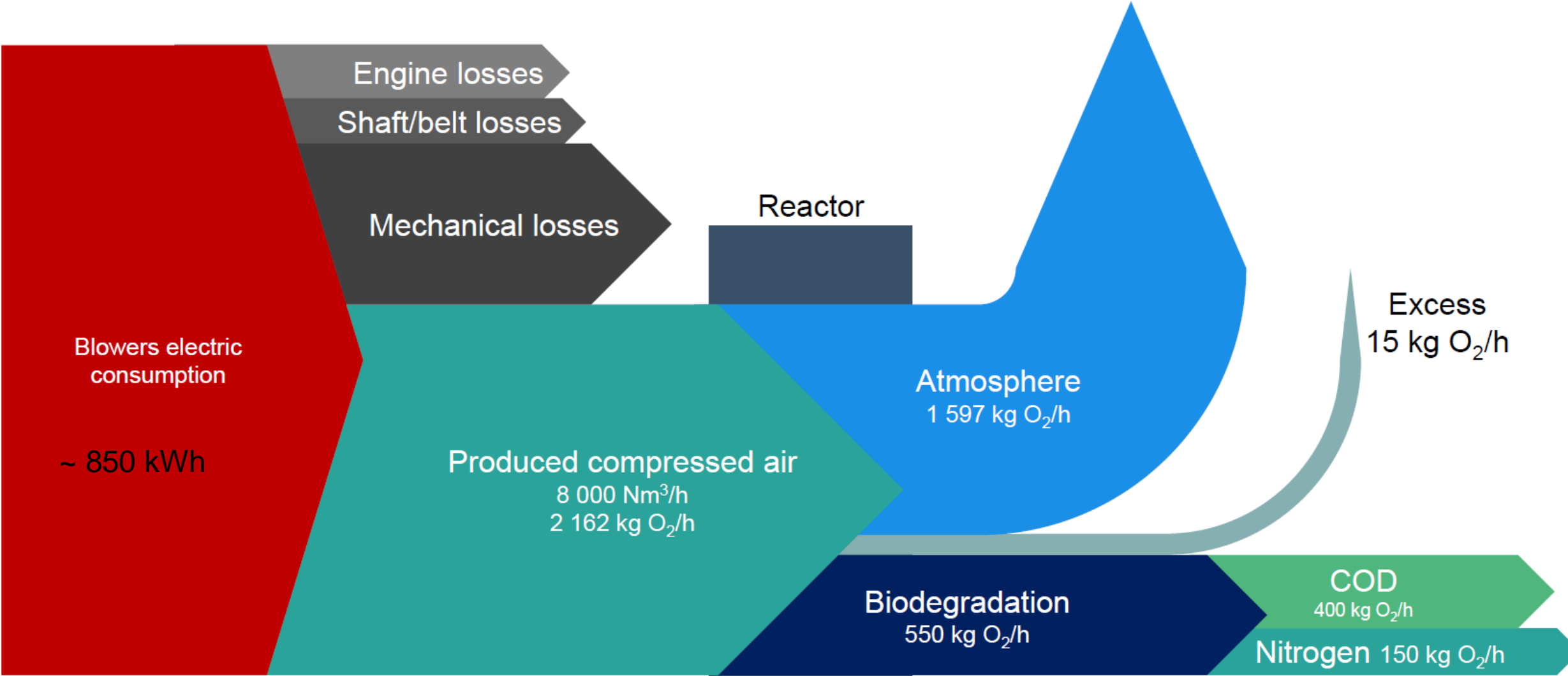


## OPTIMIZE

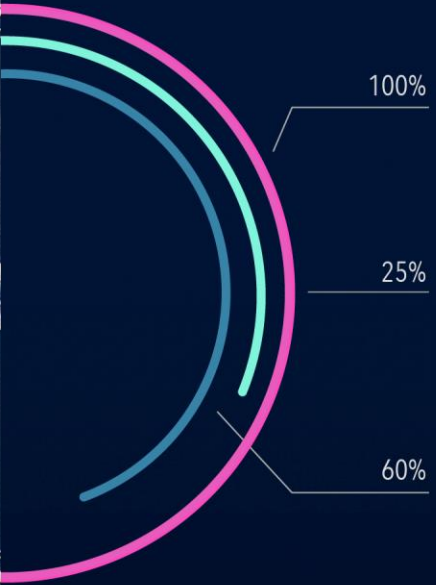
*- Reduced energy needs for lower operational expenses -*



# Energy breakdown consumption of the aeration process



HOLISTIC LEVEL



# OPTIMIZATION CONCEPT

*Finding the best operational set-up from the possible and available set-ups*

EFFLUENT  
LIMITS

OPERATING  
COSTS

RELIABILITY  
AND FLUIDITY  
OF TREATM.  
PROCESSES

# WWTPs CHALLENGES covered by our Optimization Software Module

## REGULATORY COMPLIANCE

- COD, TN and TP limits & risk of penalties and discharge fees
- New EU legislative 2025-2040

## SYSTEM & TREATMENT EFFICIENCY

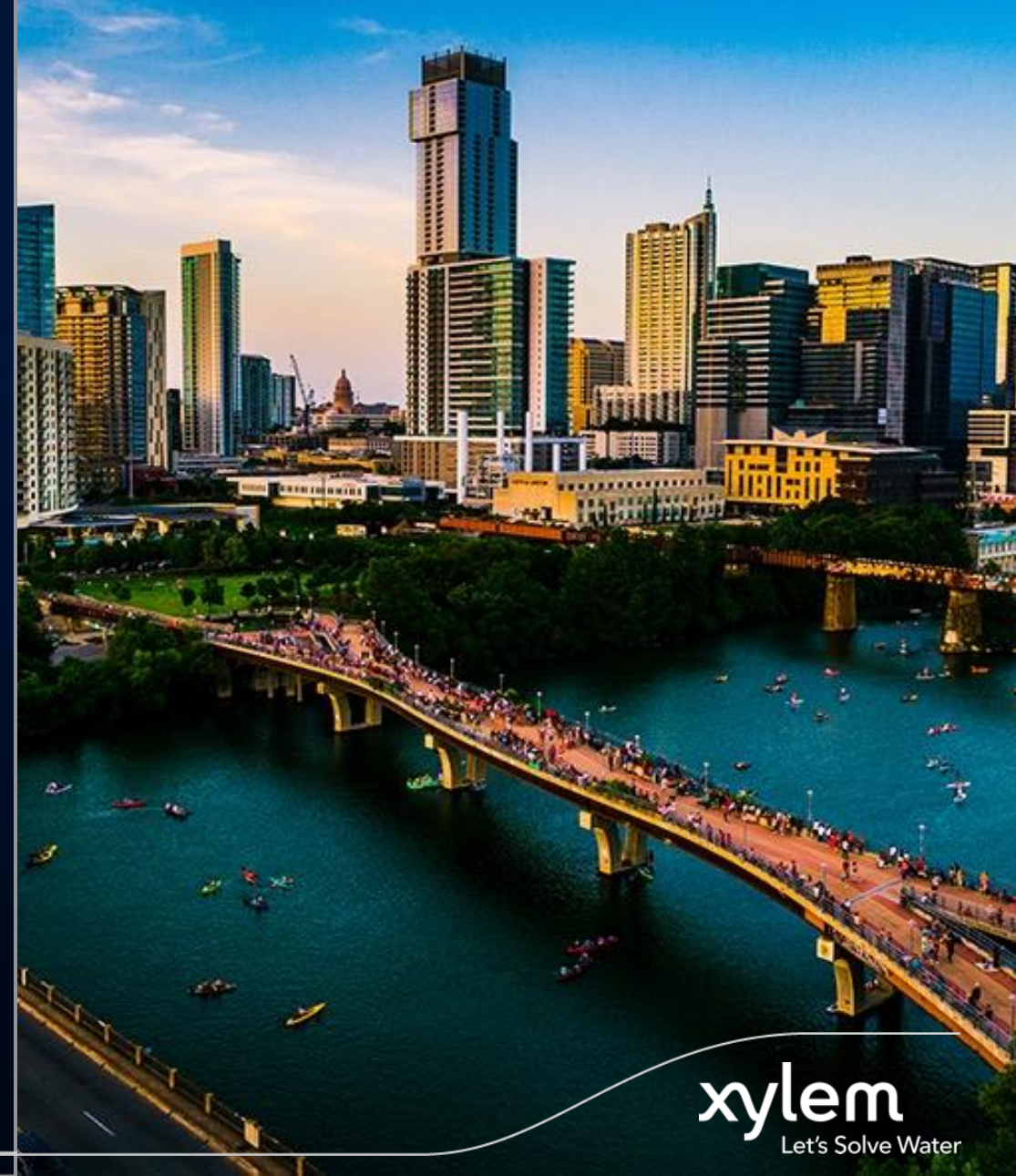
- Energy reduction ( aeration, digestion)
- Chemical consumption
- Effective using of sources and devices
- Cost of labor and operation
- Fast problems identification = fast response times
- Unpredictable weather events ( long dry weather, heavy storms\*)

## STAFF REDUCTIONS AND/OR AGING STAFF

- Lack of experienced specialists, budget/ staff reduction
- Staff retirement

## ENVIRONMENTAL SERVICES & TRUST

- Unwanted bad publicity, “pollutant label” & environmental impact



# XYLEM Optimization Software Module dedicated to CAS WWTPs

## TSO system

**Bigger WWTPs**  
**> 100 000 PE**

Existing WWTP with  
**HISTORICAL DATA**

Unique solution tailored  
made for each WWTP-  
**Artificial intelligence,**  
**holistic approach**

Huge scope of optimizing  
operation of entire facility  
incl. sewer system (or  
combination)



## EDGE CONTROL

**Mid size**  
**and small WWTPs**  
**> 10 000 PE**

Existing and new  
build WWTP- no  
historical data needed

PID controller with  
mathematical  
calculation, pre-  
configured

Limited scope for  
process optimization-  
**3 (4) available**  
**modules**



## OSCAR

**Mid and small size WWTPs**  
**> 10 000 PE**

New WWTP and older one  
with refurbishment of air  
distrib. system

Bundle solution of  
hardware ( blower,  
diffusers) + software

Cover solution for  
Conventional AS, SBR, Ox-  
ditch- Bioloop



Continuous data flow

# XYLEM Energy Efficiency Study dedicated to CAS WWTPs

## Benchmarking & Evaluation of WWTP performance

Address Address Line 1  
Address Line 2  
Phone No Phone  
Date Date

**A. Secondary Treatment Drawings and Aeration**

Please include clear dimensional drawings of tanks with aeration equipment details with this survey. Drawings should include:

- All basin / zone dimensions
- Aeration equipment type and diffuser quantity per zone
- Air main layout, with valve and airflow metering locations
- Process instrumentation locations (DO, ammonia, nitrate, nitrite, ph, etc.)

**B. Additional Plant Information**

1. Site Elevation Enter elevation Feet

2. Power Cost costs \$/kW hr

3. Wastewater Temperature Range Min - Max Choose Units

4. Target DO Concentration Enter DO mg/L

5. Pre-Anoxic Tank  Yes  No

i) Pre-Anoxic Tank Dimensions Length x Width x Depth Units

6. Anaerobic Tank  Yes  No

7. Chemical Dosing  Yes  No

i) Metal Salt Choose salt

**R CONFIGURATION TOOL (for Xylem internal use only)**

Plant Capacity (MGD) 4  
Total number of Groups 4  
Total number of CU's 12

**Select Processes to include in proposal**

Total Nitrogen  
 Ammonia Removal  
 Ammonia + Nitrogen Removal

**Energy Savings**

Pulsed Aeration  
Ammonia Removal  
Summary

CU's w/ Energy Savings Potential  
CU's w/ savings potential at low loading  
CU's w/ no potential for VEMA

Quantity % of total  
0 #CIV0  
0 #CIV0  
0 #CIV0

**Notes:**

Customer airflow meter maximums per CU need to be before or after

An aeration zone that has a grid with a dedicated drop pipe and/or a unique diffuser density (ATAD), maximum allowed 6 per CU  
One or more aeration zones that are controlled with an airflow modulating valve, airflow meter, and DO probe, maximum allowed = 12 per group  
A group of CU's that for which only one CU is allowed to pulse at any given time, maximum allowed = 4

Zone(grid)	Name	Primary Clarifier (Y/N)	Zone Geometry	Zone Length(m)	Zone Width(m)	Zone Diameter (m)	Zone Depth (m)	Diffuser Course	Diffuser Type	Zone Area (m <sup>2</sup> )	Min Allowable Dist Airflow per zone (norm)	Max Allowable Airflow (norm)	Zone mixing (norm)(m <sup>2</sup> /hr)	Flux at zone (norm)(g/ft <sup>2</sup> /hr)	Mixing per zone per m <sup>2</sup> (norm)	Min Mixing per CU (norm)	Pulse per CU
a										0	0	0	0.00	0.00	0	0	0
b										0	0	0	0.00	0.00	0	0	0
c										0	0	0	0.00	0.00	0	0	0
d										0	0	0	0.00	0.00	0	0	0
e										0	0	0	0.00	0.00	0	0	0
f										0	0	0	0.00	0.00	0	0	0
Total										0	0	0	0.00	0.00	0	0	0

**xylem**  
Let's Solve Water

**Xylem Water Solutions USA, Inc.**  
Sanitaire Products

247 W Freshwater Way, Suite 200  
Milwaukee, WI 53204  
Tel 414-365-2200  
Fax 414-365-2210

February 16, 2022

ATTN: Customer Contact  
RE: Project Name

Xylem is pleased to provide a quote for the following solution:

Region	Part Number	Description	Qty	USD

**External Antenna Options**

Applicable when the Gateway will be installed inside of a control panel, or area with poor cellular signal

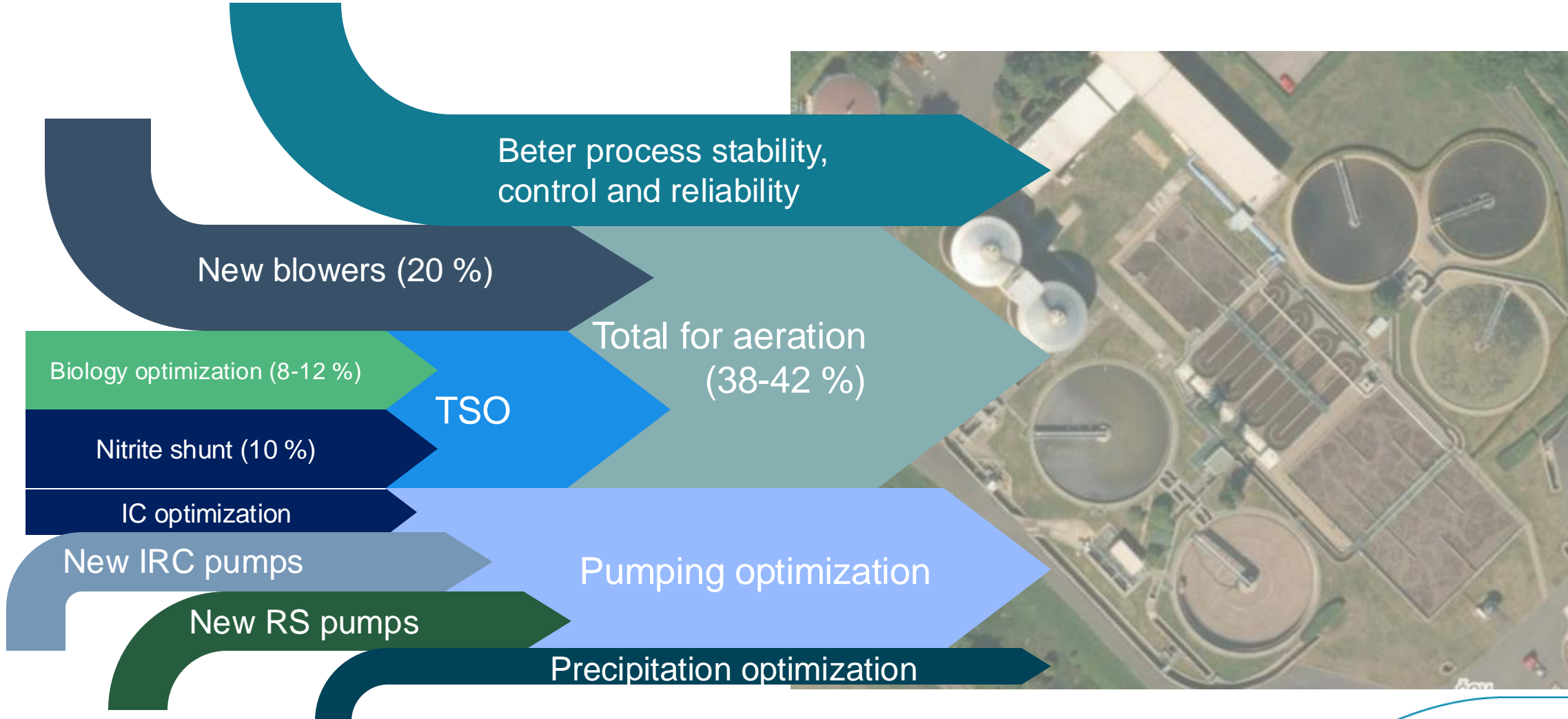
Part Number	Description	Qty	Unit Price	Total Price

Customer Process Survey

Configurator

Proposal

# Energy Efficiency Study - Our recommendation for your plant



# Xylem Solutions for a “Net Zero” Alternative

Xylem Solution	Description	Benefits to Industrial Customers
Treatment Plant Optimization Software EDGE Control & TSO	<b>Treatment Plant Optimization System</b> , based on machine learning and predictive algorithms	Helps your wastewater treatment <i>plants improve efficiencies to save energy</i> , minimize chemical inputs, and deliver better water and results at <i>optimized cost and effort</i> .
Taron Rotating Dynamic Disc Filter	Novel, unique, <b>modular filter</b> that produces superior <b>effluent quality</b> suitable for reuse applications	Replaces clarifiers and tertiary treatment with the opportunity to disrupt traditional concrete based water treatment facilities and to generate CAPEX and LCC savings
Ozone for CIP	Injection of <b>gaseous ozone</b> into CIP water for <b>disinfection</b> of pipe, tank and process machines interiors instead chemical use	<ul style="list-style-type: none"> <li>• <i>Less time</i> required for CIP</li> <li>• <i>No chemical</i> residual after CIP</li> </ul>
Advanced Oxidation Process (AOP) & Water Reuse	Strong oxidation via combinations of <b>UV irradiation</b> or <b>ozone</b> with <b>hydrogen peroxide</b> for even recalcitrant micro pollutant reduction in intake/process water and taste and odor improvements. COD, color reduction	<ul style="list-style-type: none"> <li>• Safe barrier against <i>micro pollutants</i></li> <li>• Exploring <i>new water sources</i>, e.g. waste water treatment plant (WWTP) effluent.</li> <li>• Replacing of membranes possible → <i>water savings</i></li> </ul>
Pumps & Complete pumping stations	Wide range of wastewater <b>pumps</b> and <b>smart pumping stations</b>	Sustained efficiency, <i>optimized energy use</i> with 50% energy savings, 80% inventory reduction
Mixers	Wide range of mixers plus <b>smart mixers</b>	Automatically adjusts thrusts based on aeration and <i>decreases energy use</i>
Innovative Aeration Systems	Some of the most energy efficient <b>Blowers and Diffusers</b> in the market	Aeration grids in WWTP consumes 80% of energy and our systems can significantly <i>reduce this consumption</i>
Renewable Energy	Technologies ( <b>hydroturbines, mixers, CEDI</b> , etc.) enable hydropower, biogas and hydrogen production.	Proven technologies to enable access to renewable energy and reduce carbon footprint.



Thank You!

We look forward to seeing you at  
EXPOAIPA 2024 Brasov  
Xylem Booth: A31