

asset lifecycle management

Managing the lifecycle
of your water treatment equipment

summary

SUEZ AT A GLANCE

key facts
& figures



OUR VISION

for your site's
performance



OUR OFFER

for assets'
lifecycle
management



DETAILED EXPERTISE

our expertise
in details



OUR REFERENCES

throughout
the world

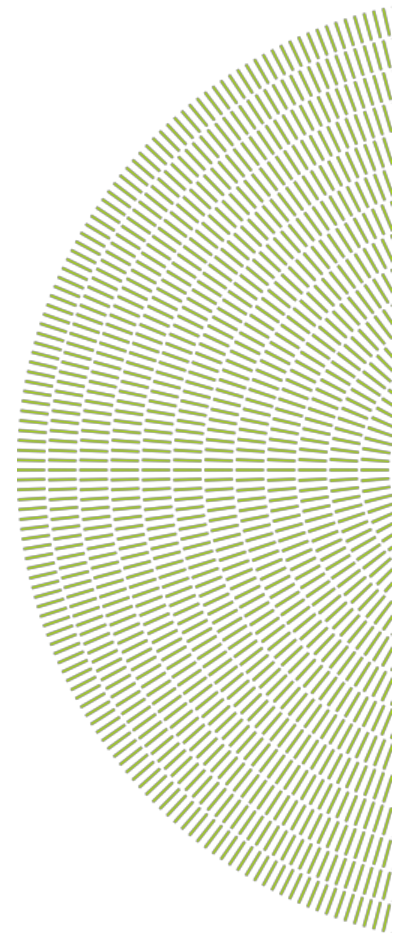




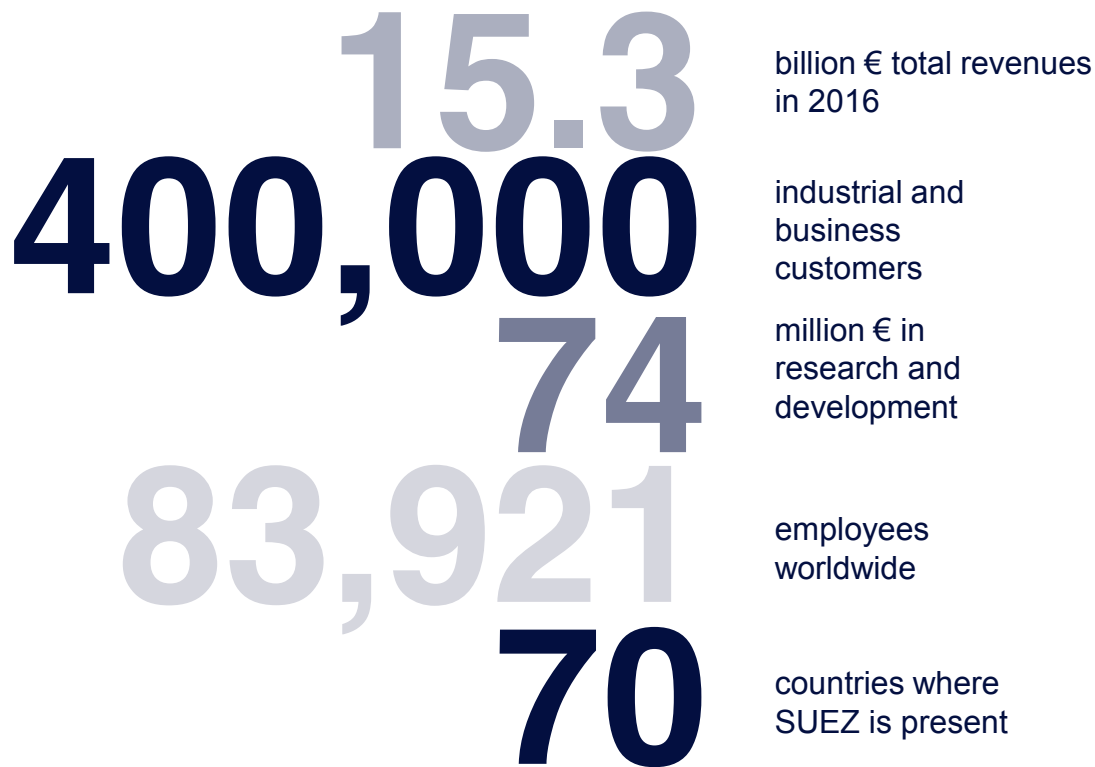
SUEZ at a glance

who we are

we are **84,000** employees
providing our customers (industries, local authorities and consumers), partners and stakeholders, all over the world,
with **concrete solutions to address
new resource management challenges**



key figures



a world leader in water & waste resources management for industry

2,200 wastewater treatment plants built for industrial customers

5,000 industrial sites equipped with a water systems

1,800 process water production plants built for industrial customers

1.5 million tonnes of soil decontaminated

350 secondary raw material production facilities

9 hazardous waste incineration units

14 Mt industrial and commercial waste collected

46 incinerators for non-hazardous waste



**our vision for
your site's performance**

water management is critical to



guarantee
the **quality**
of your production



increase
your **financial**
performance



manage
your **environmental**
footprint

... and should adapt to your production cycle

- water and wastewater installations should be able to **adapt to your production cycle and face any circumstances**, such as:
 - production increase or decrease,
 - a change in production conditions,
 - new environmental norms,
 - wear and tear,
 - any urgent situation.



**anticipating and defining
your asset lifecycle strategy
is key to...**



prevent

unplanned
production
disruptions

extend

the lifespan
of your
installations

provide

you with
autonomy and
peace of mind

optimize

safety,
expenses &
resource use



our offer



we guarantee you

reduced complexity

- reduce operating time
- focus on your core business

minimized risks

- avoid downtime
- improve safety

cost control

- maintenance costs
- operational costs

maximized performance

- consistent water quality

choose the best service plan

ESSENTIAL



Basic service coverage agreement

PERFORM



Long-term service agreement, including service coverage and performance guarantees

CUSTOMIZED

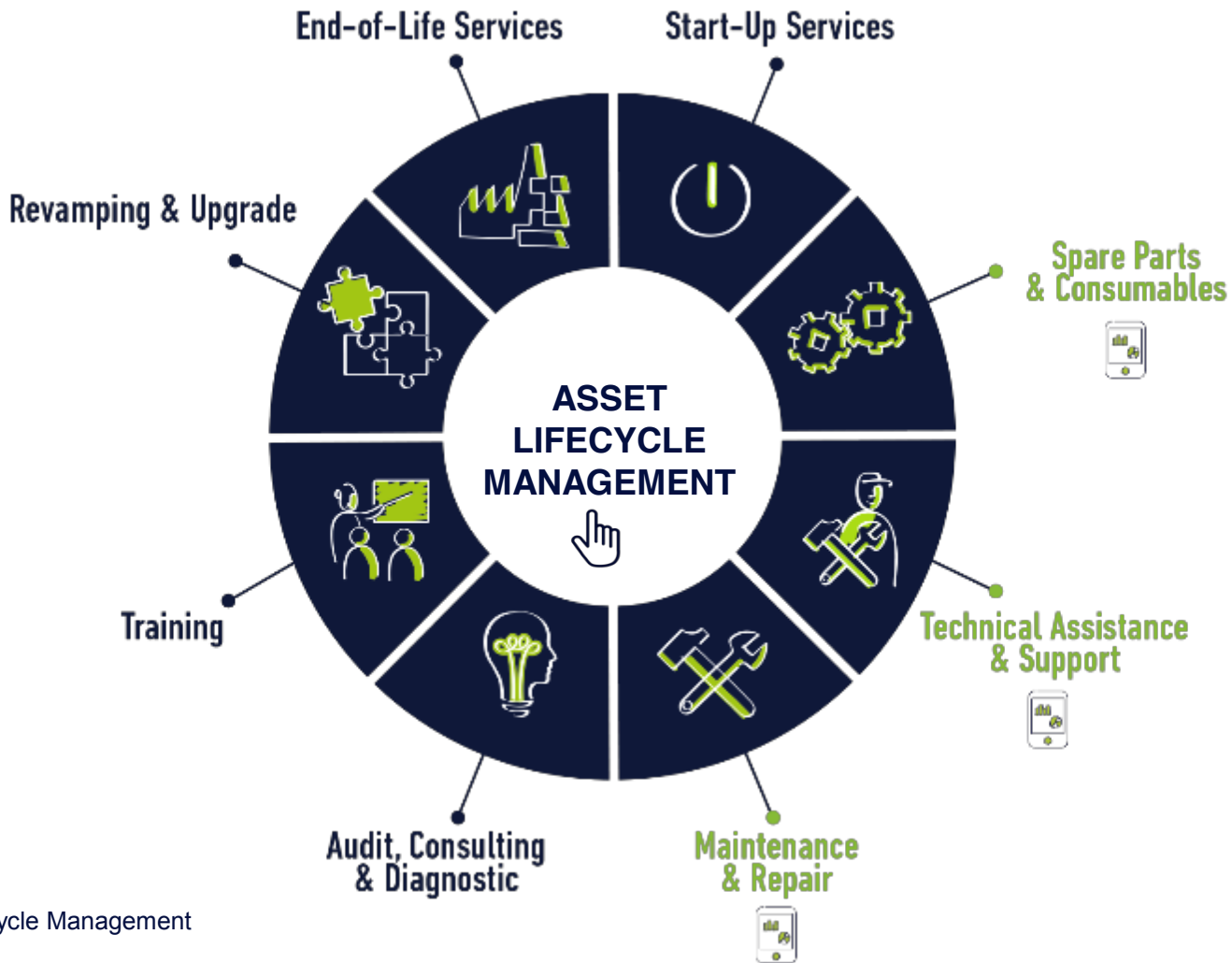


Tailor-made agreement suited to your specific needs



**detailed
expertise**





Start-Up Services



Pilot Test with Mobile Units

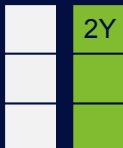


Commissioning

Consumables



Supply



Installation

Commissioning

Spare Parts



Supply



Installation

Analysis And Recommendations

Refurbishment

First-Aid Kit

Conditioning Optimization

Membrane Optimization

Technical Assistance & Support

Warranty Period Extension

24/7 Telephone Remote Support

Ecoflow Guarantee

Biomass Brokerage Service

24/7 Emergency On-Call Duty

Mobile Unit Emergency Dispatch

Local Assistance (d/y or h/d)

Expert Support Assistance

Remote Monitoring & Diagnosis

Efficient Delegated Operations

Real-time Mobile Alerts

Maintenance & Repair

Emergency Maintenance

Preventive Maintenance

Scheduled Maintenance

On-Call Repairs

Maintenance Mngmt Software

Audit, Consulting & Diagnostics

Process & Hydraulic Assessment

Energy Efficiency Solutions

Emissions Solutions

Equipment Audit

Water Sample Analysis

Training

HSE Training

Online Training Center

Customized Training Center

Revamping & Upgrade

Revamping & Upgrade

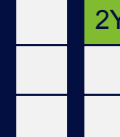
End-of-Life Services

Decommissioning

Disposal & Recycling



1Y 2Y



Legend:
1Y : one year / 2Y: two years

start-up services

SUEZ ensures that all systems and components of your plant or equipment are designed, installed and tested according to your requirements.



pilot test with mobile units



commissioning

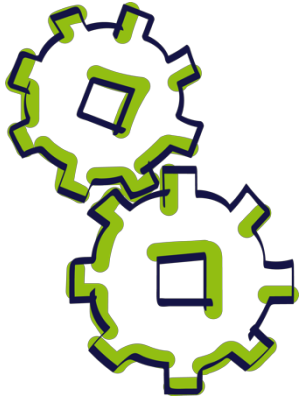
benefits

- Make sure your installation works from day 1
- Optimize future performance and reliability
- Enhance safety and risk management
- Benefit from a turnkey solution



spare parts & consumables

SUEZ supplies and installs the right parts and consumables at the best price to keep your plant running every day.



consumables

consumables supply & installation

water conditioning services



consumables optimization



spare parts

spare parts supply

spare parts installation

analysis & recommendations

refurbishment

first-aid kit

benefits

- Avoid supply disruption and loss of production
- Make sure your asset is always operating at its fullest capacities
- Save time thanks to our optimized purchasing process



spare parts & consumables

Our qualified team of experts and technical staff performs **a large array of services** for parts and consumables, from analysis to complete refurbishment, for any kind of water treatment, such as:

decantation

Replacement of scraper bridges and lamellar modules, refurbishment of aeration tanks.

filtration

Servicing open sand filters: replacing or strengthening concrete floors, interventions on enclosed metal filters, renovation of surface coatings, replacement of filter mass and nozzles.

demineralization

Replacement of ion exchange vessels and resins.

membrane filtration

Cleaning and replacement of ultrafiltration, nanofiltration and reverse osmosis membranes.

sludge treatment

Reconditioning or replacement of screen rakes, sludge drains, filter presses, etc.



conditioning optimization



aqualead[®] access

aqualead[®] access is a software that helps you centralize, monitor and manage all the data on the chemical treatment of your installations.

benefits

- Follow the various parameters online
- Receive alerts in case of failure
- Secure processes
- Achieve higher productivity

aqualead[®] watch

aqualead[®] access is a water scanner that regulates in real-time the injection of anti-corrosion and anti-scaling agents in cooling systems. It comes equipped with a self-cleaning system for maximum robustness.

benefits

- Optimize chemical use
- Protect your installations



MEMboard® is a powerful tool to help you get the most out of your membranes. By implementing MEMBoard®, you can better manage membrane cleaning schedules, optimize energy use and achieve maximum membrane life.

benefits

- Quality Control
- Lifespan Predictions
- Cleaning Strategy
- Renewal Strategy
- Failure Diagnosis



technical assistance & support

Our expert technicians provide on-site and remote support at all stages of your asset's lifecycle and share their knowledge with your teams.



warranty period Extension	24/7 telephone remote support	ecoflow® guarantee
biomass brokerage service	24/7 emergency on-call duty	mobile unit emergency dispatch
local assistance (d/y or h/d)	expert support assistance (d/y or h/d)	remote monitoring & diagnosis
efficient delegated operations (EDO)		real-time mobile alerts

benefits

- Minimize long-term risks
- Benefit from a rapid response
- Optimize operational and economic performance
- Comply with health & safety standards





edo is a performance contract, based on our operational teams and experts, with at least one contract supervisor on site.

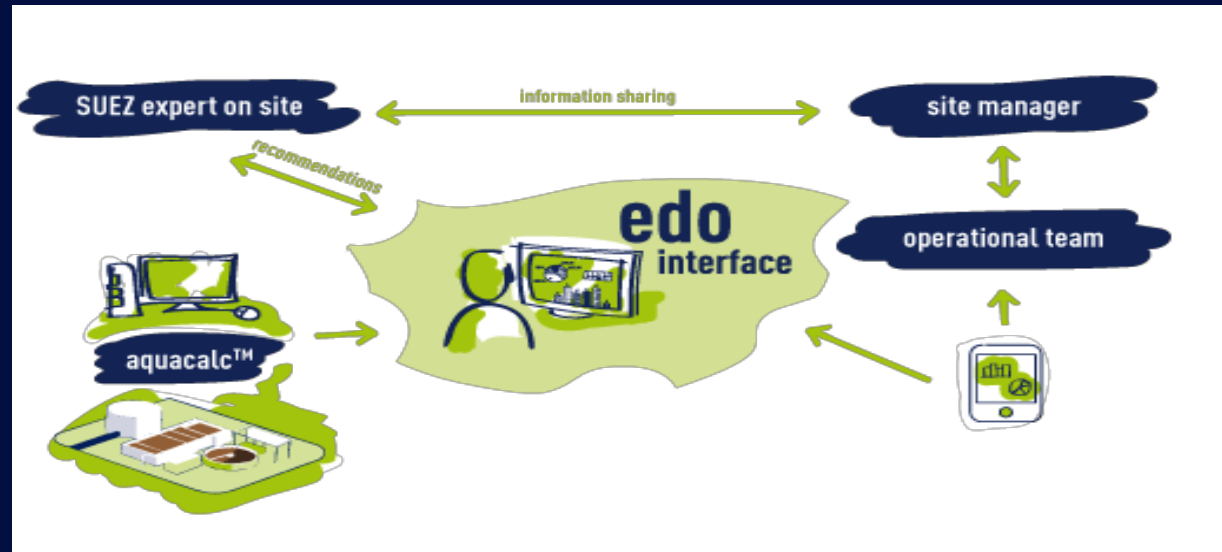
SUEZ commits to **performance guarantees**, based on clients' effluent specifications.

benefits

- Budgetary control: Guaranteed Total Cost of Operations
- Environmental management: Guaranteed discharge levels
- Productivity: Guaranteed productivity gains
- Service continuity: Complete support(crisis management, on-call technical support...)



Thanks to our **aquacalc™ software**, our on-site expert track the performance of your plant and provides daily recommendations for improvement.



- Integration of all the documentation
- Set up of automatic information input in aquacalc®
- Integration and monitoring of KPIs
- Daily, monthly and annual reports
- Integration of recommendations with follow-up of realization

maintenance & repair

Our expert technicians provide regular maintenance and repair on all types of equipment to prevent wear and tear. In case of emergency, they quickly intervene to restore production.



emergency
maintenance (h/y)



preventive
maintenance (d/y)

scheduled
maintenance (h/y)

on-call repairs



maintenance
management software

benefits

- Rapid and flexible response
- Reduce the risk of production disruption
- Extend your asset's life expectancy
- Maximize long-term reliability
- Minimize maintenance costs



audit, consulting & diagnostic

SUEZ takes a global view of your water cycle to optimize your assets' processes and reduce your environmental footprint



energy efficiency solutions →

process & hydraulic assessment →

equipment audit

emissions solutions



remote monitoring & diagnosis

water sample analysis with mobile units

benefits

- Simplify and optimize processes
- Improve asset profitability
- Maximize energy and water use efficiency
- Minimize chemical consumption
- Reduce environmental impact and carbon emissions
- Avoid unexpected and costly surprises



training

Our fully qualified professionals deliver targeted and interactive training to your operational teams for maximum efficiency.



HSE training

online training center

customized training center

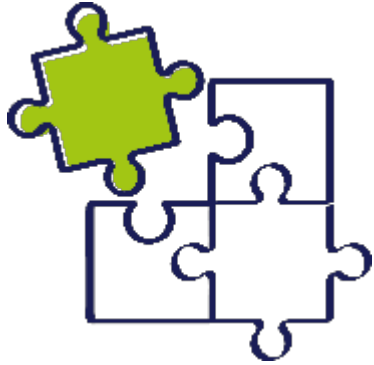
benefits

- Increase operational performance
- Improve maintenance
- Comply with health and safety standards



revamping & upgrade

SUEZ can revamp and upgrade every type of water treatment plant and equipment to restore or improve their working conditions.



revamping



upgrade



remote operation

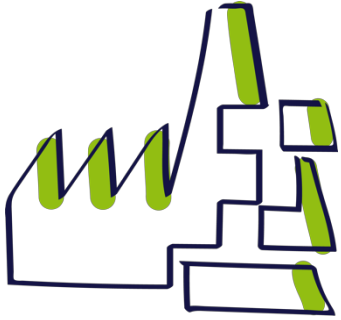
benefits

- Mitigate the effects of obsolescence
- Enhance the lifetime of your asset
- Adapt to changing production needs
- Conform with new water quality norms
- Avoid capital spending



end of life services

SUEZ carries out decommissioning, dismantling and removal work for your plants and equipment safely and responsibly.



decommissioning

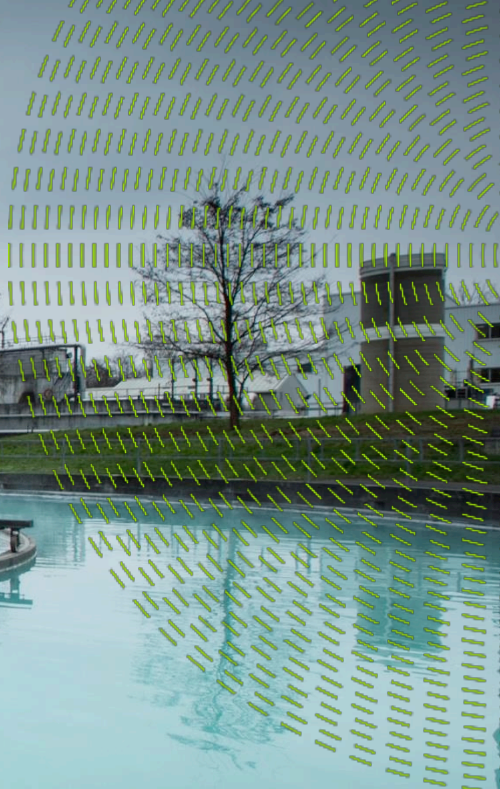


disposal & recycling

benefits

- Benefit from a turnkey solution
- Respect industry standards
- Comply with environment and safety rules and norms





our references



Food & Beverage

Pilot test with mobile units on 3 sites Wastewater pre-treatment plant - France



issues

The client was experiencing problems with its aerobic digestion plant:

- Plant operating at full capacity limiting the client's production
- Proliferation of filamentous bacteria inhibiting the decantation process
- Foaming due to overloading
- Excessive sludge production
- Excessive phosphorus discharge

solution

Pilot test of a pre-treatment unit to reduce the influent load and optimize discharge to the environment

benefits

- 70% reduction of influent load
- Reduced energy consumption
- Less foaming and filamentous bacteria
- Less sludge production leading to waste management savings
- Less phosphorus discharge





19 nuclear plants

Lifecycle Management

2 or 3 demineralization plants by site: total installed capacity ~5000 m³/h - France



issues

- Ensure production continuity
- Extend the lifetime of equipment

solution

SUEZ and EDF have signed partnerships that include:

- Mobile services: dispatch of water treatment mobile units during refurbishments to ensure production continuity
- Maintenance and expertise services

SUEZ also provides EDF with the following services when needed :

- Refurbishment works
- Supply and installation of spare parts
- Technical assistance



benefits

- Reduced operational and maintenance costs
- Consistent water quality
- No production disruption



Upstream Oil & Gas

Technical assistance

Onshore produced water plant - Azerbaijan



issues

Specific maintenance and technical assistance services at the Sangachal Terminal and the offshore rig.

solution

In 2007, after performing a pilot test, SUEZ designed and built the onshore produced water treatment plant of the Sangachal Terminal.

benefits

- Supervision of commissioning and technical support services since 2008
- Provision of analyser technician & ad hoc support services onshore / offshore since 2010





Chemical & Pharmaceutical

Ecoflow® guarantee

Wastewater treatment plants on 20 sites - worldwide



issues

- Continue production whatever the circumstances
- Eliminate the risks from plant shutdown or overload
- Benefit from certified back-up treatment solutions in every situation all year round

solution

Subscription to an annual Ecoflow® Guarantee covering 20 wastewater treatment plants sites across the world
(If for any reason the client is unable to treat its effluent, SUEZ ensures that it will be treated externally within 24 hours at a fixed price until the situation returns to normal)



benefits

- Production continuity
- Peace of mind
- Regulatory compliance



Chemical & Pharmaceutical

Mobile units emergency dispatch

Process water treatment plant -



issues

- The client used permeated water, produced from decarbonate filtered drill water, in the manufacture of ion exchange resins.
- Due to a temporary peak in production, the client needed a temporary solution adapted to the site's stringent quality requirements.

solution

- Dispatch in under 72h of a double-pass reverse osmosis mobile unit.
- The solution used reagents and membranes of similar quality than the client to comply with requirements.
- A dedicated team installed and commissioned the unit in the very short time and provided operational support.

benefits

- Speed of intervention
- Quality of service
- Production continuity





Pulp & Paper

Maintenance & Repair

Sand filtration



issues

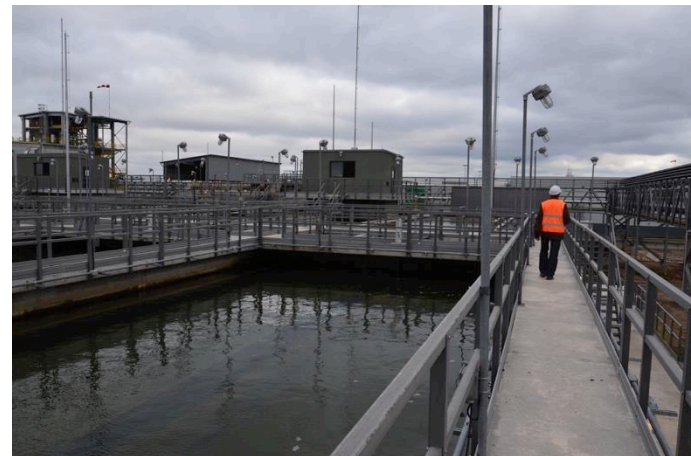
- Deficiencies in the false bottom with problems in joints and sand leaks
- Cracks and breaks in the central channel

solution

- Installation of stainless steel top collectors and vertical downspouts for aeration
- Replacement of the false bottom with high density polyethylene blocks, allowing air and water distribution

benefits

- Very noticeable reduction in filter maintenance
- Increased conservation, by eliminating the problems caused by the raising of the bottom slabs and the joints
- Improved filter performance by decreasing the number of stops, avoiding clogging problems and dead spaces between inlet filters





Chemical & Pharmaceutical

Process and hydraulic assessment

Water & wastewater treatment plants - France



issues

The client wanted to drastically reduce water consumption

solution

- In-depth assessment of the client's assets along the entire water cycle
- Detailed recommendations for water consumption reduction: Water reuse, automation optimization
- Elaboration of two scenarios to treat effluents following water consumption reduction

benefits

- Elaboration of a strategy to achieve a 50% reduction in water consumption
- OPEX and CAPEX optimization of effluent treatment





Food & Beverage

Process and hydraulic assessment

Water & wastewater treatment plants - worldwide



issues

Adapt water treatment process of 29 sites across 15 countries in order to:

- Reduce costs
- Minimize water consumption

solution

After conducting a benchmark of all sites, SUEZ identified 2 actions:

1. Re-circulate cooling water instead of discharge
2. Re-use process water in cooling systems

benefits

Identification of a strategy to achieve a 15% reduction in water consumption





Chemical & Pharmaceutical

Energy and efficiency solutions

Water & wastewater treatment plants – Global (MSA)



issues

- Maximizing economic and environmental performance all over the value chain
- Improving the energy efficiency of 112 sites globally
- Conserving resources

solution

- Partnership and integrated offer with performance obligation
- Mobilization of a broad scope of SUEZ skills
- Efficient and transparent Open Book process

benefits

- Guarantee of compliance with environmental standards
- Optimized costs
- Reduced environmental impact
- Long-term partnership for environmental performance





Downstream Oil & Gas

Revamping & upgrade

Membrane bioreactors - Rotterdam



issues

The client needed to meet new stringent discharge regulations (TSS < 1 mg/l)

solution

- Revamping of existing wastewater treatment plant
- Upgrade of biological activated treatment by Membrane Bioreactors (MBR) to implement nitrification and denitrification using Zenon membranes.

benefits

- Environmental compliance
- Largest MBR plant operational since 2007
- One of the first MBR systems in a petrochemical complex





Downstream Oil & Gas

Revamping & upgrade

Dissolved air flotation (DAF) - Antwerp



issues

- The former Degremont® DAF tank built in 1980 was at the end of its life.
- Moreover, because of a corrosive water quality, the unit was leaking, compromising the safety of the plant.

solution

- Upgrade of the existing concrete installation with an automated and robust Duplex Stainless Steel Flotation to avoid leaking
- SUEZ designed, manufactured and installed a tailor-made unit of the same dimensions

benefits

- 23% capacity increase from 270 to 350 m³/h
- New DAF operational in just a few weeks
- Increased water quality





Chemical & Pharmaceutical

Revamping & upgrade

Ozonia® ozone systems – Los Angeles, USA



issues

- An Ozonia® Ozone system (3 x Ozonia® OF) was installed for wastewater treatment in 1992
- Total ozone production was 150 kg/h
- Due to increased demand the client needed to triple capacity
- The existing equipment footprint, piping, and infrastructure needed to stay consistent because no expansion was possible

solution

- SUEZ upgraded the Ozonia® ozone system with new technology 4 times over 24 years

benefits

- Maximum capacity increased 200%, from 150kg/h to 300kg/h using the latest IGS technology
- Ozone concentration was increased from 6 wt% to 12 wt% improving efficiency and lowering OPEX
- The existing footprint, piping, and infrastructure was used requiring very low capital investments for the upgrades





Food & Beverage

Decommissioning

Demineralization plant - France



issues

In 2001, the demineralization plant on the client's site in Toulouse (France) was stopped following a large explosion.

solution

The plant was uninstalled then reinstalled on the VSPU industrial platform where SUEZ manages the water cycle for 3 chemical companies.

benefits

- Investment savings
- The demineralization plant is still in operation today

