

Wastewater Treatment Plant

E-Guide | Recommended architectures for electrical systems

START



Purpose of the

E-GUIDE

Experience Schneider Electric's complete Water Wastewater Treatment Plant approach and solutions with our digital tools, e-learning modules and much more.

We will guide you at every step through the selection and design phases of our Wastewater Treatment Plant recommended power architectures, so you can benefit today.

Schneider Electric can also provide the digital twin for automation process architecture, please connect with your point of contact or our web site.



Life Is On

Schneider
Electric

WASTEWATER TREATMENT PLANT

Water Industry and Market analysis

Major challenges to water
and wastewater operators

Keys for sustainability and
resilience

Sub-segments of Water
and Wastewater market

GO

Build Sustainability and Resilience

Let's find out the
Schneider Electric value
proposition for key
personas and our
differentiation by Digital
transformation.

GO

Know & understand Wastewater Treatment Plant

Key figures and market
challenges about
Wastewater Treatment
Plants and critical steps of
the process.

GO

Recommended Architectures

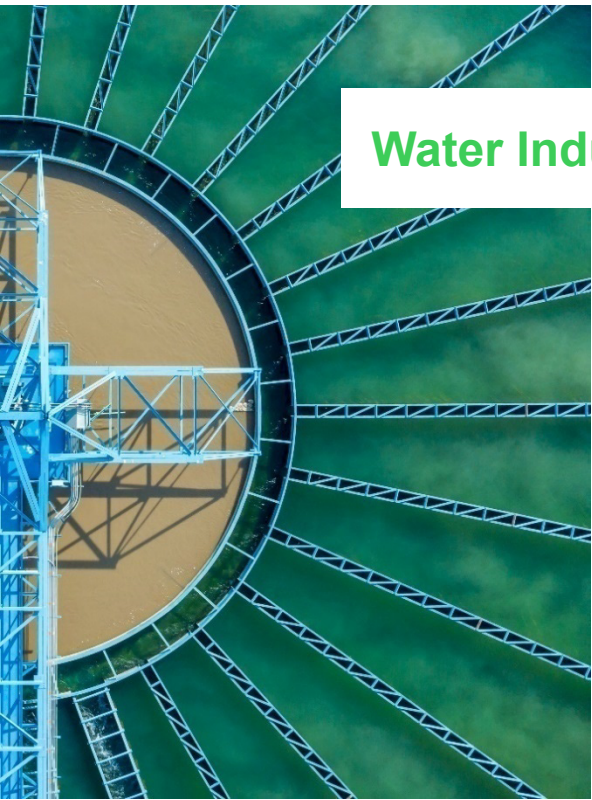
Radial or open-loop, multi-
source or microgrid, and
related offers.

GO

Go further

Upscale your awareness with
additional technical resources
written by our Water and
Wastewater segment experts.

GO



Water Industry and Market analysis

Key content to get a quick overview of today's water industry context:

- Trends and challenges
- Water industry sub-segments

GO



PDF leaflet



Video



On-line course



Blog

Focus on Digitization

-  [Now is the time to digitize your WWW facility: Here's why and how](#)
-  [Holistic motor management: A key for driving Water & Wastewater industry digitization benefits](#)
-  [Unifying your water and wastewater operations](#)



Water & Wastewater industry trends and challenges



Climate change



- **4%** of total electricity consumption and **3-10%*** of global GHG emissions from the water industry
- **70%** of the impact of climate change will be felt through the water cycle

Water resources management



- **40%** gap in water supply by 2030
- **30%** water loss globally
- **70%** water in agriculture, ecosystems protection
- **20%** water in industry, Zero Liquid Discharge
- **Net zero pollution**, new contaminants regulation

Water circularity



- **Water reuse** potential untapped
- **Reduce waste**, recovery of resources
- **Develop** links to other sectors, new business
- **Water stewardship**

Consumer-centric business



- **Demands driven** from empowered consumer
- **More services** from utilities
- **Microbiology** and quality parameters

Digital revolution



- **Cybersecurity** vulnerabilities, attacks increasing
- **New business models**
- **Systems interoperability**

*Estimation for scopes 1, 2, 3. For scopes 1 and 2: 2% of global GHG (GWI, 2022)



Sub-segments of water industry



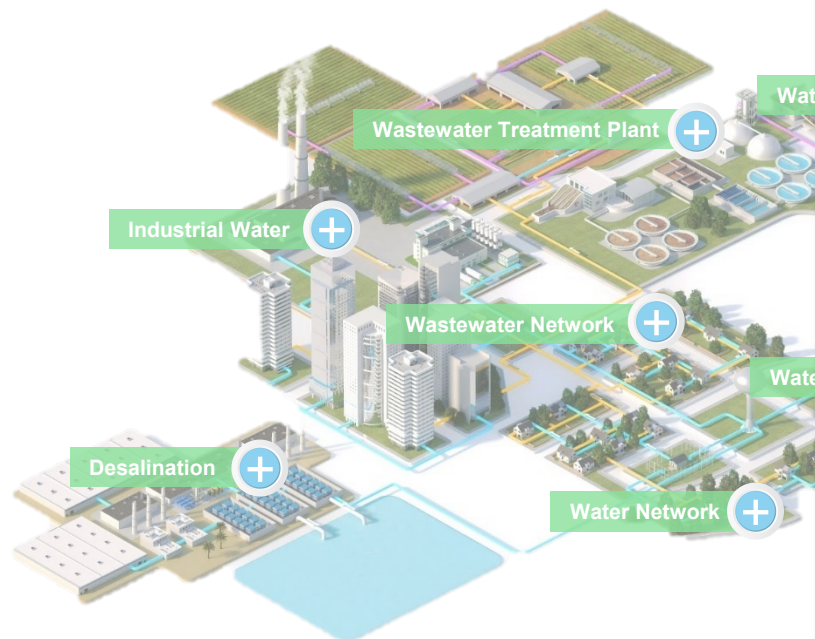
We deliver key
benefits to

**7 key sub-
segments**



We deliver key
benefits to

**7 key sub-
segments**



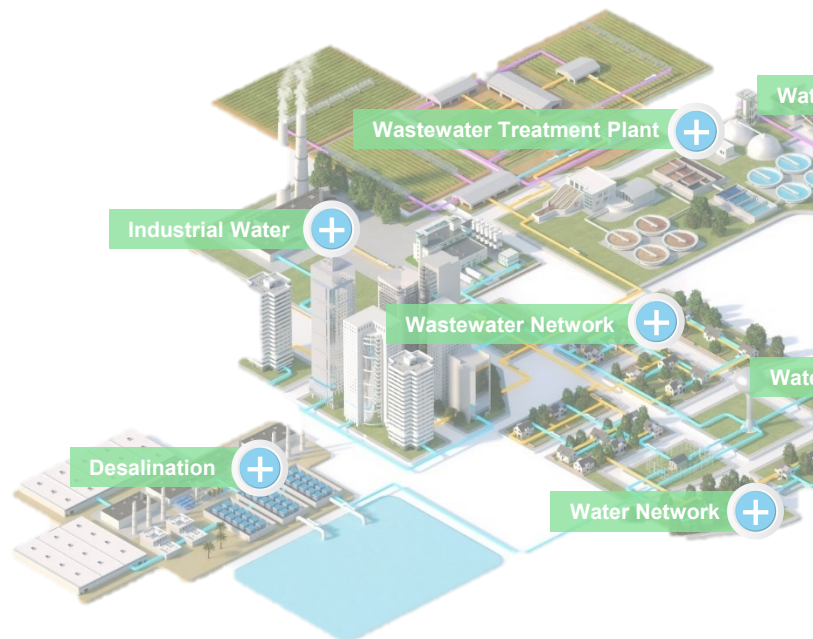
Our solutions to

Water Resources

Ensure source and bathing water quality, optimize strategies for drought and flood management with integrated telemetry, real-time monitoring and decision-support solutions for natural water resources

We deliver key
benefits to

**7 key sub-
segments**



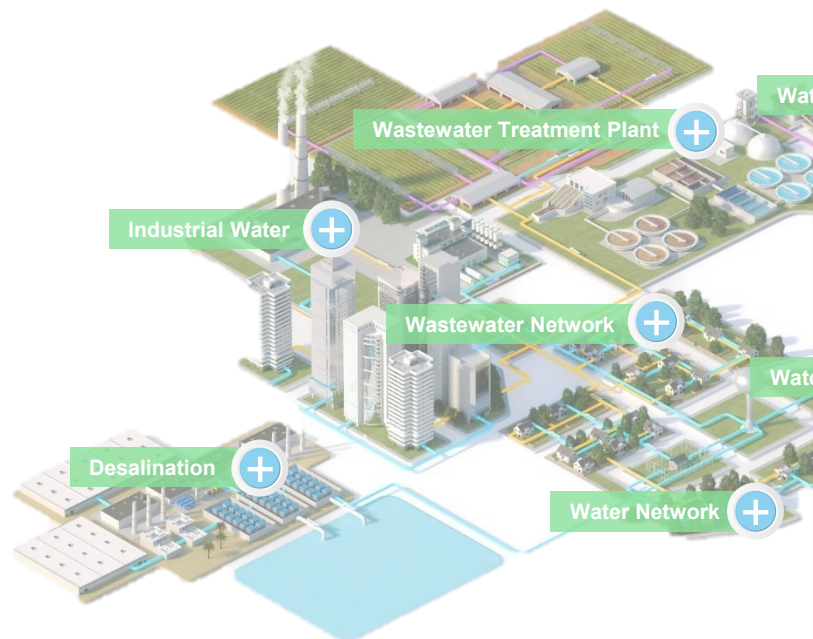
Our solutions to

Desalination Plants

Reduce costs and risks in running those highly power consuming, expensive processes by providing safe, reliable, and efficient energy and automation solutions, powered by analytics to optimize and decarbonize the process.

We deliver key
benefits to

**7 key sub-
segments**



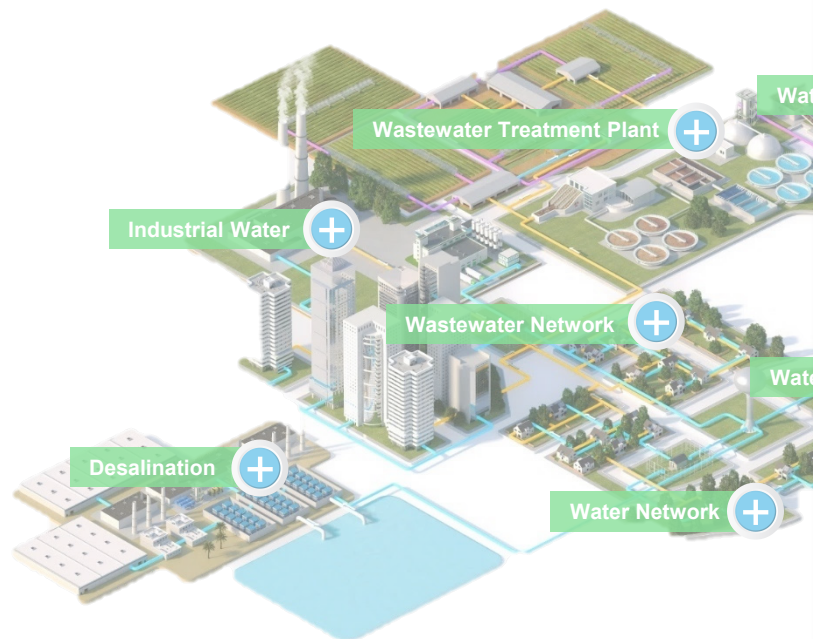
Our solutions to

Water Networks

Develop strategies and implement Smart Water networks to reduce leakage and power consumption, and improve efficiency, longevity, and reliability of the water network infrastructure, ensuring water quality

We deliver key
benefits to

**7 key sub-
segments**



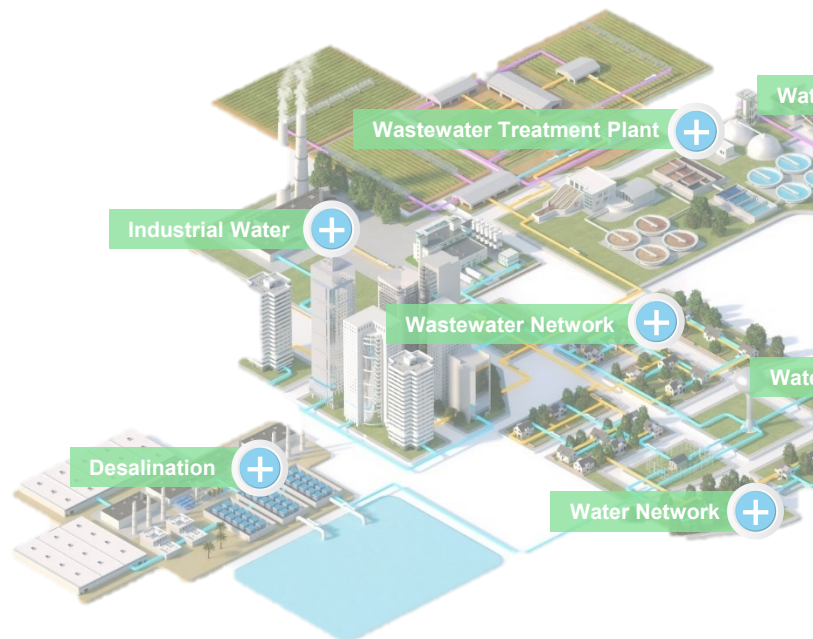
Our solutions to

Wastewater Networks

Simulate and manage the remote infrastructure through Smart Wastewater networks to reduce flooding and sewer overflows for climate resilience and compliance, and to optimize pumping for energy and carbon savings.

We deliver key
benefits to

**7 key sub-
segments**



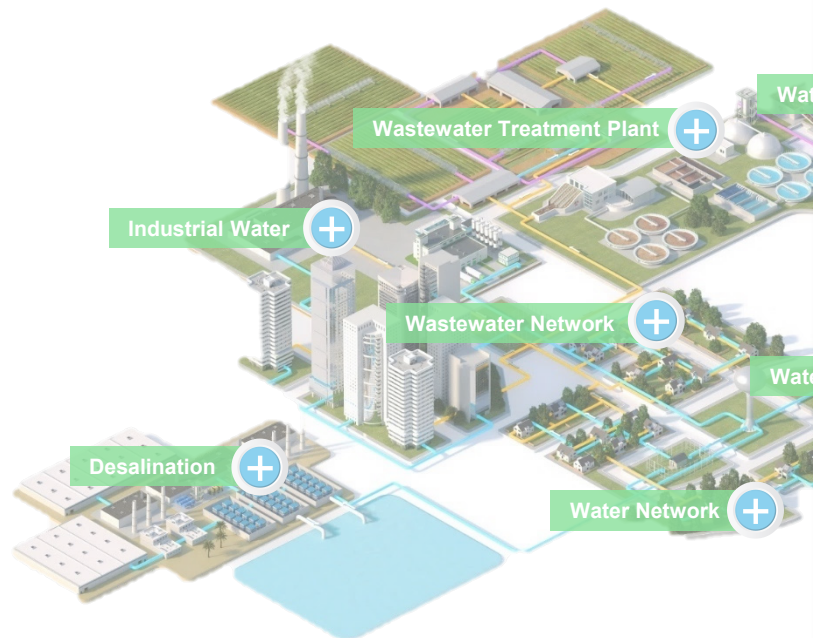
Our solutions to

Water Treatment Plant

Ensure continued production of clean water and optimal operations reducing energy and chemicals, based on our integrated power and process management approach.

We deliver key
benefits to

**7 key sub-
segments**



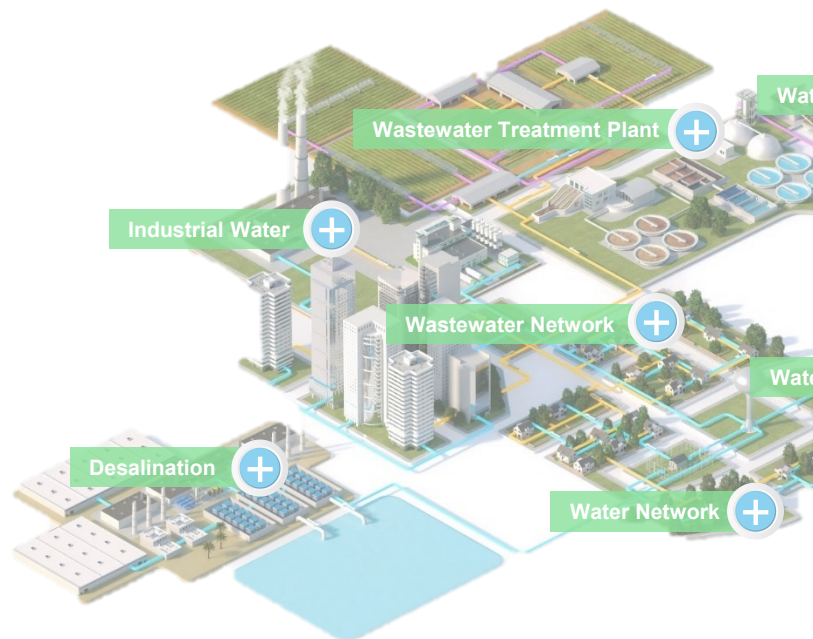
Our solutions to

Wastewater Treatment Plant

Implement cutting - edge solutions and services for asset management, energy consumption optimization, operation efficiency and carbon reduction. As for other segments, data management through analytics is at the core of the added value delivered

We deliver key
benefits to

**7 key sub-
segments**



Our solutions to

Industrial Water

Industry takes up to 22% of total water consumption and is growing faster than municipal market. Deploy technologies to improve process and power efficiency to comply with local regulation (wastewater treatment, discharge, water purification,...), manage water scarcity (desalination,...) and achieve sustainability (water intakes, water re-use,...). Multiple industries are concerned: energies & chemicals, mining, pharmaceutical, microelectronics,...



Build sustainability and resilience

Let's find out in several applications how technologies – connected products, edge control, analytics & services - can enable sustainability and resilience objectives achievement.

[GO](#)

Customer stories

 [Thermal Padania Acque](#) [Thermal Padania Acque](#) [Kunming CGE Water](#)

Videos

 [Thermal Sensors Help Detect Faults in Power System Electrical Connections | Schneider Electric](#) [Digital Transformation of Power Systems Explained](#)

PDF Leaflet

 [How SF6 Alternatives and Digital Technologies Combine to Empower Electricity Decarbonization and Efficiency](#)[PDF leaflet](#)[Video](#)[On-line course](#)[Blog](#)



Our sustainability promise to Water industry players

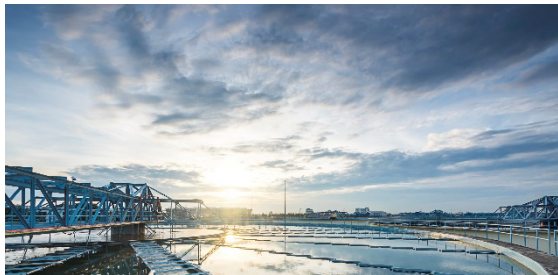


Our sustainability promise to Water Wastewater customers towards Net Zero Water



Net Zero GHG emissions

Energy Efficiency
and Carbon-Neutrality



Water Conservation

Water Efficiency and Resilience
by Digital



Net Zero Waste

Circularity and Biodiversity

Sustainable objectives*

* 5 objectives (among a list of 17) defined by the United Nations in terms of sustainability

6

Clear water and
sanitation

9

Industry, innovation
and infrastructure

11

Sustainable cities
and communities

13

Climate action

14

Life below water

Net Zero GHG emissions

We support water utilities towards **energy efficiency and GHG* net zero journey** by combining energy and process **from strategy to execution**

* Greenhouse gas

Enterprise climate strategy to meet customer's ambition aligned with **Science-Based Targets** initiative.

With our partners we address **key processes for energy efficiency and decarbonization** of WWW operations.

Reduce energy use by **15-30%** and GHG emissions with **digitization and power & process** efficiency plans.



Water Conservation & Resilience

We help to **preserve the water resource and boost efficiency and climate resilience** of the wet infrastructure by digital technologies and services across the water cycle

End to end approach to unlock the sustainability potential of **Digital Transformation**.

We partner with market leaders to provide **cybersecure digital continuity** and **smart water applications** across the asset lifecycle, from site to enterprise.

Save water by **10%**, **energy by 15%**, **reduce pollution events by 35%**, **increase asset availability and efficiency** with **digitization**.



Net Zero Waste

With our partners we support companies to manage water and waste to **maximize resource circularity and achieve Zero Impact**

Water resources stewardship to protect natural water bodies and agriculture.

Innovative solutions for industrial water large and skid/package applications **leveraging software centric automation, smart apps** for Process OEM.

Save water by reuse, industrial Zero Liquid Discharge, recover energy and resources for **Zero Waste**, eliminate hazardous chemicals from process.

Solutions for the Complete Water Cycle

Sustainability Consulting Services

Energy & carbon strategy and solutions
Green energy sourcing

Decarbonization Solutions

Integrated Power and Process
Power Automation
Smart Electrical Distribution
Microgrid solutions

Smart water cycle management

Digital twin for plant and network
Pumping Energy Optimization
Water loss management
Treatment process optimization
Urban drainage management
River basin management
SCADA & Telemetry

Digitization Services & Solutions

Digital Transformation consulting
Cybersecurity services
Digital Technology platform

Asset performance

Asset health monitoring
Digital services, service plan



Process technology upgrade / asset renovation

Partnerships with Global service players
Low environmental impact products

Smart design & build

Smart engineering with integrated sustainability
Electrical design
Plant/network simulation
Construction management with 6D

Water & Environment

Water balance for industrial application
District energy management
Waste management for resource recovery



Know & understand Wastewater Treatment Plant

Key content to upscale your awareness on:

- Key figures, customer needs and challenges
- Critical process steps

GO



PDF leaflet



Video



On-line course



Blog

Customer story



[Veolia Water](#)

Focus on Motor Management



[4 Cybersecurity Practices for the Water and Wastewater Industry](#)

E-learning for Partners on 'mySchneider'



[From Electric Motor to Motor Applications](#)



20 minutes



[Water and Wastewater Value Proposition: Water Conservation and Decarbonization](#)



35 minutes

White Paper



[Accelerating Digital Transformation of the Water and Wastewater Sector](#)

Wastewater Treatment Plant Key Figures

Water Technology Market for Utilities



Spending in 2023



Spending for
Wastewater Treatment



Investment in Digital
solutions @8% growth

WWTPs Regional Footprint



Above 90% of 42K+ WWTPs
serve < 100,000 PE

WWW Technology Market - Utility

WWTPs Regional footprint



Plants generally in use
for 50...100 years,
typically requiring some
repair or upgrade after
25-30 years.

The 6 largest
Wastewater Treatment
Plants range from 2.8 to
5.5M m³/day* are in
Egypt, USA, UK,
Russia and China.

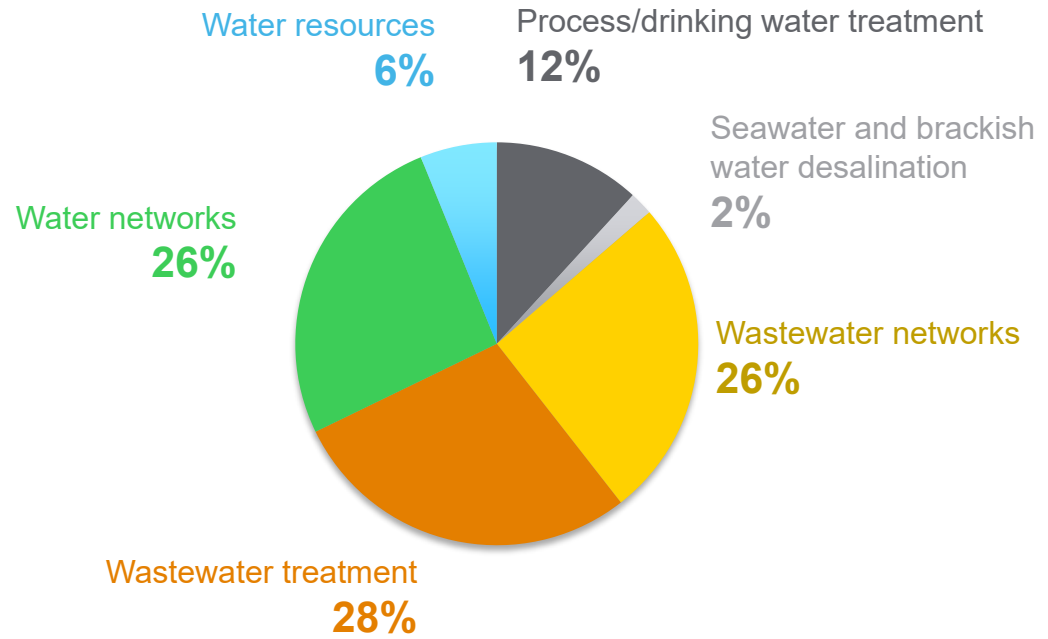
*1M m³ serves approx. 3M people



WWW Technology Market - Utility

Total investment in technology (split by subsegment) in 2024.

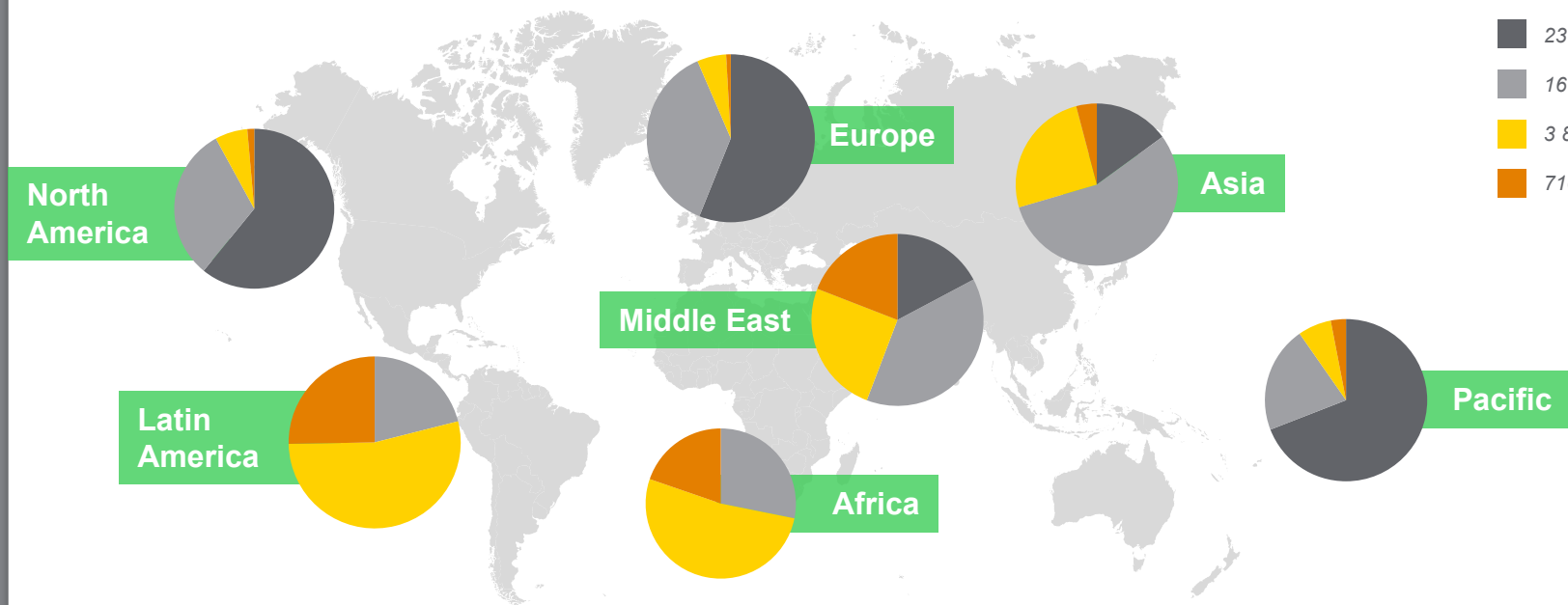
Technology includes:
digital, fluid handling, dissolved solids removal, physical chemical treatment, disinfection, sludge mgmt., biological treatment





WWTPs Regional footprint

42K+ WWTPs, above 90% serve < 100,000 PE



Wastewater Treatment Plant Key Figures

Global GHG emissions



Come from Water and Wastewater industry



Due to energy consumption
(4% of global energy consumption)



WWTP represent ~20% of global water industry electricity consumption
(up to 70% for aeration)

Energy used in Wastewater Treatment



Energy used in wastewater treatment is 1/3 of the total operational spending

Global GHG emissions

OPEX WWTP



Wastewater can generate biogas, heat, and electricity.

It can produce about **five times more energy than is required for its treatment** – enough to provide electricity for **around half a billion people per year**.

([UNEP, 2023](#))



Global GHG emissions



N₂O from WWTPs make
6% of world's emissions



CH₄ from wastewater
7 – 10% of world's emissions

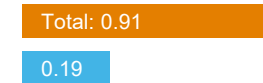
Global totals Energy consumption (TWh/year)



Total = 3.7% of global electricity consumption (EIA, 2018 est.)

Global averages Energy intensity (avg. kWh/m³)

Water resources
(conventional)



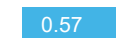
Water
treatment



Desalination



Water
networks



Wastewater
networks



Wastewater
treatment

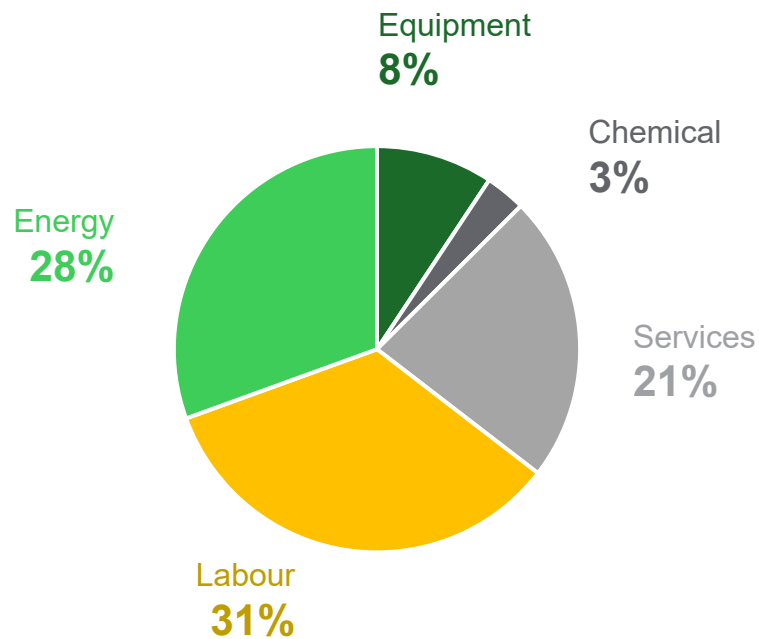


Sludge
treatment



Desal = more than the electricity consumption of Chile (75 Twh)

*in kWh/tDS (gross energy consumption)

OPEX WWTP

Wastewater Treatment Customer needs and challenges



Reduce GHG

direct emissions from treatment process (scope 1) and indirect from energy consumption (scope 2)

Comply with Regulations

which are accelerating the shift to more sustainable water management and more complex treatment processes

Expand Capacity

within limited available footprint

Energy Efficiency / Neutrality

to reduce OpEx and decrease dependency

Increase Circularity

WWTPs as bio factories, to process waste and recover resources

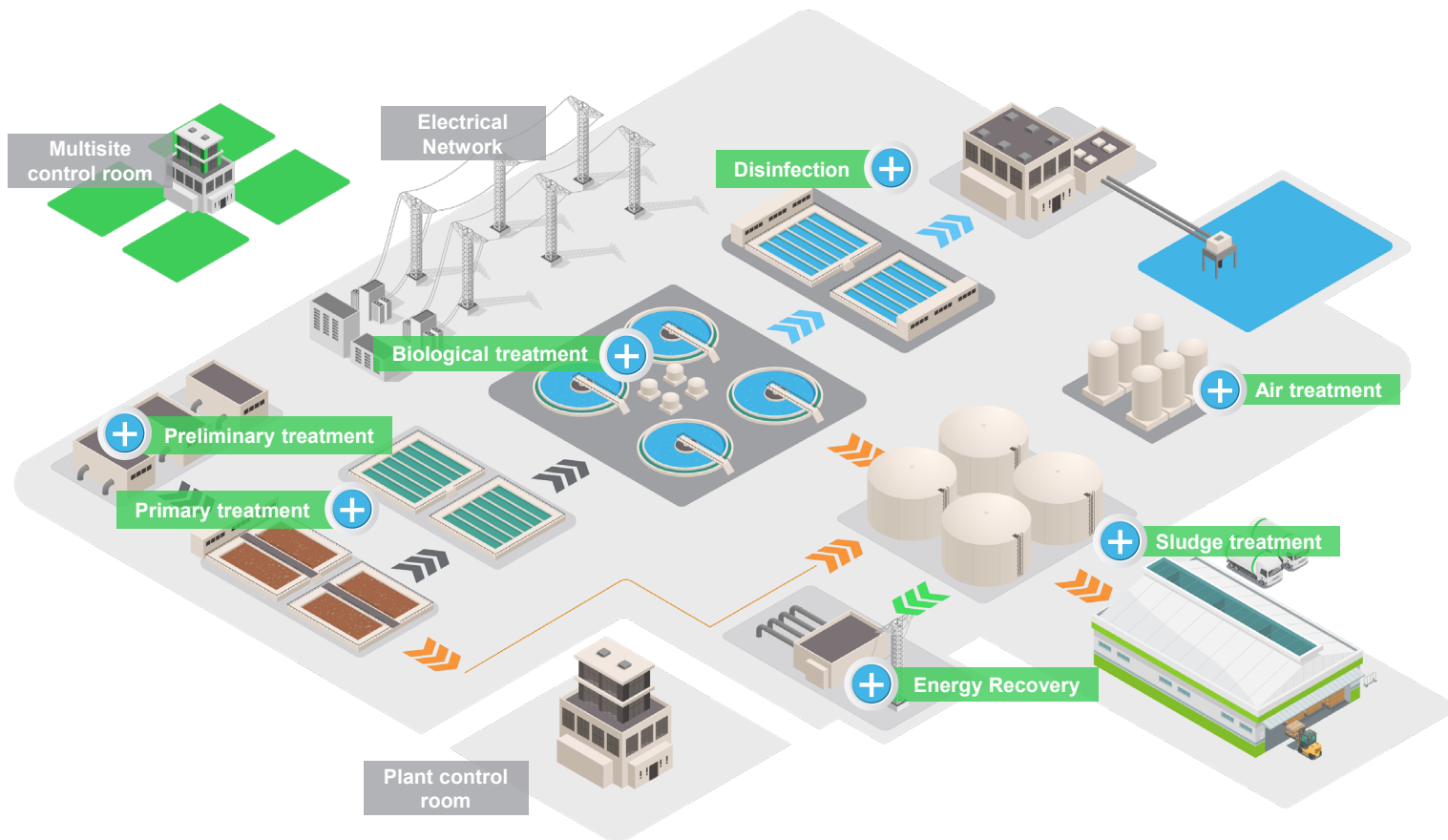
Increase Resilience

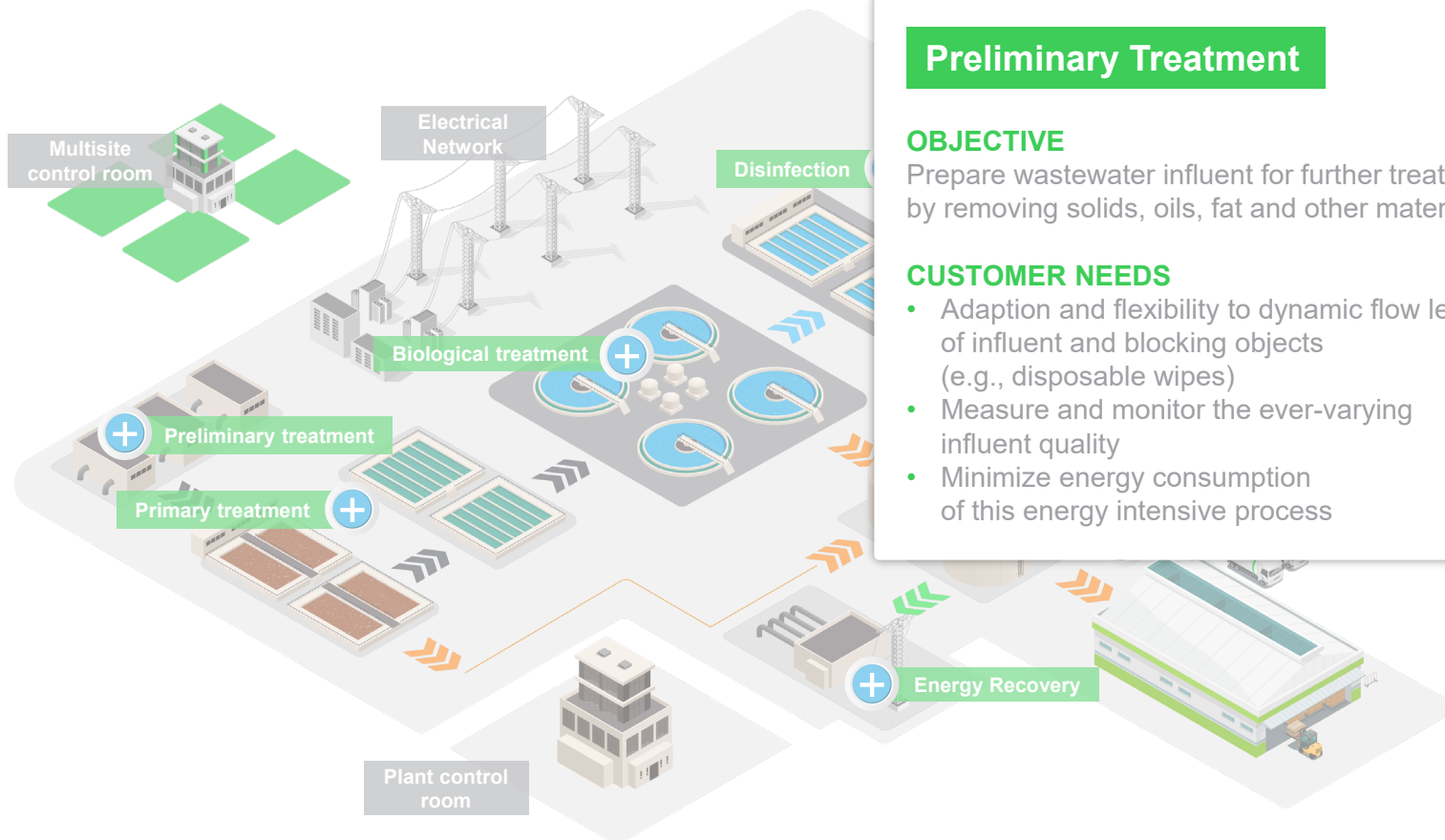
of assets and optimize operations under variable conditions ensuring water quality



Wastewater Treatment Plant: Process steps







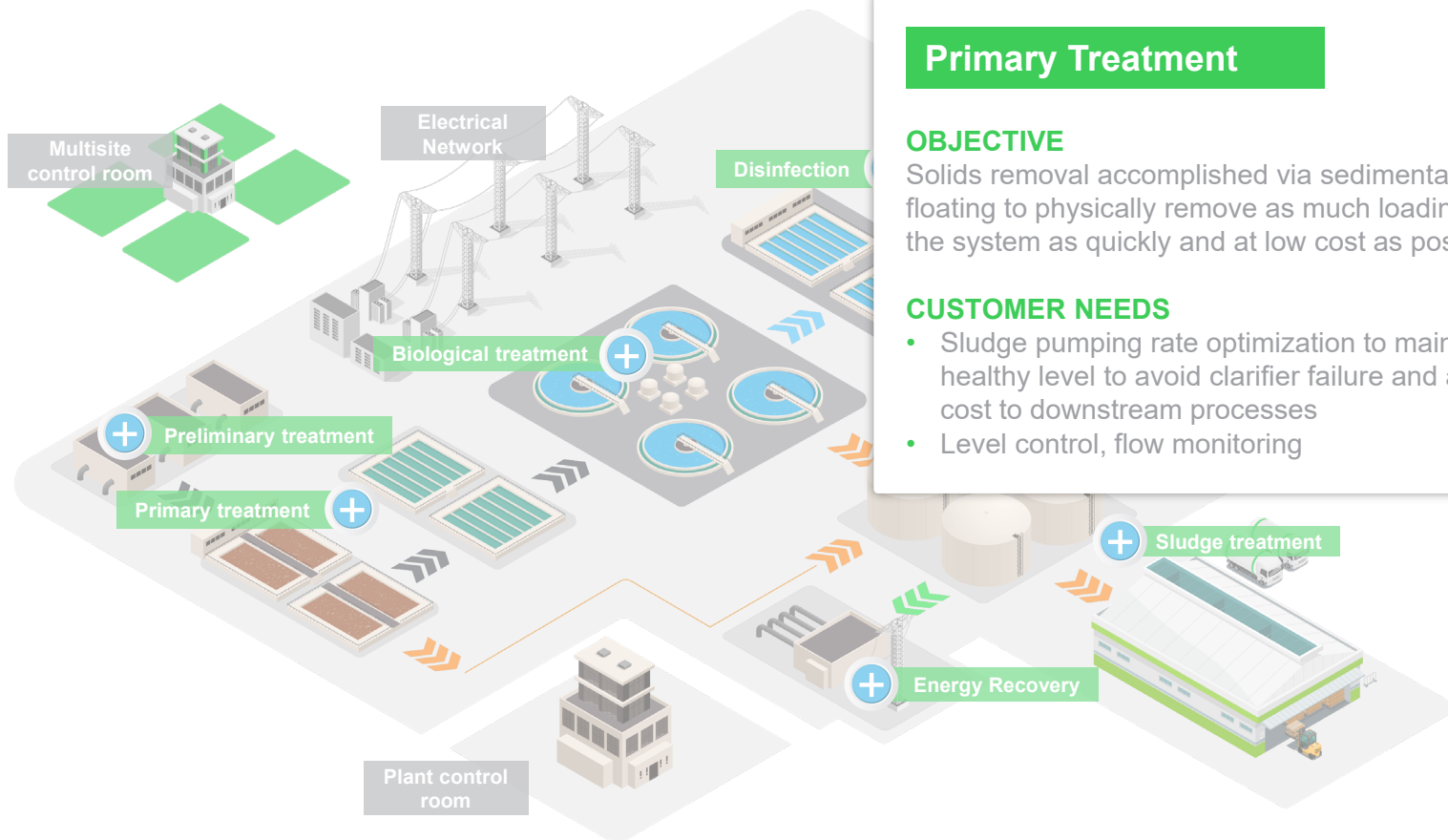
Preliminary Treatment

OBJECTIVE

Prepare wastewater influent for further treatment by removing solids, oils, fat and other material

CUSTOMER NEEDS

- Adaption and flexibility to dynamic flow levels of influent and blocking objects (e.g., disposable wipes)
- Measure and monitor the ever-varying influent quality
- Minimize energy consumption of this energy intensive process



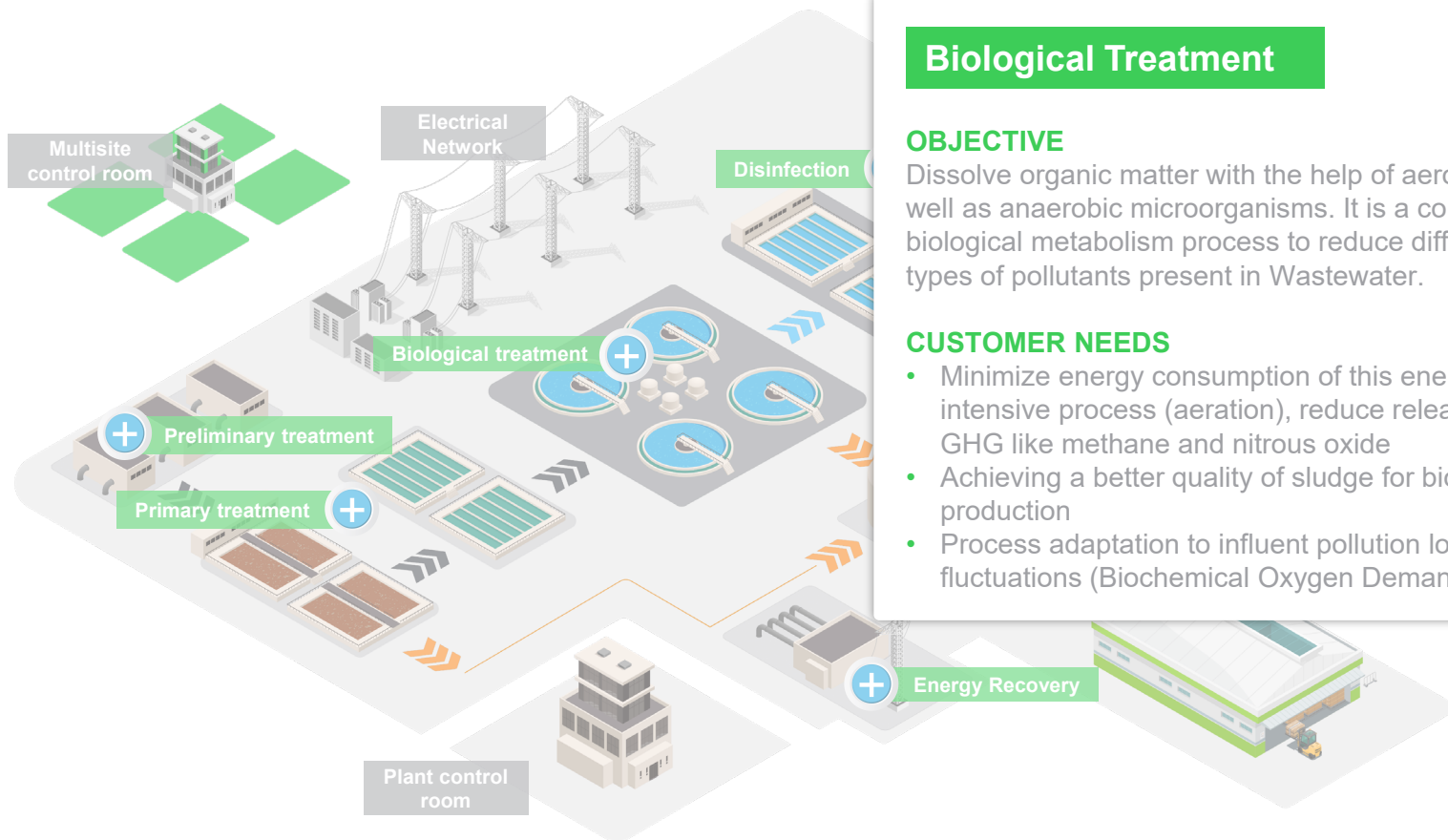
Primary Treatment

OBJECTIVE

Solids removal accomplished via sedimentation or floating to physically remove as much loading from the system as quickly and at low cost as possible.

CUSTOMER NEEDS

- Sludge pumping rate optimization to maintain healthy level to avoid clarifier failure and added cost to downstream processes
- Level control, flow monitoring



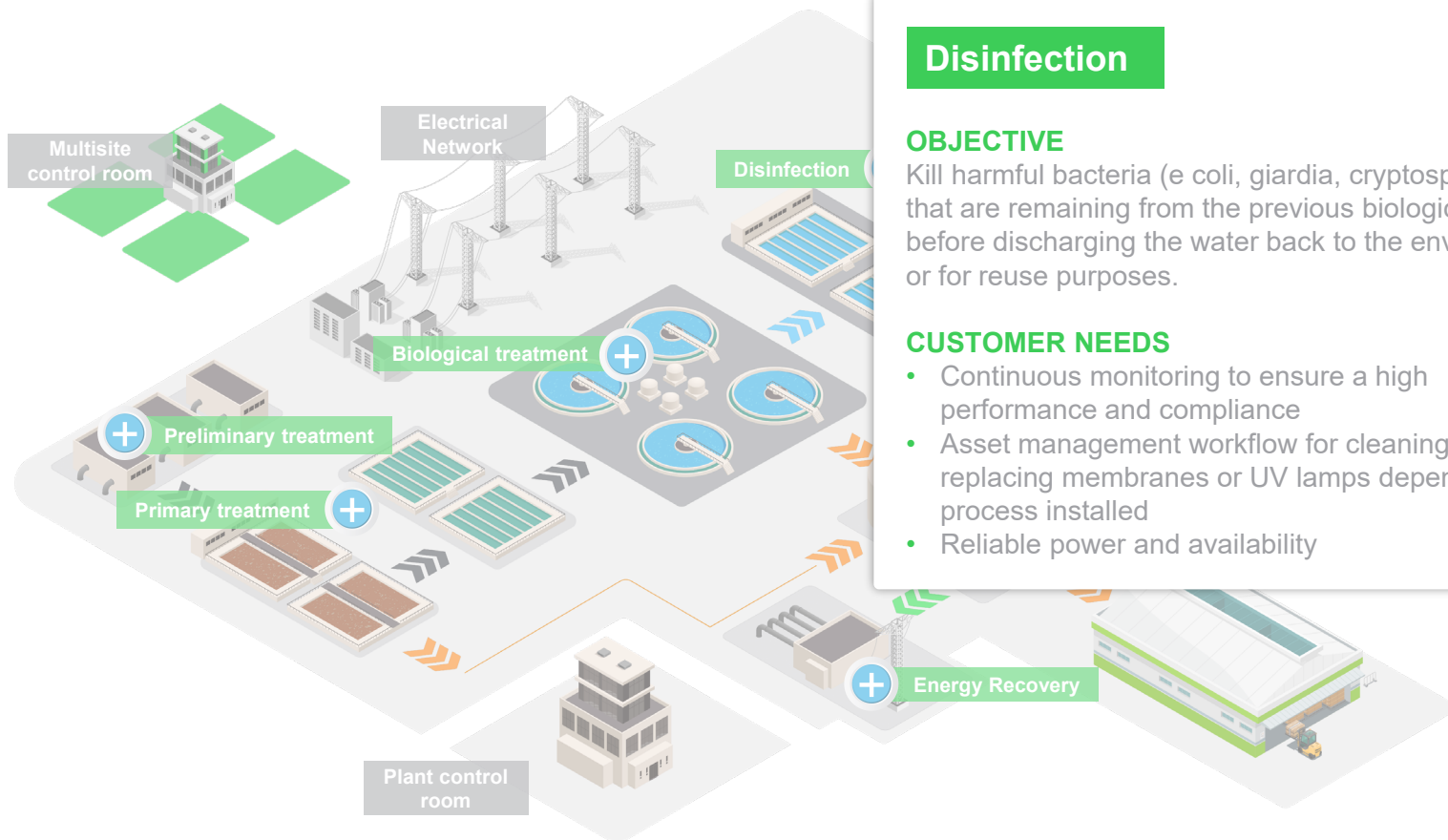
Biological Treatment

OBJECTIVE

Dissolve organic matter with the help of aerobic as well as anaerobic microorganisms. It is a continuous biological metabolism process to reduce different types of pollutants present in Wastewater.

CUSTOMER NEEDS

- Minimize energy consumption of this energy intensive process (aeration), reduce release of GHG like methane and nitrous oxide
- Achieving a better quality of sludge for biogas production
- Process adaptation to influent pollution loading fluctuations (Biochemical Oxygen Demand)



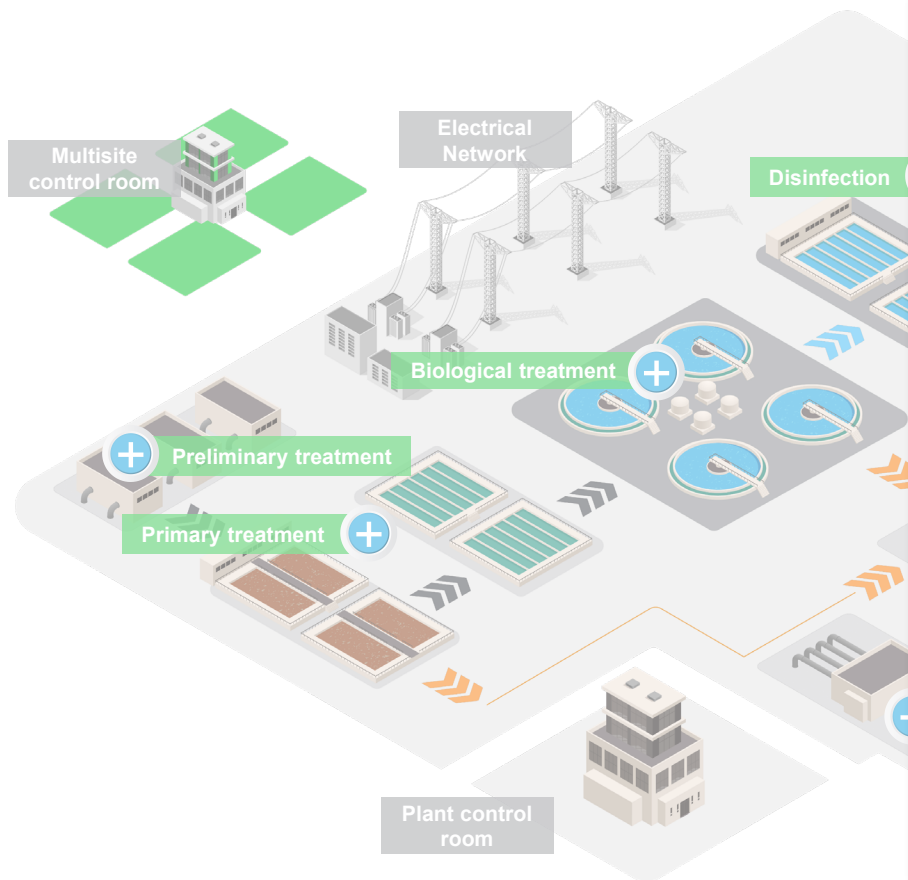
Disinfection

OBJECTIVE

Kill harmful bacteria (e coli, giardia, cryptosporidium) that are remaining from the previous biological stages before discharging the water back to the environment or for reuse purposes.

CUSTOMER NEEDS

- Continuous monitoring to ensure a high performance and compliance
- Asset management workflow for cleaning or replacing membranes or UV lamps depending on process installed
- Reliable power and availability



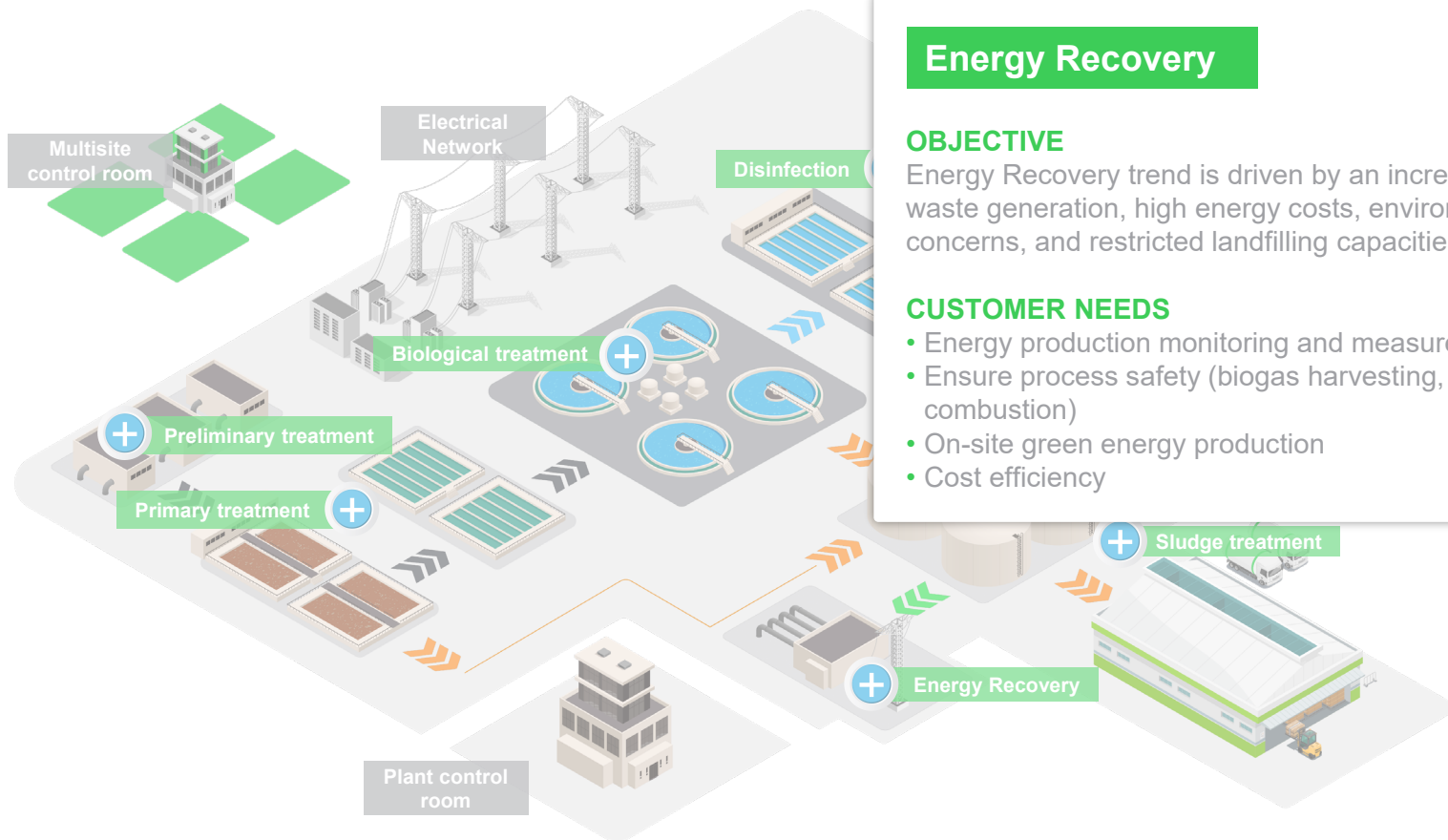
Sludge Treatment

OBJECTIVE

Minimize amount of sludge to be handled and its related transportation costs, a large proportion of water contained in sludge shall be removed. Manage sludge produced during Wastewater treatment to reduce or remove potential health risks, remove water contained in sludge, reduce its weight and volume, and collect products or by-products. This is achieved by sludge thickening, sludge dewatering processes and anaerobic digestion

CUSTOMER NEEDS

- Ensure safety process
- Pump optimization and efficiency
- Dynamic control system with feedback and monitoring
- Reduced operational costs
- Proactive maintenance
- Increase global plant energy efficiency by producing energy from sludge, balancing energy consumption
- Avoid methane leakage in anaerobic digestion



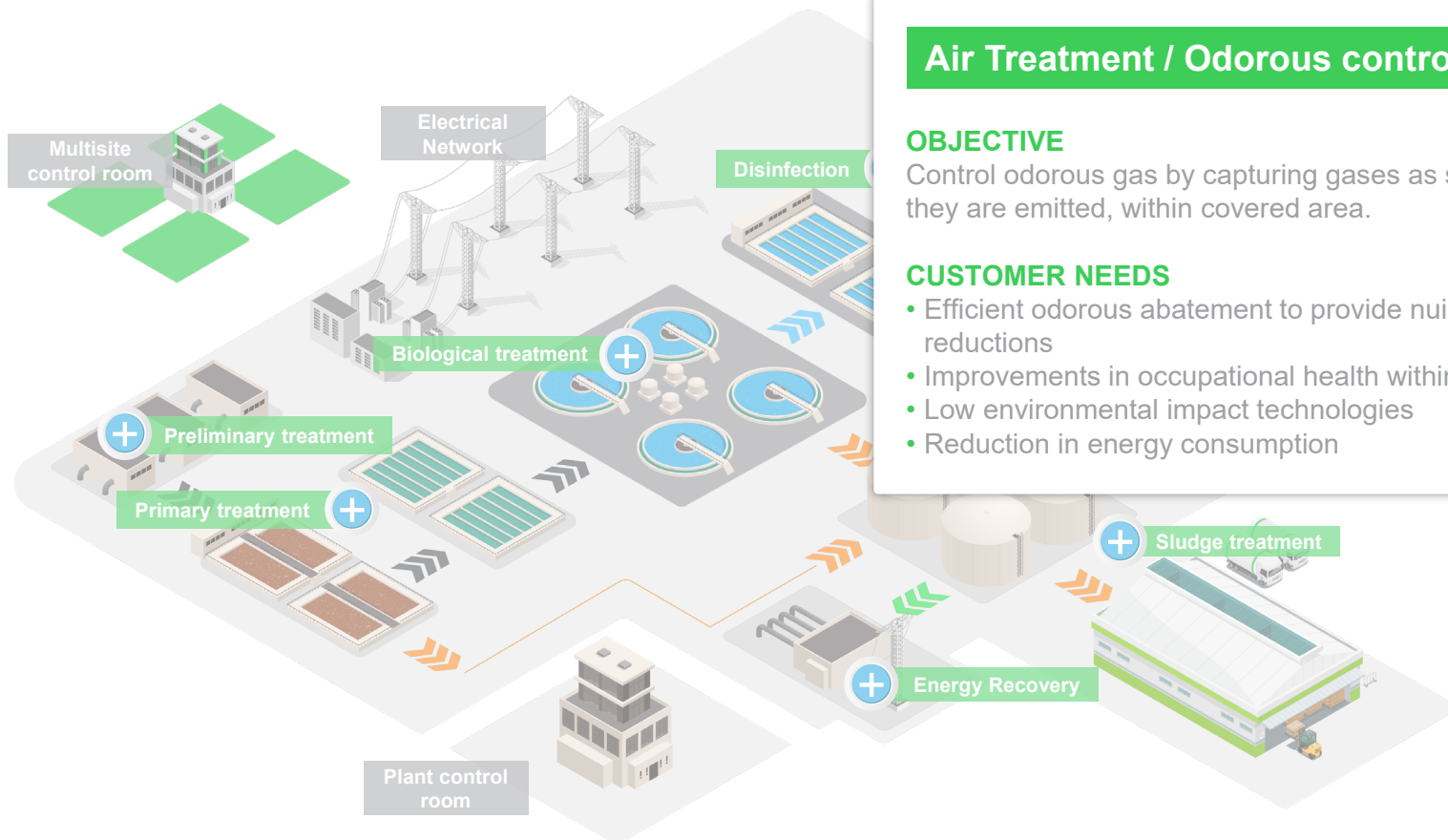
Energy Recovery

OBJECTIVE

Energy Recovery trend is driven by an increasing waste generation, high energy costs, environmental concerns, and restricted landfilling capacities

CUSTOMER NEEDS

- Energy production monitoring and measurement
- Ensure process safety (biogas harvesting, thermal combustion)
- On-site green energy production
- Cost efficiency



Air Treatment / Odorous control

OBJECTIVE

Control odorous gas by capturing gases as soon as they are emitted, within covered area.

CUSTOMER NEEDS

- Efficient odorous abatement to provide nuisance reductions
- Improvements in occupational health within the plant
- Low environmental impact technologies
- Reduction in energy consumption



Define Wastewater Treatment Plant Architecture

Considering this challenging context, it is more important than ever for Wastewater Treatment Plant to have a reliable and scalable electrical architecture.

A standardized electrical architecture:

- Improves availability, reduce costs, and improve flexibility.
- Uses components and systems in an optimized manner so that Schneider Electric can improve cost, footprint and reliability.
- Has been pre-engineered and validated to ensures reliable and compliant architecture.

This makes it easier to find and purchase the components and systems you need, and it also makes it easier to integrate them into existing or new systems.

This guide presents architectures for plants above 100 000 Population Equivalent (PE).

[Show the different architectures](#)

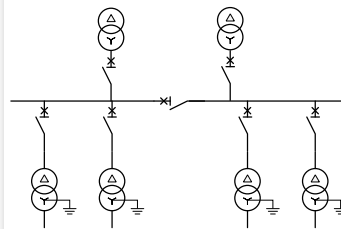


Wastewater Treatment Plant Recommended Architectures

Schneider Electric distinguishes **2 typical electrical architectures** for Wastewater Treatment Plant Applications.

Radial double feeder

This architecture is the most classical with proven reliability. The redundant feeders ensure a continuous supply of connected loads.

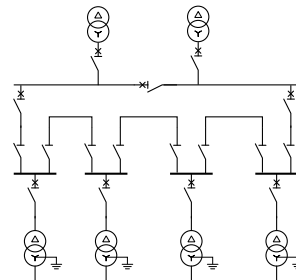


Single source

Microgrid

Open loop

This innovative architecture brings the possibility to add the automatic reconfiguration, without the need of human intervention. Each loop is cost effective below 12 MVA.



Single source

Microgrid



RM Airset



Select Architecture

DISPLAY

PRODUCTS OFF ☐ ON

DIGITAL LAYER **OFF** ☐ **ON**

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

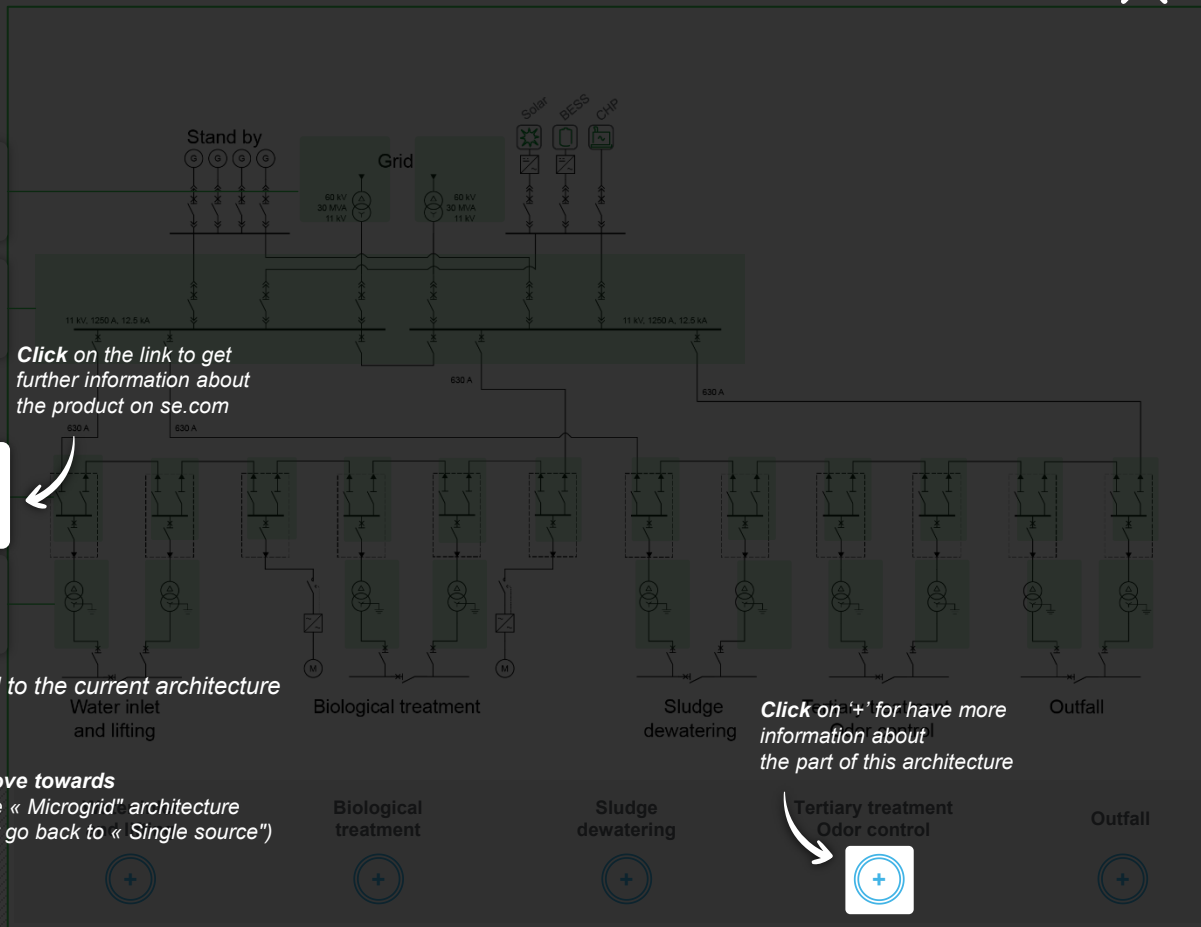
MICROGRID

Display/Hide all products related to the current architecture

Click on the link to get further information about the product on se.com

Move towards
the « Microgrid" architecture
(or go back to « Single source")

Click on + for have more information about the part of this architecture



OPEN LOOP

ARCHITECTURE

MICROGRID

Open loop architecture:

- up to 12MVA 11kV per loop
- 4 x 630A MV feeders + 12 x RMU
- Compact MV Switchboard and Substation

Major advantages:

- Flexible cable routing, suitable for extended infrastructure site
- Short 630A cable lengths
- Easy possible extension per loop (no substation modification nor process interruption)

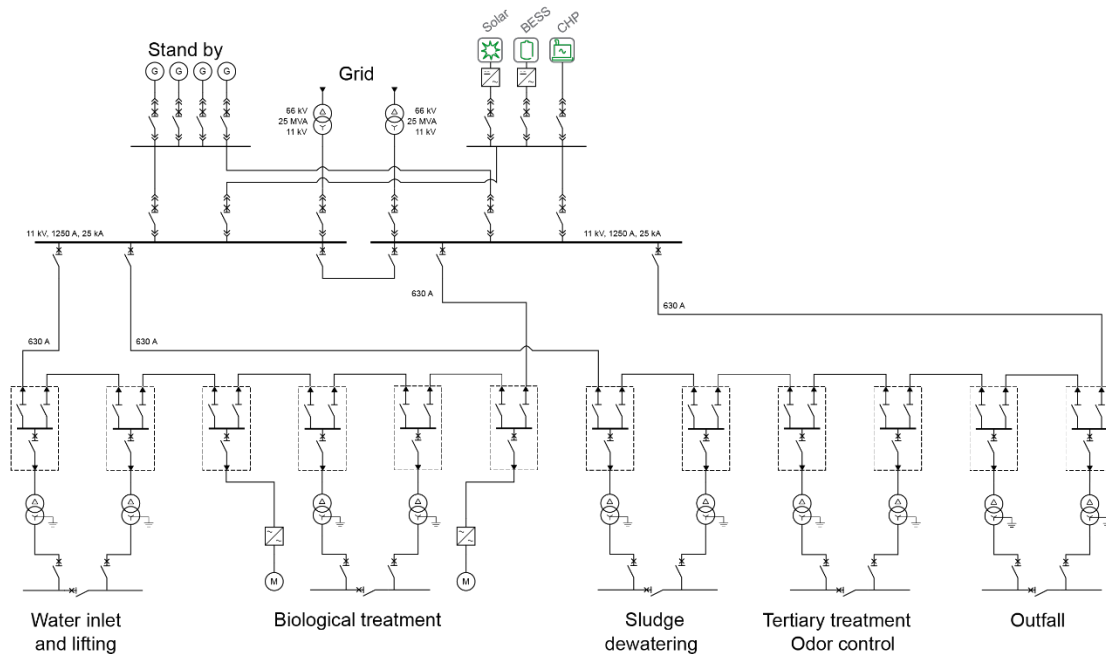
Sustainability:

- equipment fit for purpose: no over sizing
- Architecture **compliant with SF6 free offer**

Reliability: process continuity during maintenance or single major fault with **automatic reconfiguration**

Microgrid

- Energy **cost optimization**
- Reduces **carbon footprint**
- Short-term continuity enabler
- Process continuity enabler



DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

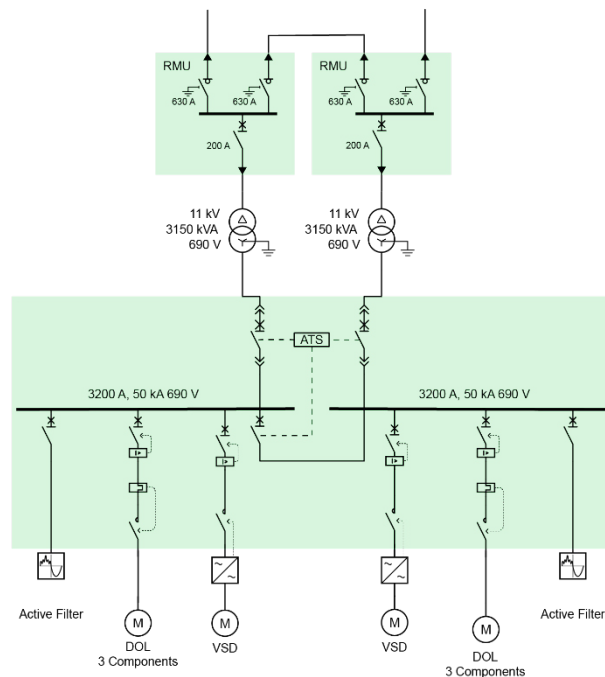
OUTFALL

Can supply water inlet and lifting up to 2000 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW or Direct On Line.



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

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Outfall



OPEN LOOP

ARCHITECTURE

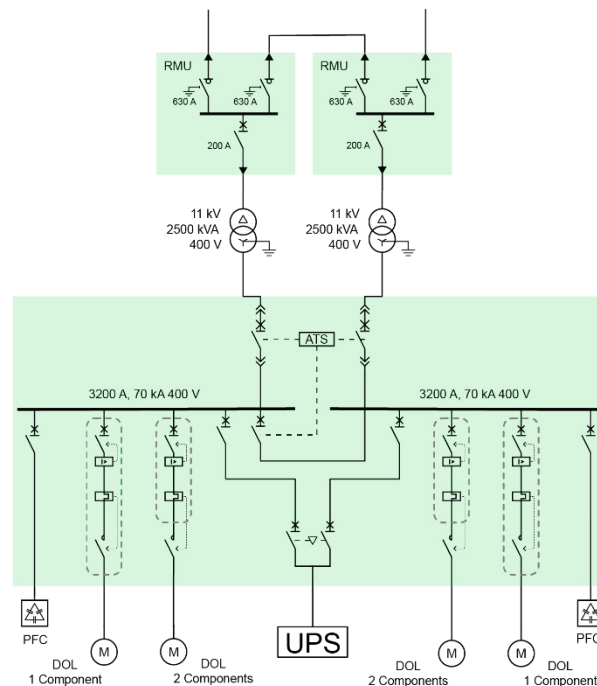
TERTIARY TREATMENT ODOR CONTROL

Can supply water inlet and lifting up to 1500 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Direct On Line 1 component up to 15 kW

Direct On Line 2 components up to 55 kW



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

[RADIAL](#)[OPEN LOOP](#)

MICROGRID

[SINGLE SOURCE](#)[MICROGRID](#)

Water inlet
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Biological
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Outfall



OPEN LOOP

ARCHITECTURE

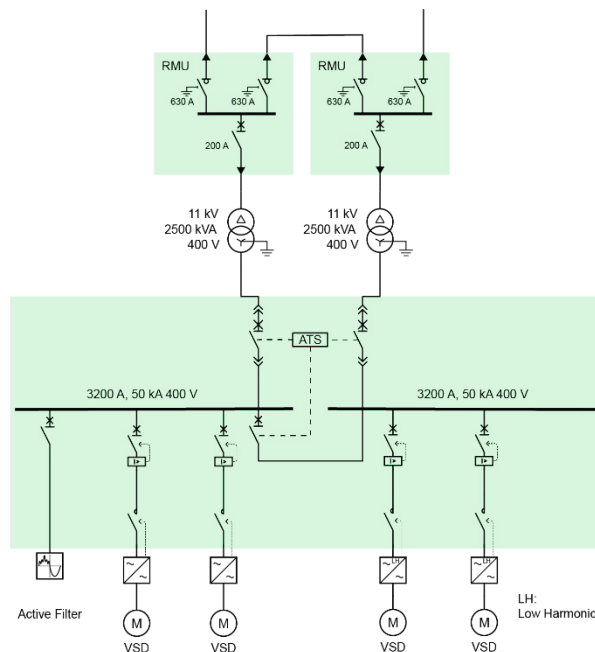
SLUDGE DEWATERING

Can supply water inlet and lifting up to 1500 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

VSD driven motor from 0,75 to 1200 kW.

VSD with the Low Harmonic option do not need any harmonic compensation of an active filter.



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

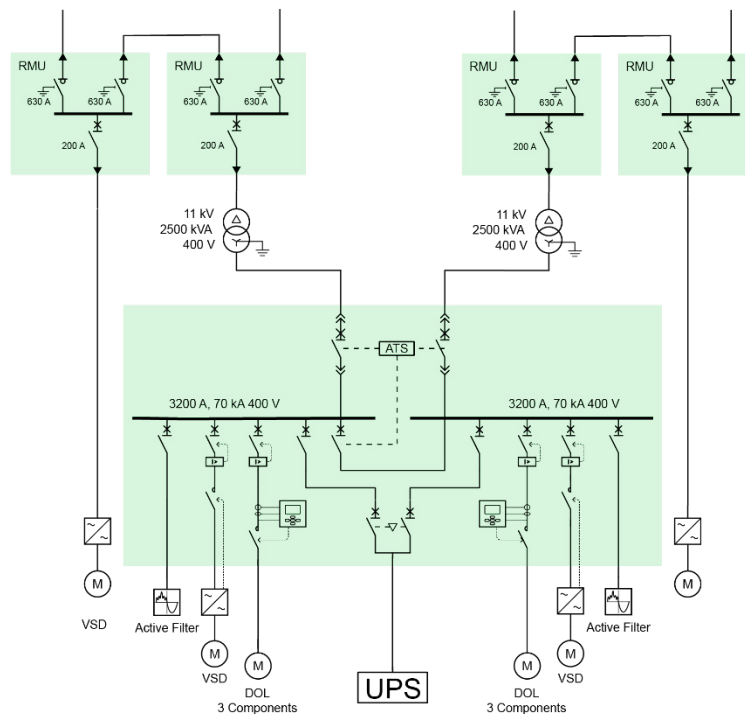
ARCHITECTURE

BIOLOGICAL TREATMENT

Can supply biological treatment up to 6500 kW
The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

VSD or Direct On Line for motors from 0,75 to 1200 kW while the medium voltage can supply the most powerful motors for blowing up to 2 x 2500 kW.

UPS to support 150 kW critical loads



DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

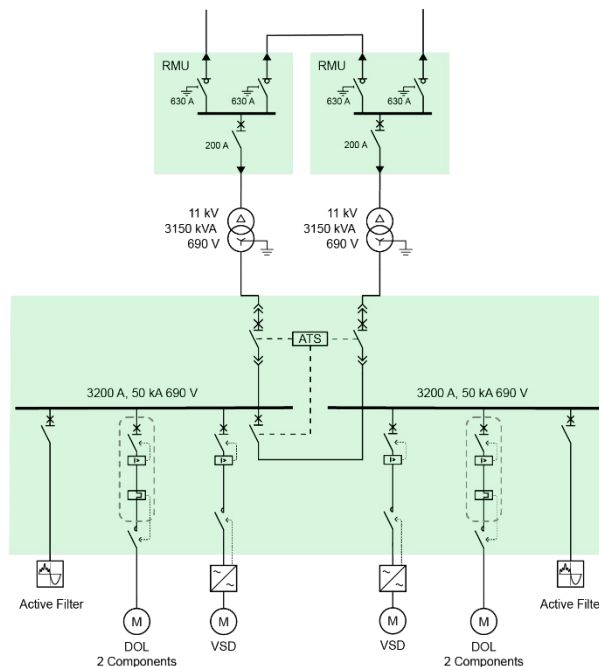
WATER INLET AND LIFTING

Can supply water inlet and lifting up to 2000 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW or Direct On Line 2 components up to 55 kW



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

[Minera MP](#)[Premset](#)[RM AirSet](#)[Trihal](#)

Click here to display
product overview

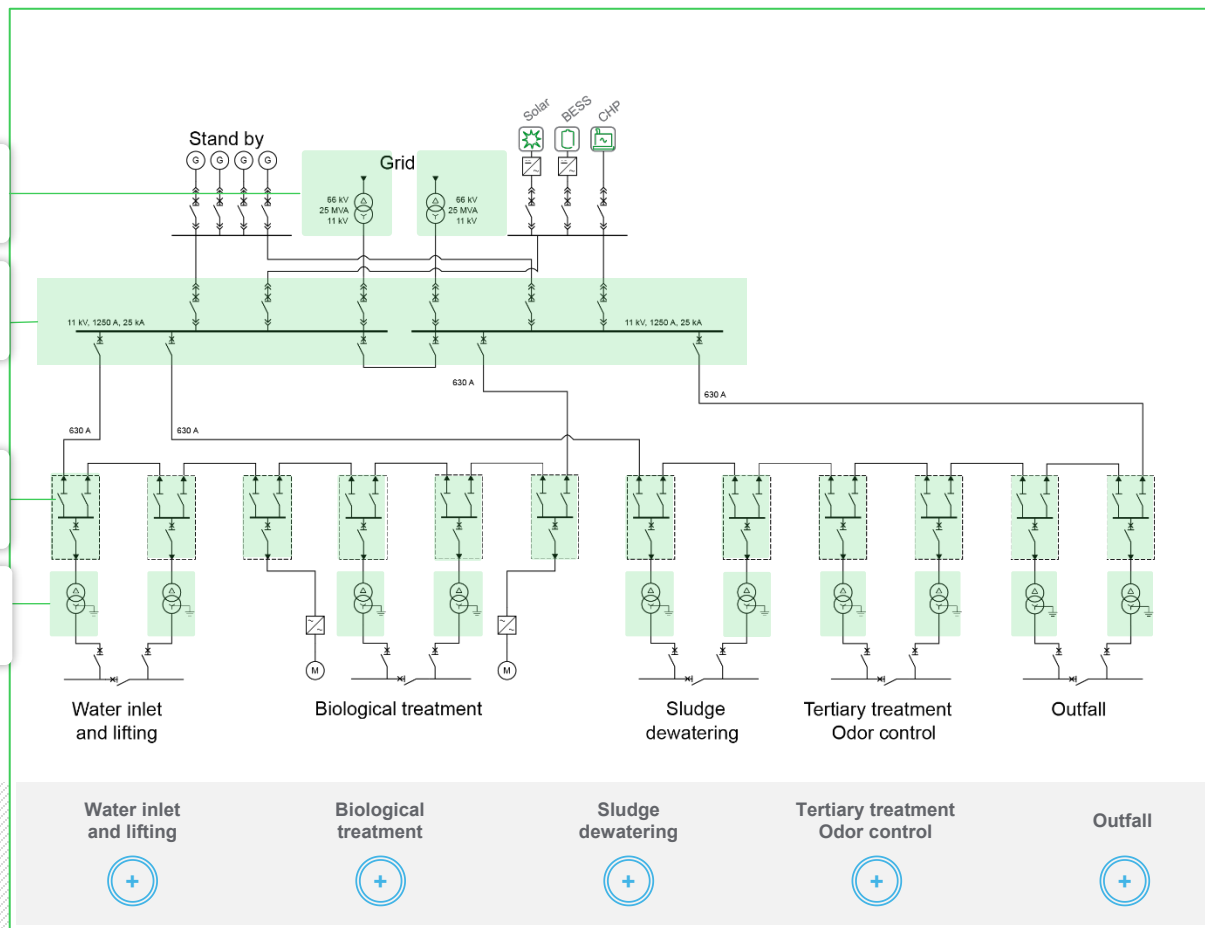
DISPLAY

DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☐ ON

ARCHITECTURE

MICROGRID

[RADIAL](#)[OPEN LOOP](#)[SINGLE SOURCE](#)[MICROGRID](#)

OPEN LOOP

ARCHITECTURE

OUTFALL



Compact NSX
circuit breakers



TeSys Giga
protection relays



TeSys Giga
contactors

Click here to display
product overview

DISPLAY

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PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

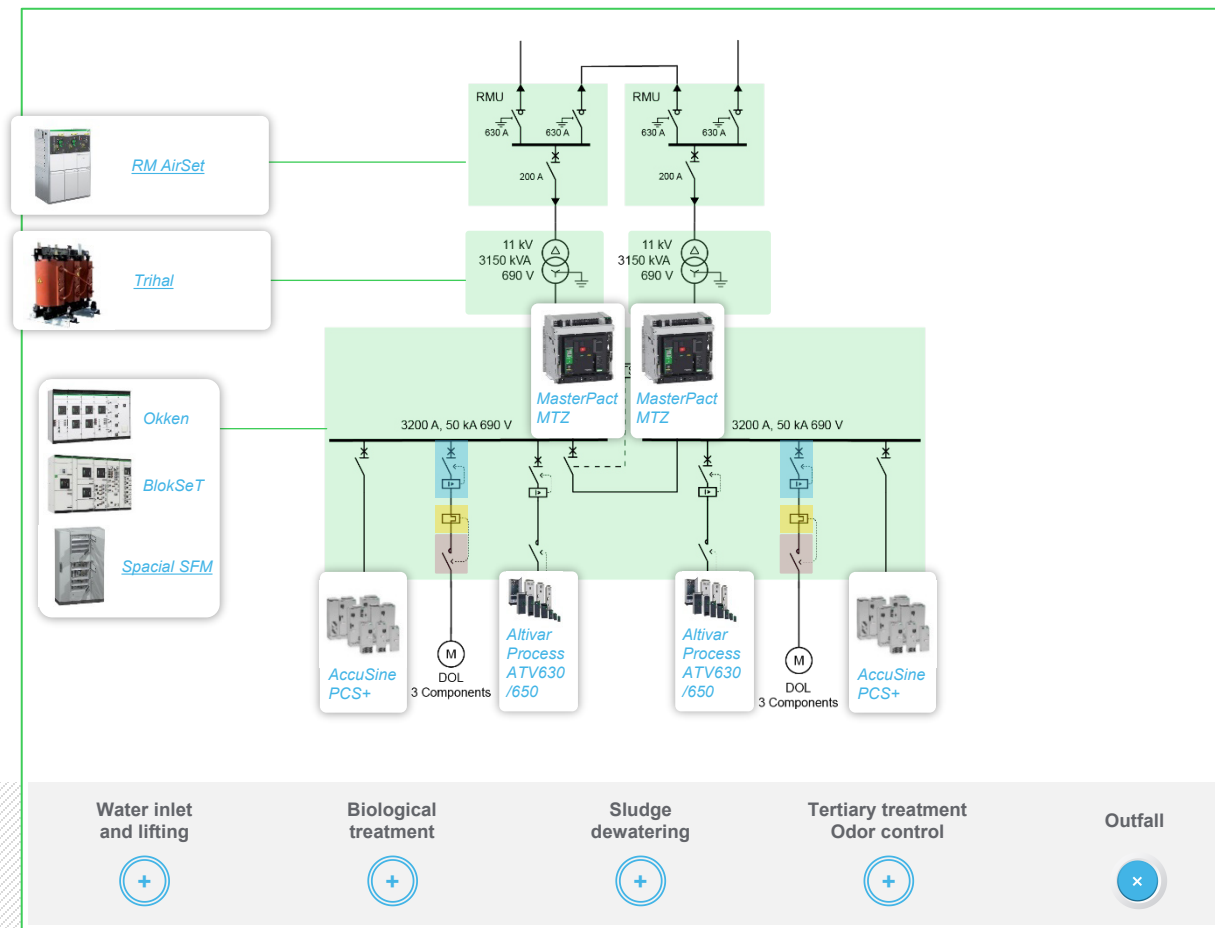
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

TERTIARY TREATMENT ODOR CONTROL



TeSys Ultra



TeSys Deca -
frame 2



TeSys Deca
contactors



PowerLogic
PFC Capacitor
Banks IEC



Trihal



Okken



BlokSeT



Spacial SFM

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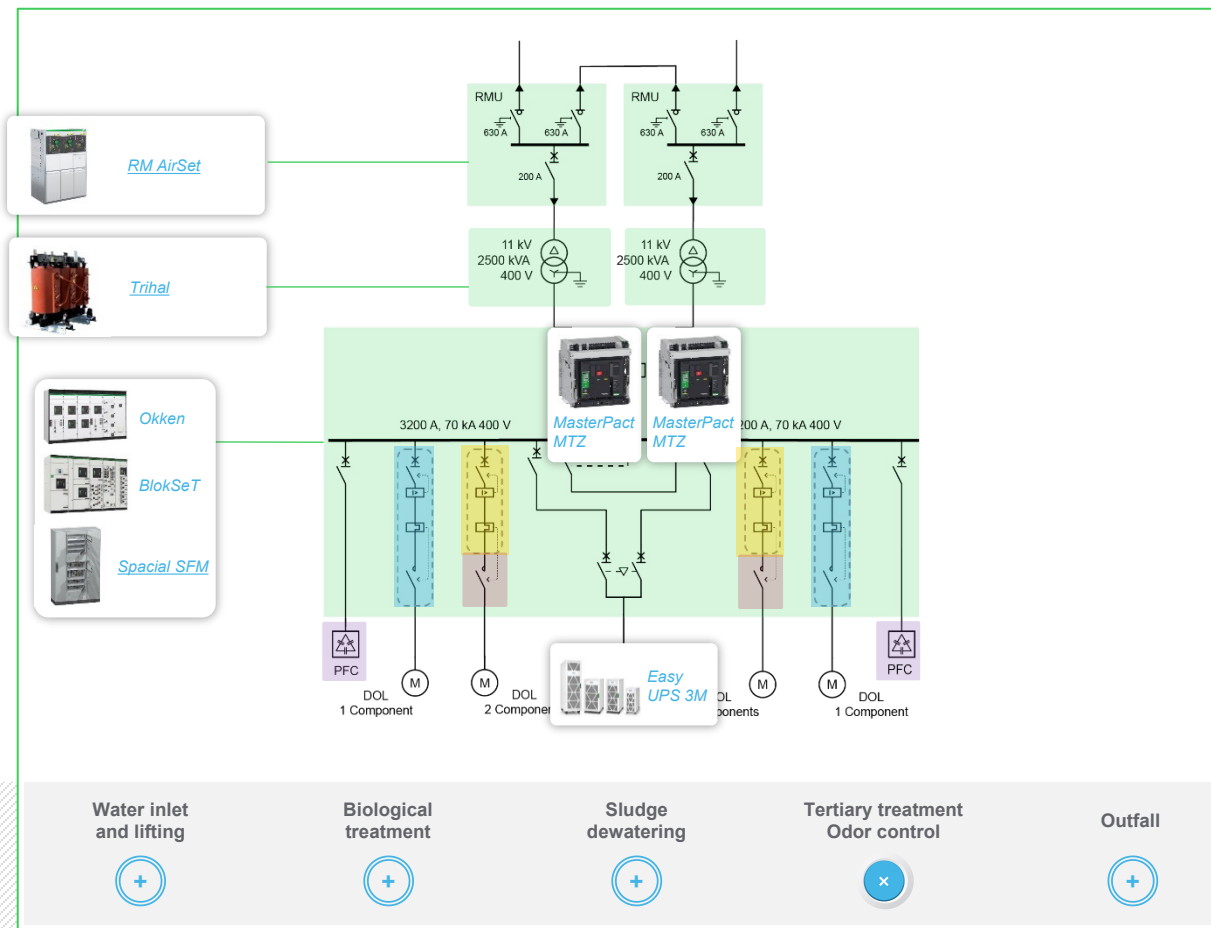
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

SLUDGE DEWATERING

Click here to display
product overview

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ARCHITECTURE

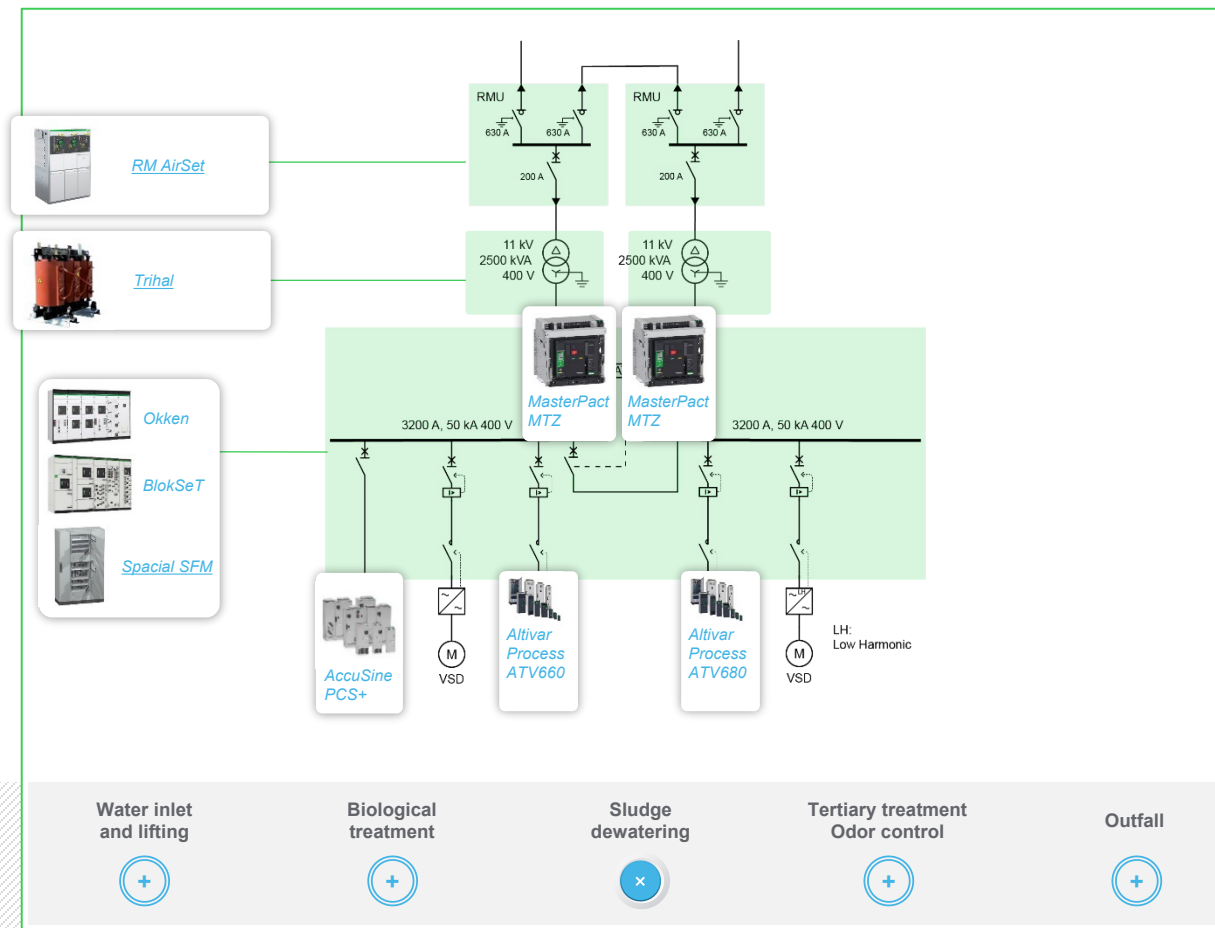
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

BIOLOGICAL TREATMENT



Compact NSX
circuit breakers



TeSys T
Protection relays



TeSys Giga
contactors

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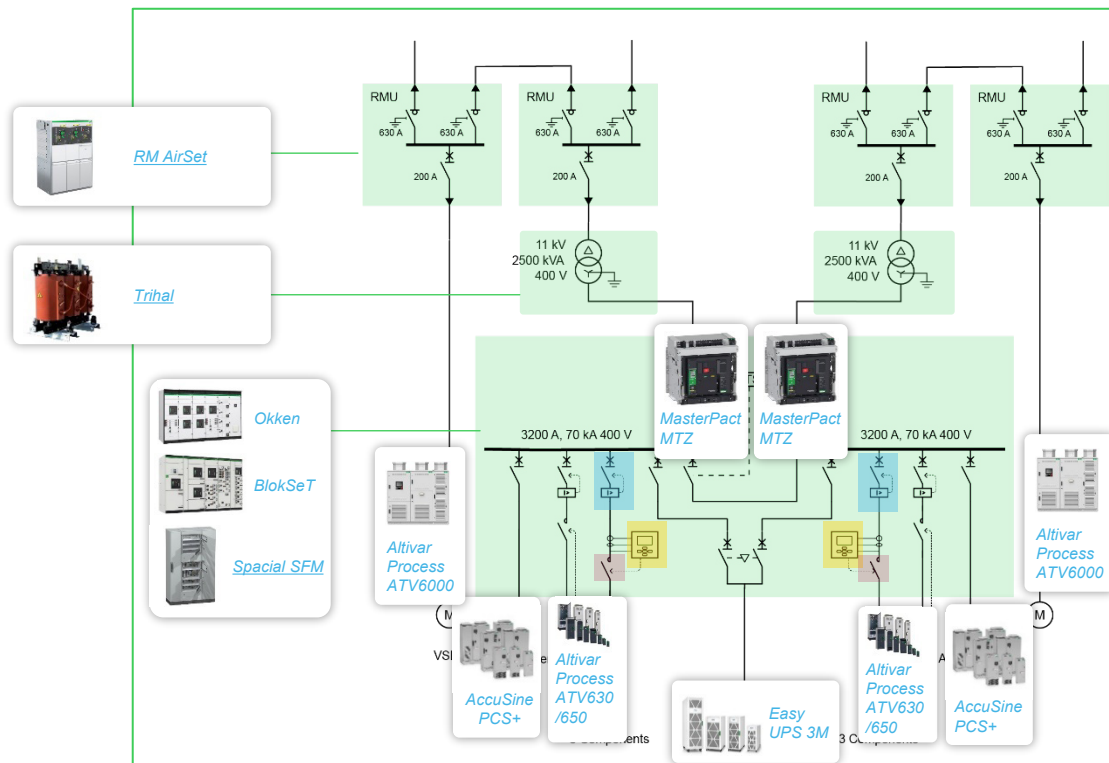
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

WATER INLET AND LIFTING



TeSys Deca -
frame 2



TeSys Deca
contactors



Compact NSX
circuit breakers

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product overview

DISPLAY

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PRODUCTS OFF ON

DIGITAL LAYER OFF ON

ARCHITECTURE

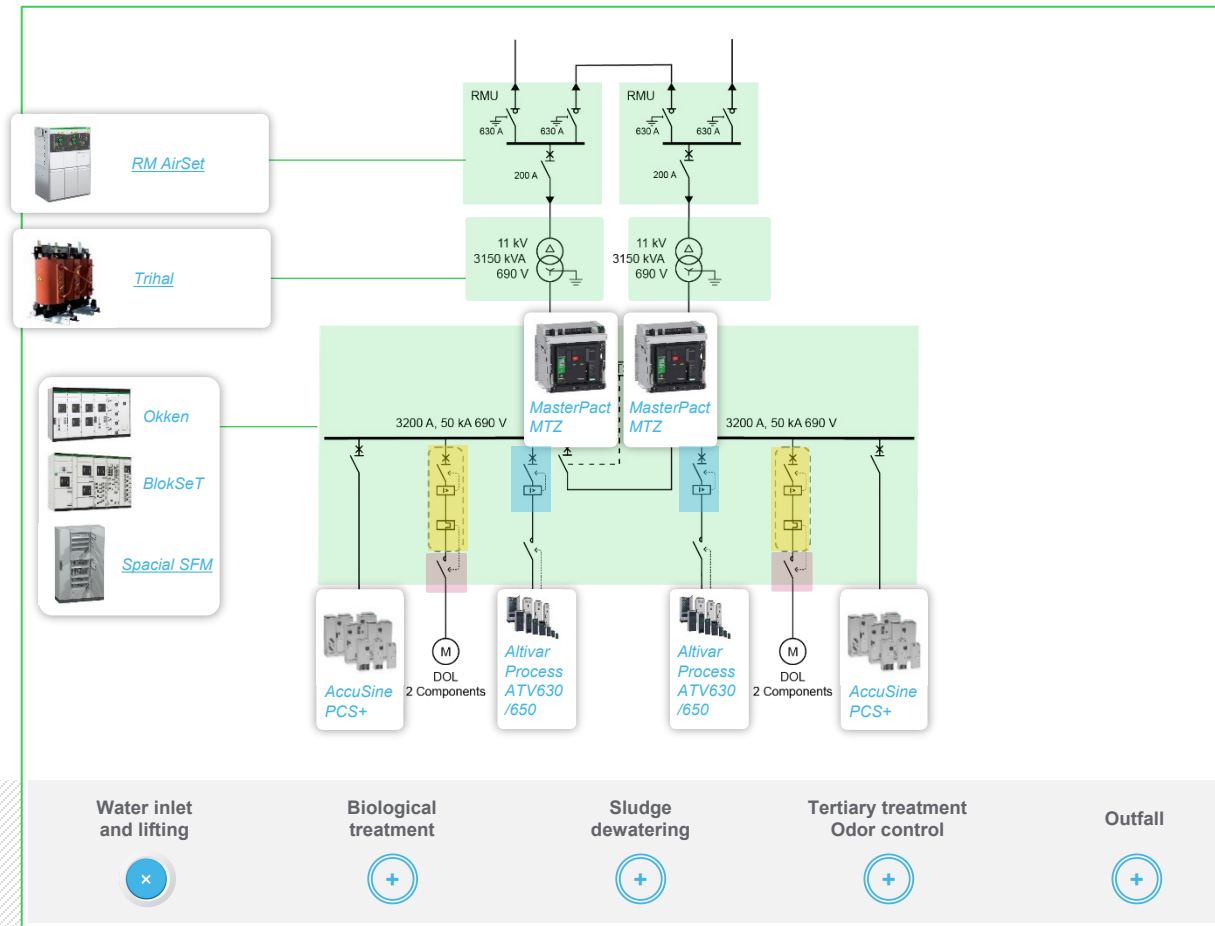
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP
ARCHITECTURE

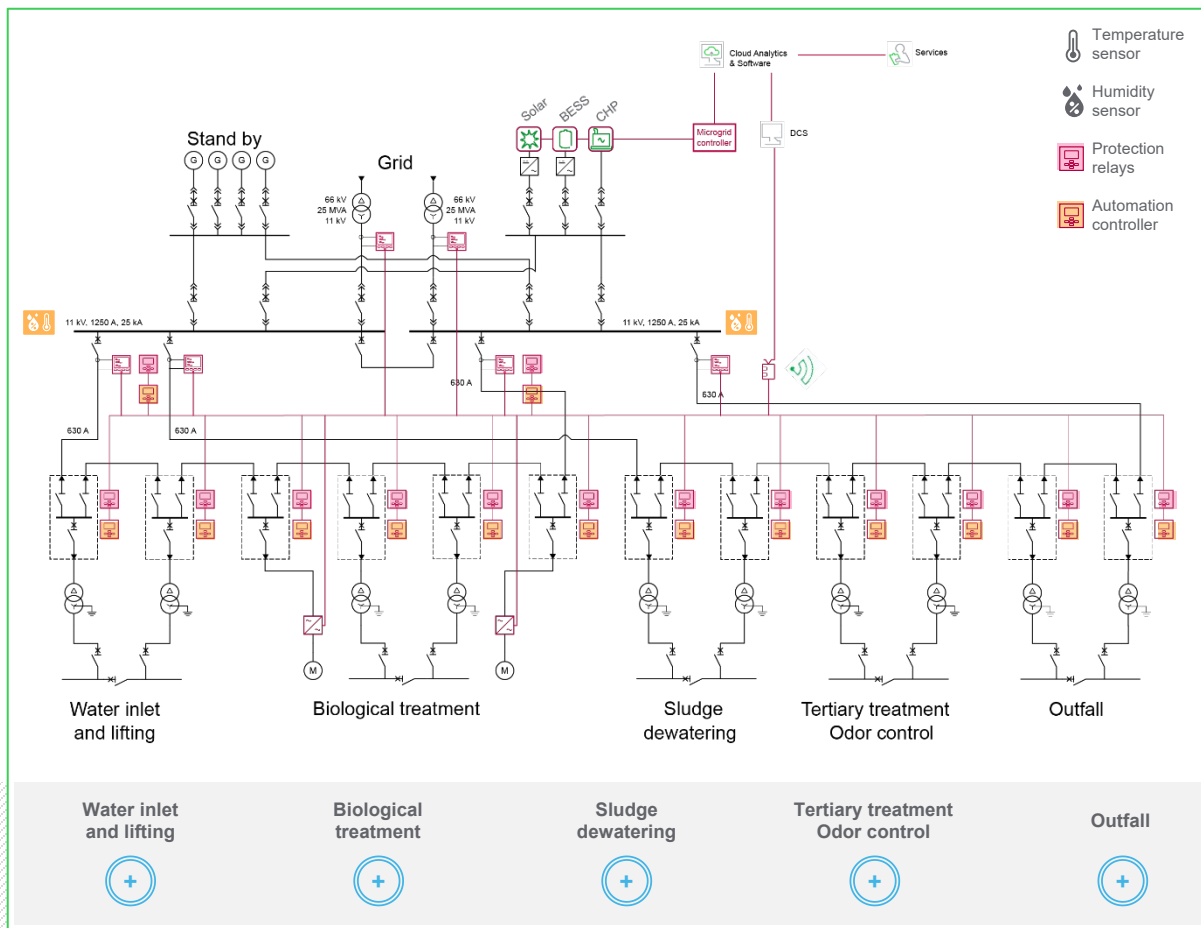
MICROGRID

Continuous monitoring 24/7

- with connected products
- with wireless sensors temperature and environment

Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost



DISPLAY

PRODUCTS OFF  ON DIGITAL LAYER OFF  ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

OPEN LOOP

ARCHITECTURE

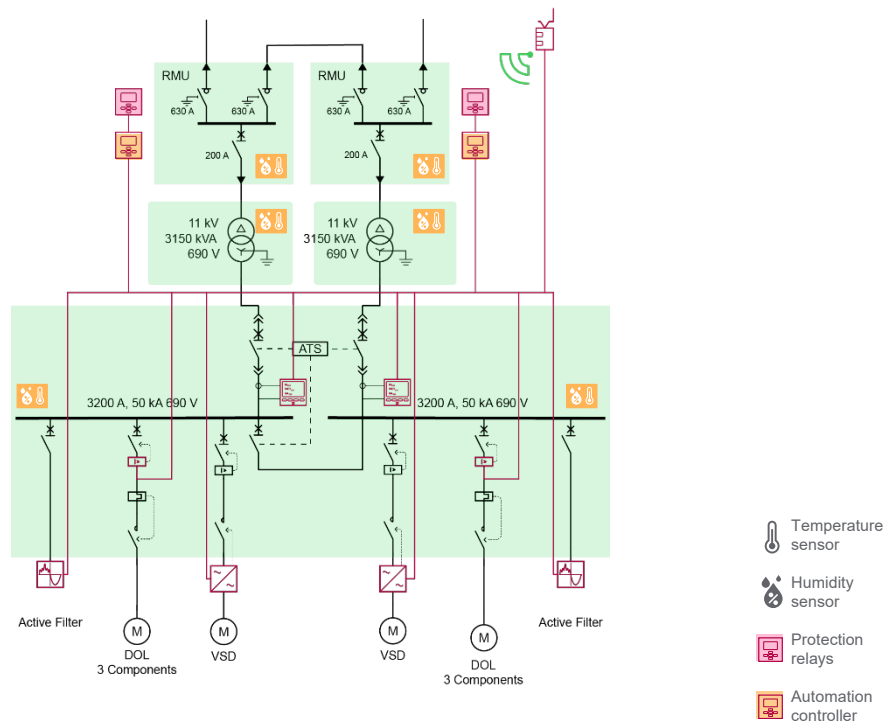
OUTFALL

Continuous monitoring 24/7

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- Reduced service cost



DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

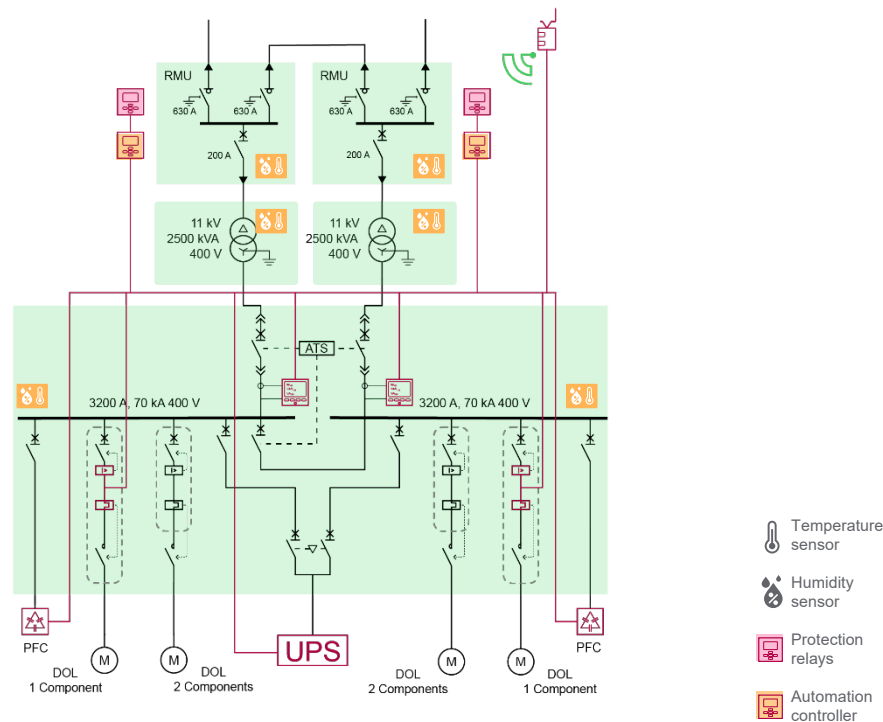
TERTIARY TREATMENT ODOR CONTROL

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ARCHITECTURE

MICROGRID

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Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

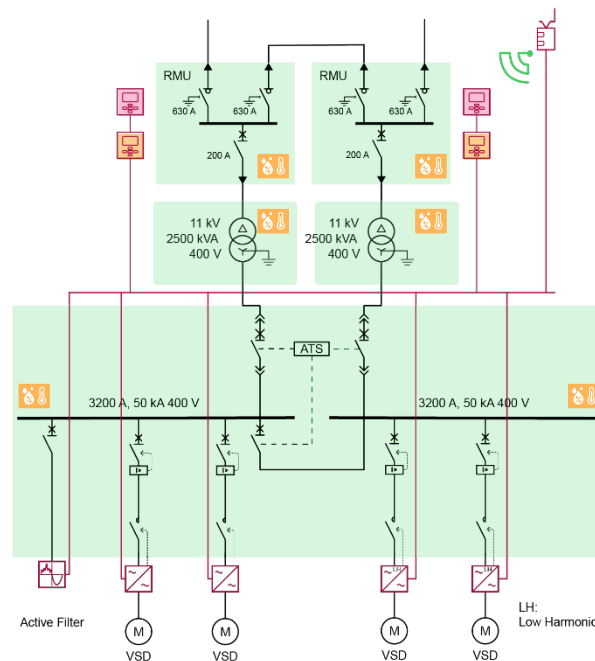
SLUDGE DEWATERING

Continuous monitoring 24/7

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Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost



Temperature sensor

Humidity sensor

Protection relays

Automation controller

DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
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Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

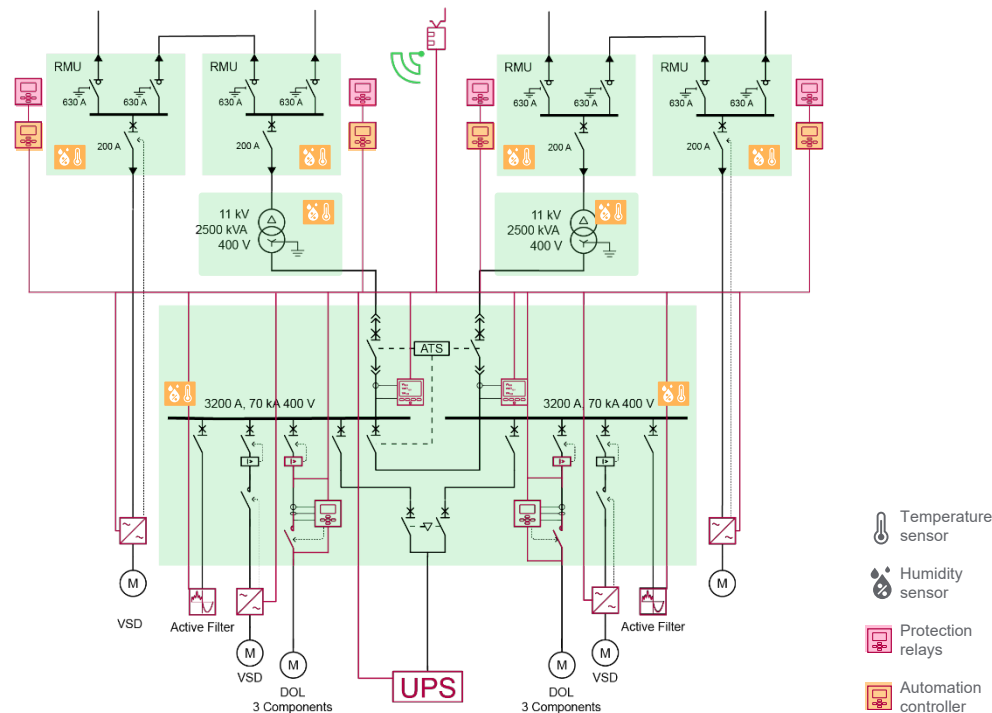
BIOLOGICAL TREATMENT

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Predictive maintenance based the actual condition of the products in their environment

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ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

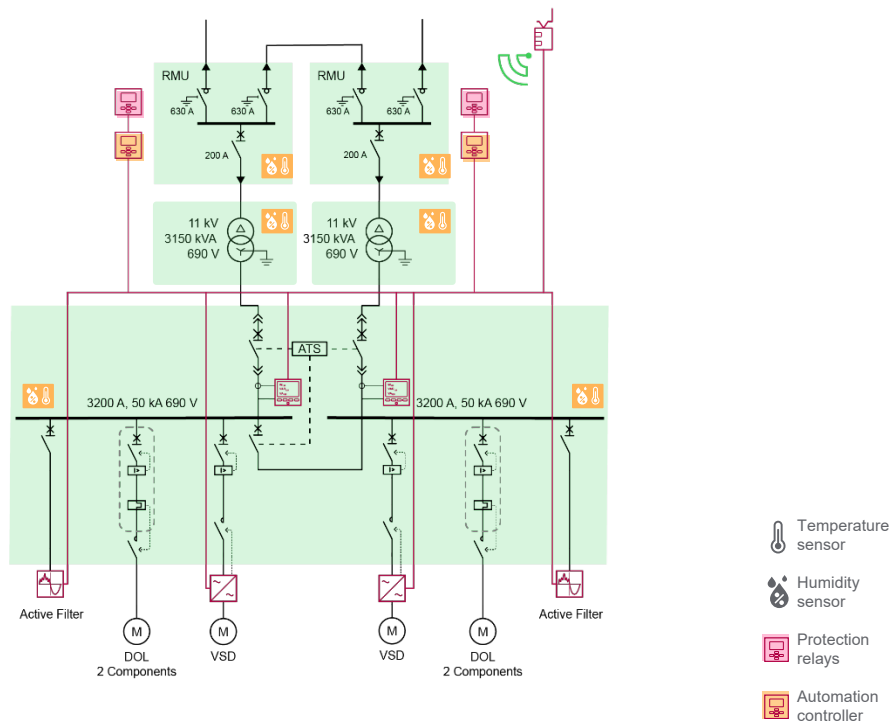
WATER INLET AND LIFTING

Continuous monitoring 24/7

- with connected products
- with wireless sensors temperature and environment

Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost



DISPLAY

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ARCHITECTURE

MICROGRID

RADIAL

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SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE



Minera MP



Premset



RM AirSet



Trihal



Easergy P3 Protection Relays



Easergy
C53 Automation
Controller 30TE
Model



EMA controller

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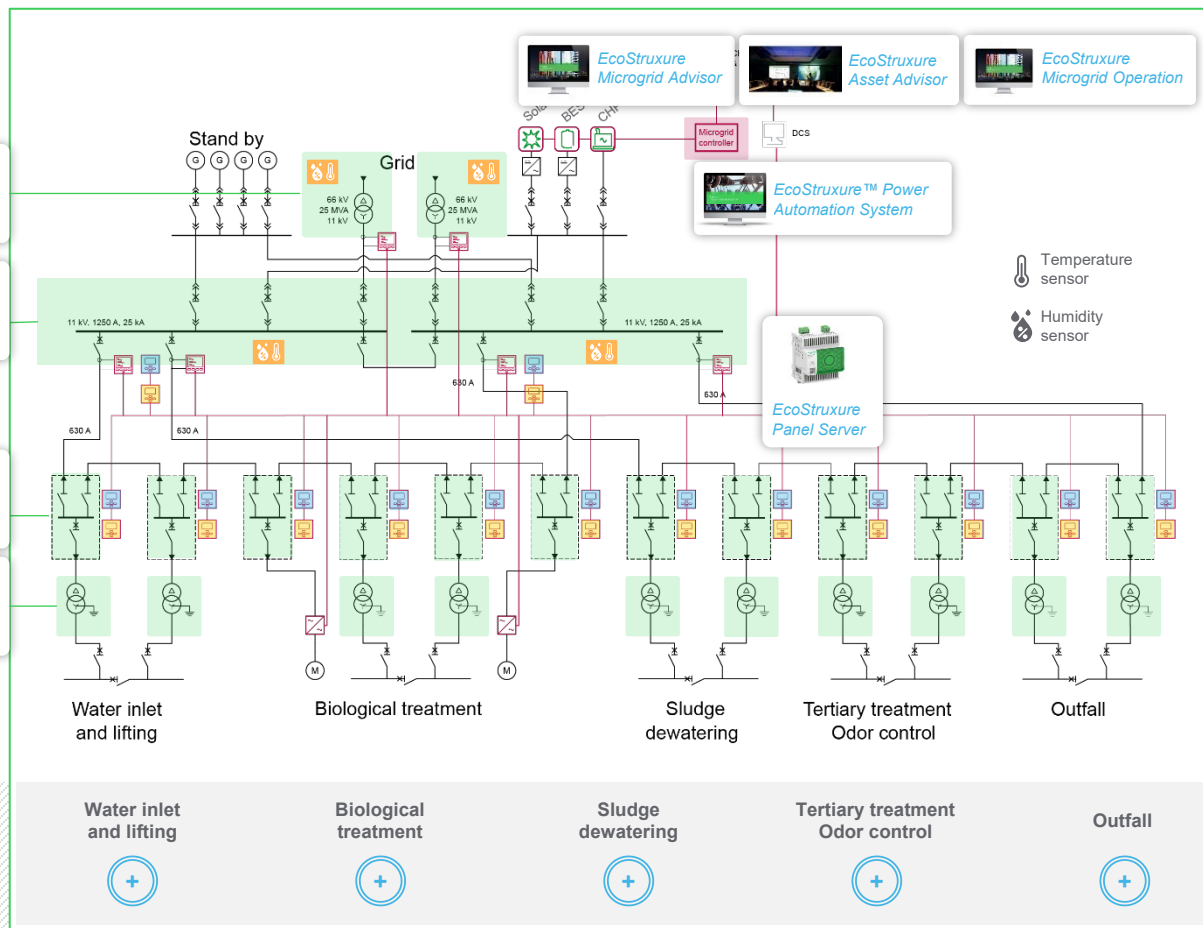
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

OUTFALL



Compact NSX circuit breakers



CL110



TeSys Giga
protection relays



TH110



TeSys Giga
contactors

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DISPLAY

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PRODUCTS OFF

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ARCHITECTURE

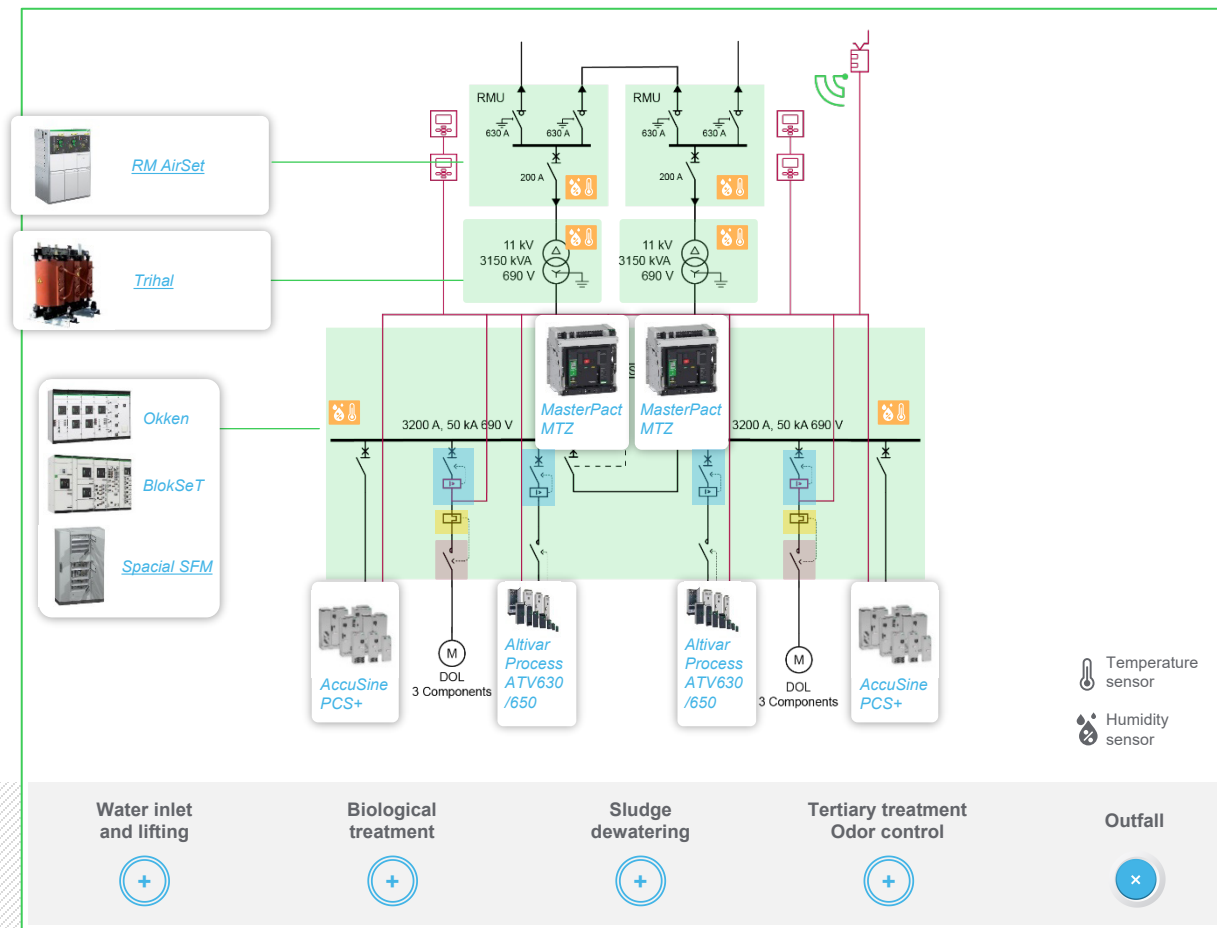
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

TERTIARY TREATMENT ODOR CONTROL



TeSys Ultra

TeSys Deca -
frame 2TeSys Deca
contactors

CL110



TH110

PowerLogic
PFC Capacitor
Banks IEC

RM AirSet



Trihal



Okken



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Spacial SFM

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ARCHITECTURE

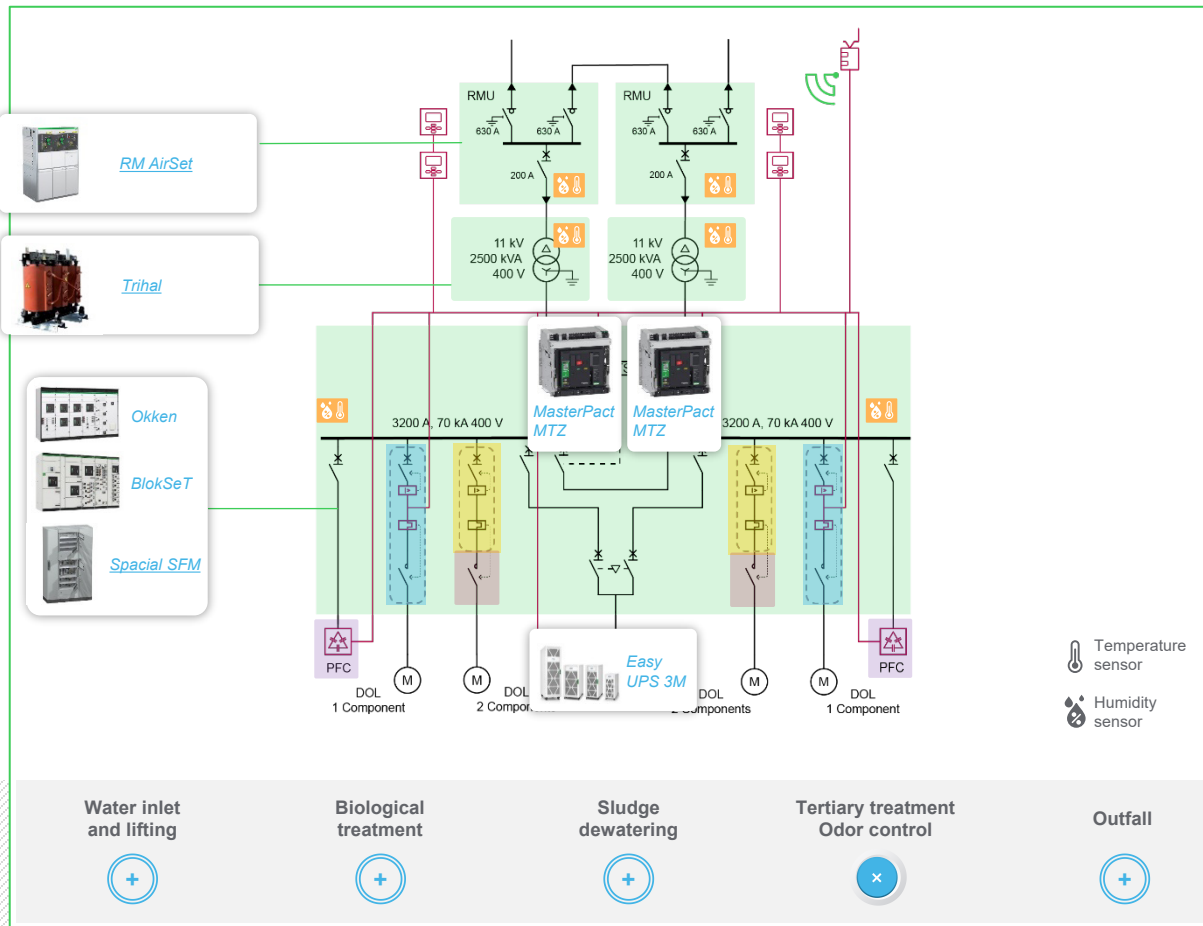
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

SLUDGE DEWATERING



CL110



TH110

Click here to display
product overview

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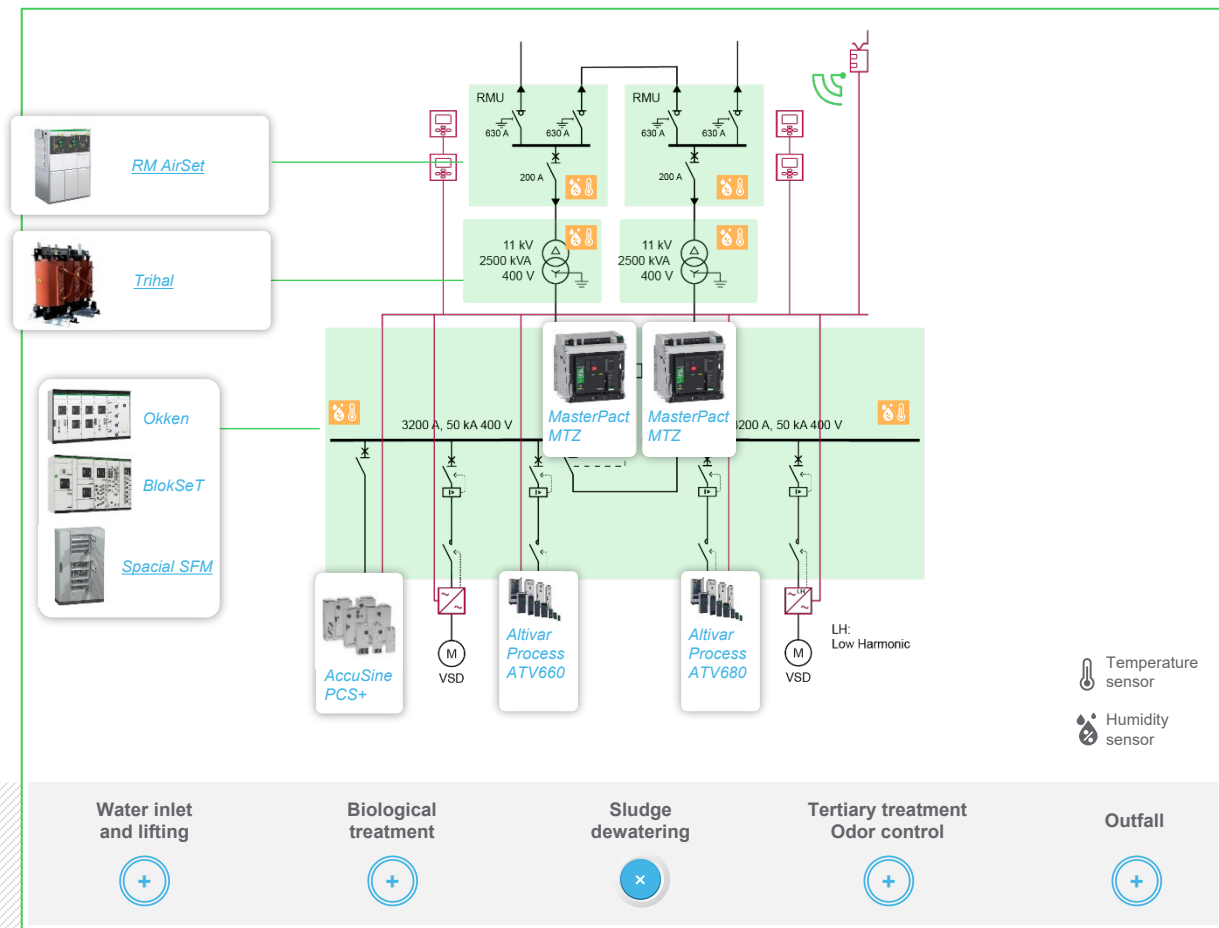
ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

OPEN LOOP

ARCHITECTURE

BIOLOGICAL TREATMENT



Compact NSX
circuit breakers



TeSys T
Protection relays



TeSys Giga
contactors



CL110



TH110

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product overview

DISPLAY

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ARCHITECTURE

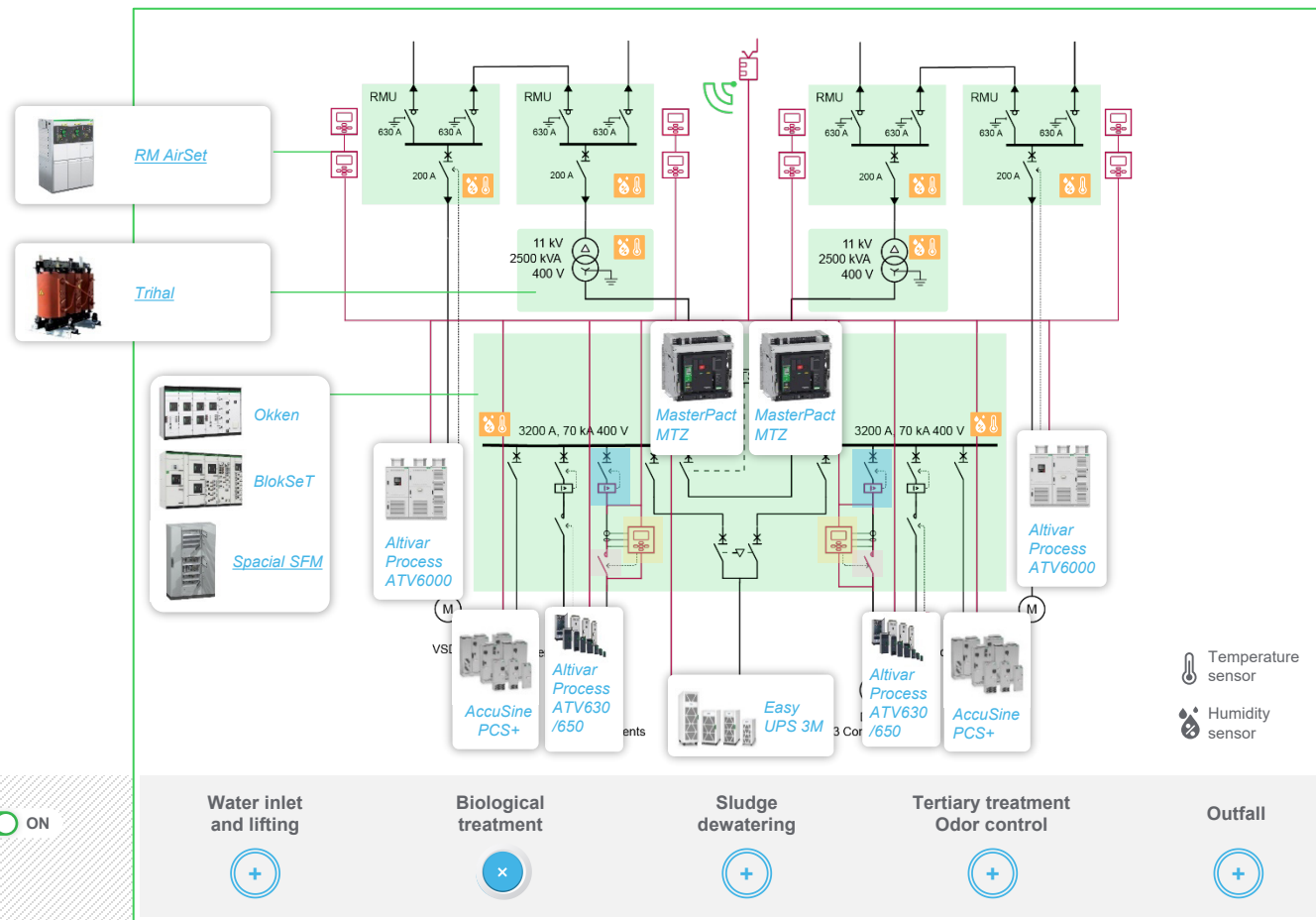
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

WATER INLET AND LIFTING

TeSys Deca -
frame 2

x2

TeSys Deca
contactors

x2

Compact NSX
circuit breakers

CL110



TH110

Click here to display
product overview

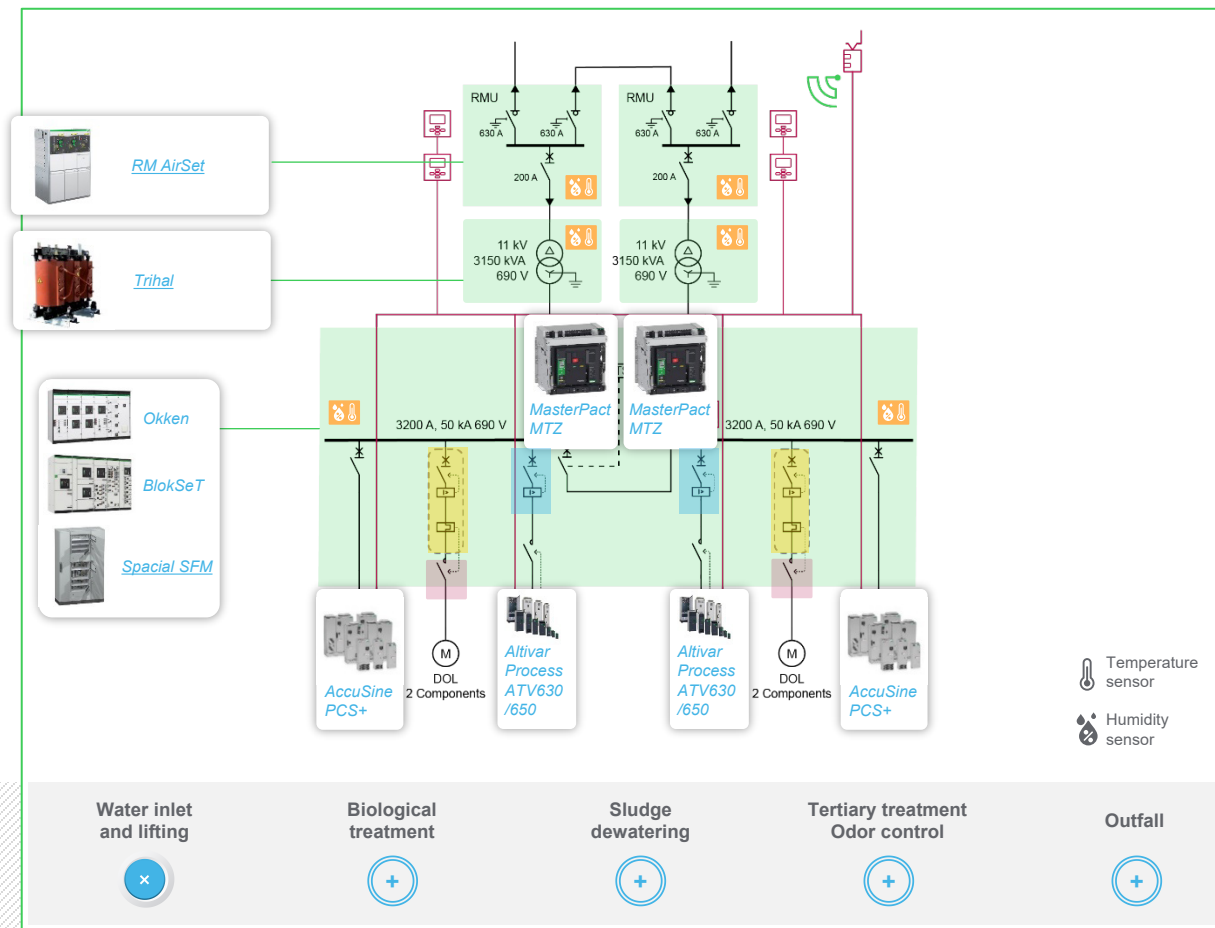
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ARCHITECTURE

MICROGRID

[RADIAL](#)[OPEN LOOP](#)[SINGLE SOURCE](#)[MICROGRID](#)



Click on the link to get further information about the product on se.com

Display/Hide all products related to the current architecture and lifting

Select Architecture

DISPLAY

PRODUCTS OFF ☒ ON

DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Move towards
the « Single source » architecture
(or go back to « MicroGrid »)

Tertiary treatment
Odor control

Click on '+' for have more information about the part of this architecture

OPEN LOOP

ARCHITECTURE

SINGLE SOURCE

Open loop architecture:

- up to 12MVA 11kV per loop
- 4 x 630A MV feeders + 12 x RMU
- Compact MV Switchboard and Substation

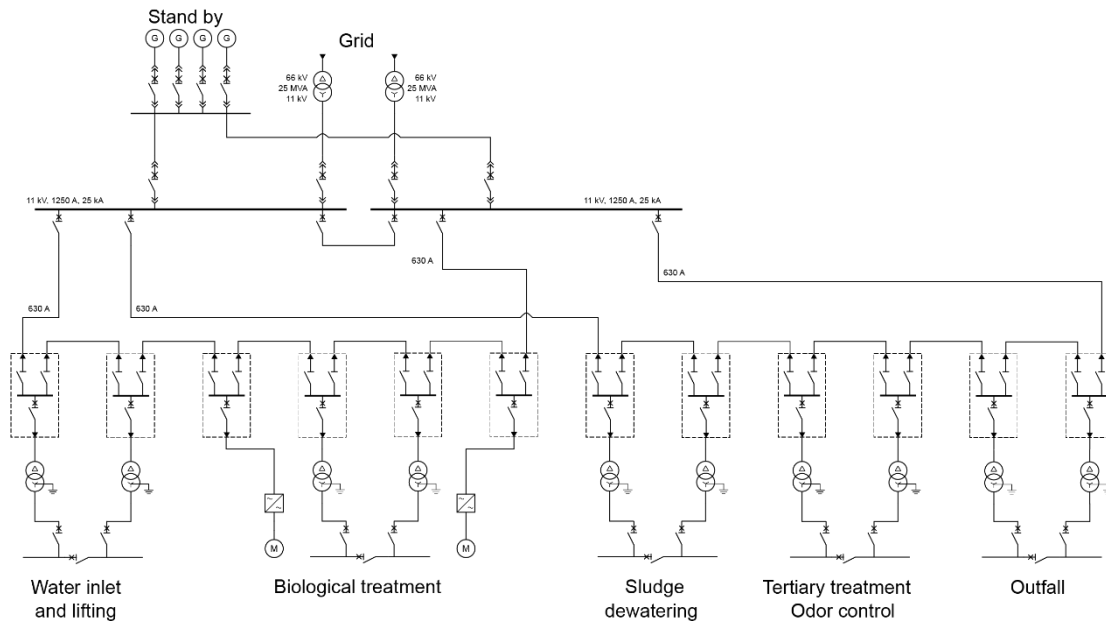
Major advantages:

- Flexible cable routing, suitable for extended infrastructure site
- Short 630A cable lengths
- Easy possible extension per loop (no substation modification nor process interruption)

Sustainability:

- equipment fit for purpose: no over sizing
- Architecture **compliant with SF6 free offer**

Reliability: process continuity during maintenance or single major fault with **automatic reconfiguration**



DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

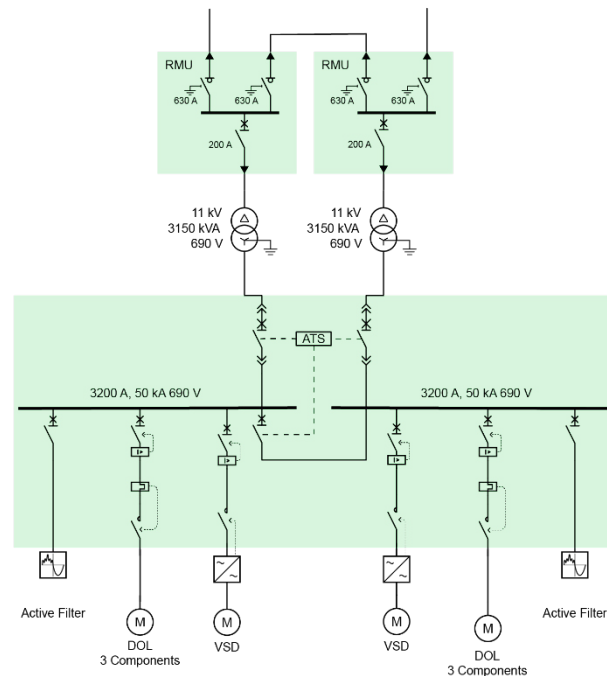
OUTFALL

Can supply water inlet and lifting up to 2000 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW or Direct On Line.



DISPLAY

PRODUCTS OFF ☒ ON

DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

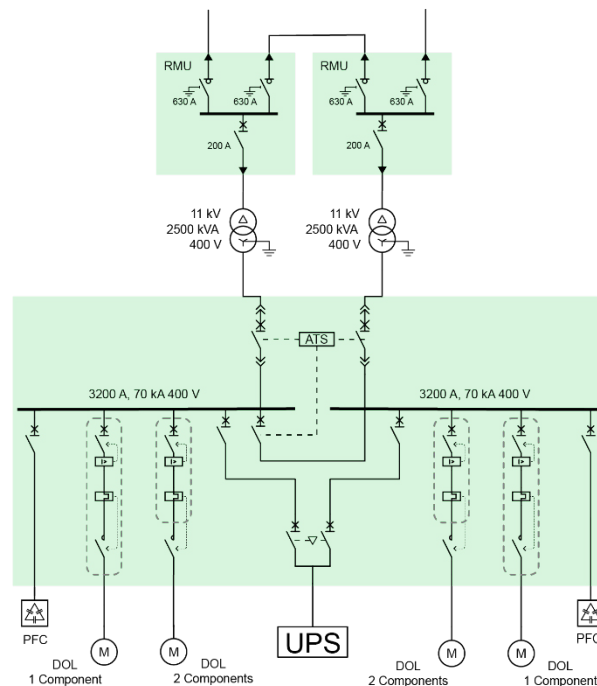
TERTIARY TREATMENT ODOR CONTROL

Can supply water inlet and lifting up to 1500 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Direct On Line 1 component up to 15 kW

Direct On Line 2 components up to 55 kW



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

[RADIAL](#)[OPEN LOOP](#)

MICROGRID

[SINGLE SOURCE](#)[MICROGRID](#)

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

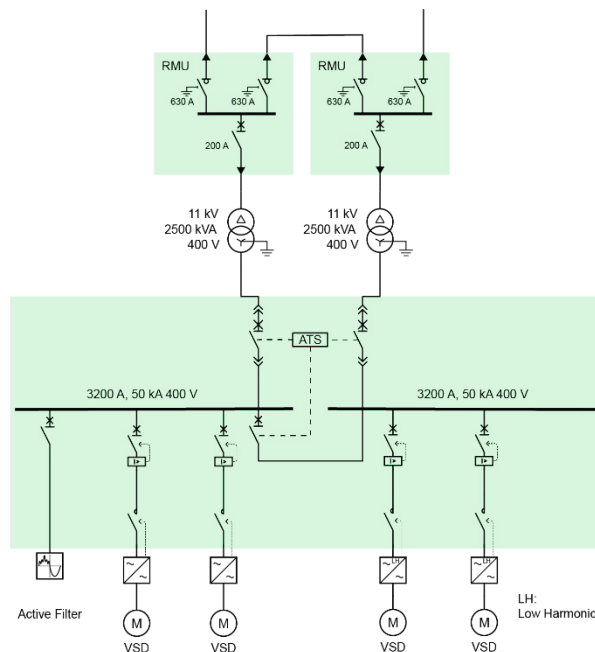
SLUDGE DEWATERING

Can supply water inlet and lifting up to 1500 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

VSD driven motor from 0,75 to 1200 kW.

VSD with the Low Harmonic option do not need any harmonic compensation of an active filter.



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

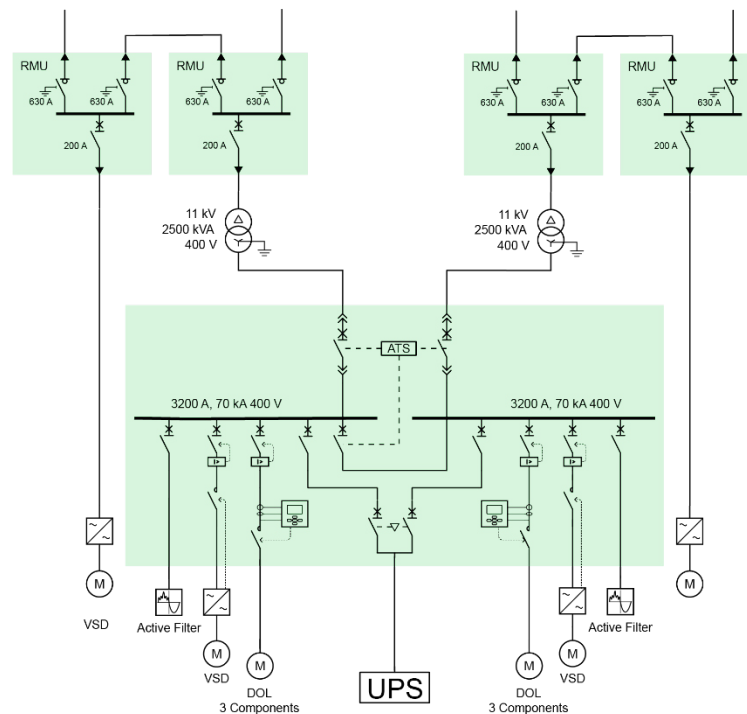
ARCHITECTURE

BIOLOGICAL TREATMENT

Can supply biological treatment up to 6500 kW
The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

VSD or Direct On Line for motors from 0,75 to 1200 kW while the medium voltage can supply the most powerful motors for blowing up to 2 x 2500 kW.

UPS to support 150 kW critical loads



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

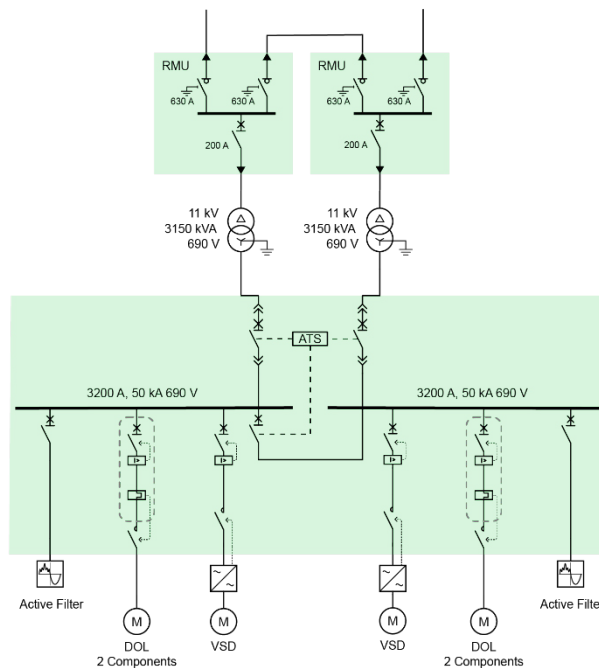
WATER INLET AND LIFTING

Can supply water inlet and lifting up to 2000 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW or Direct On Line 2 components up to 55 kW



DISPLAY

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ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE



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product overview

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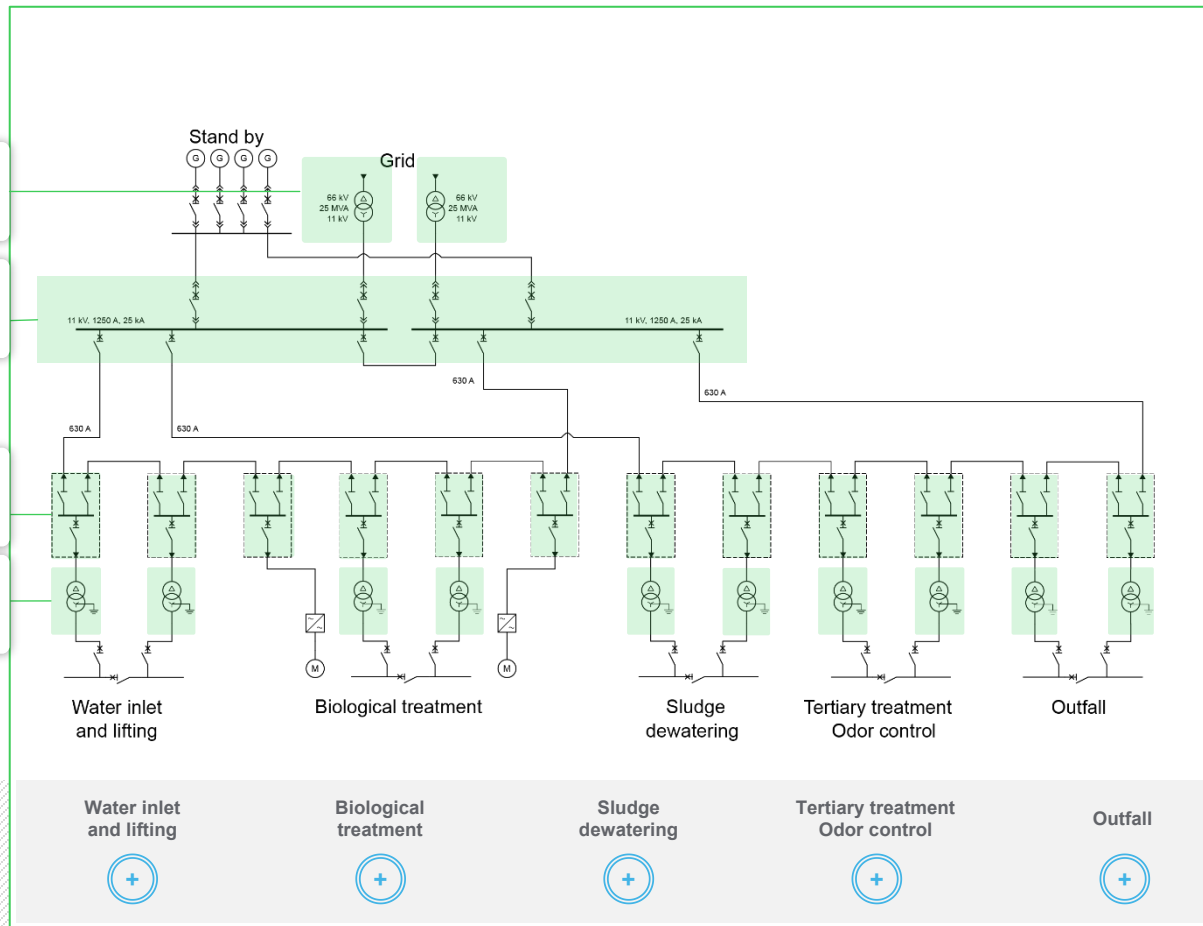
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

OUTFALL



Compact NSX
circuit breakers



TeSys Giga
protection relays



TeSys Giga
contactors

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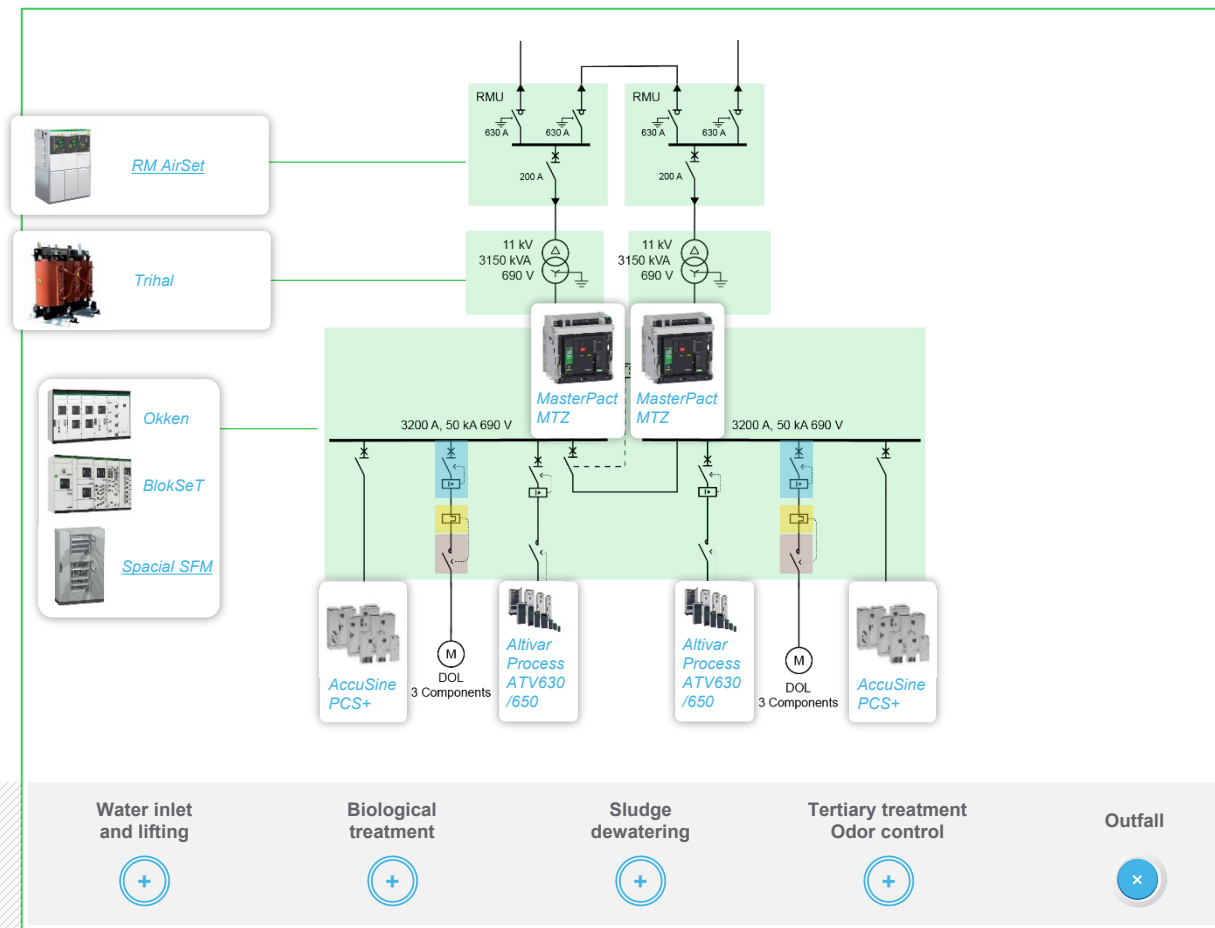
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

TERTIARY TREATMENT ODOR CONTROL



TeSys Ultra

TeSys Deca -
frame 2TeSys Deca
contactorsPowerLogic
PFC Capacitor
Banks IEC

Trihal



Okken



BlokSeT



Spacial SFM

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product overview

[DISPLAY](#)

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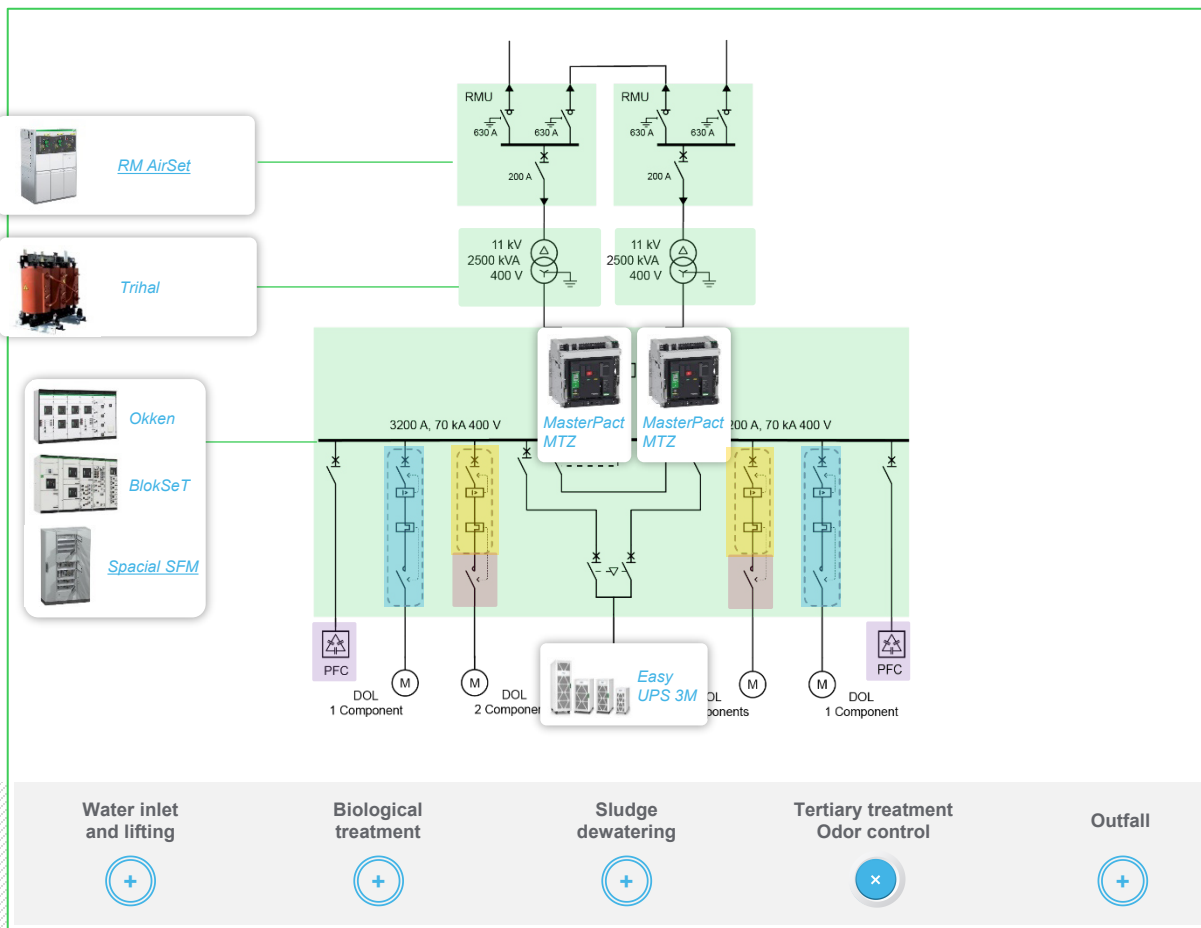
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

SLUDGE DEWATERING

Click here to display
product overview

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ARCHITECTURE

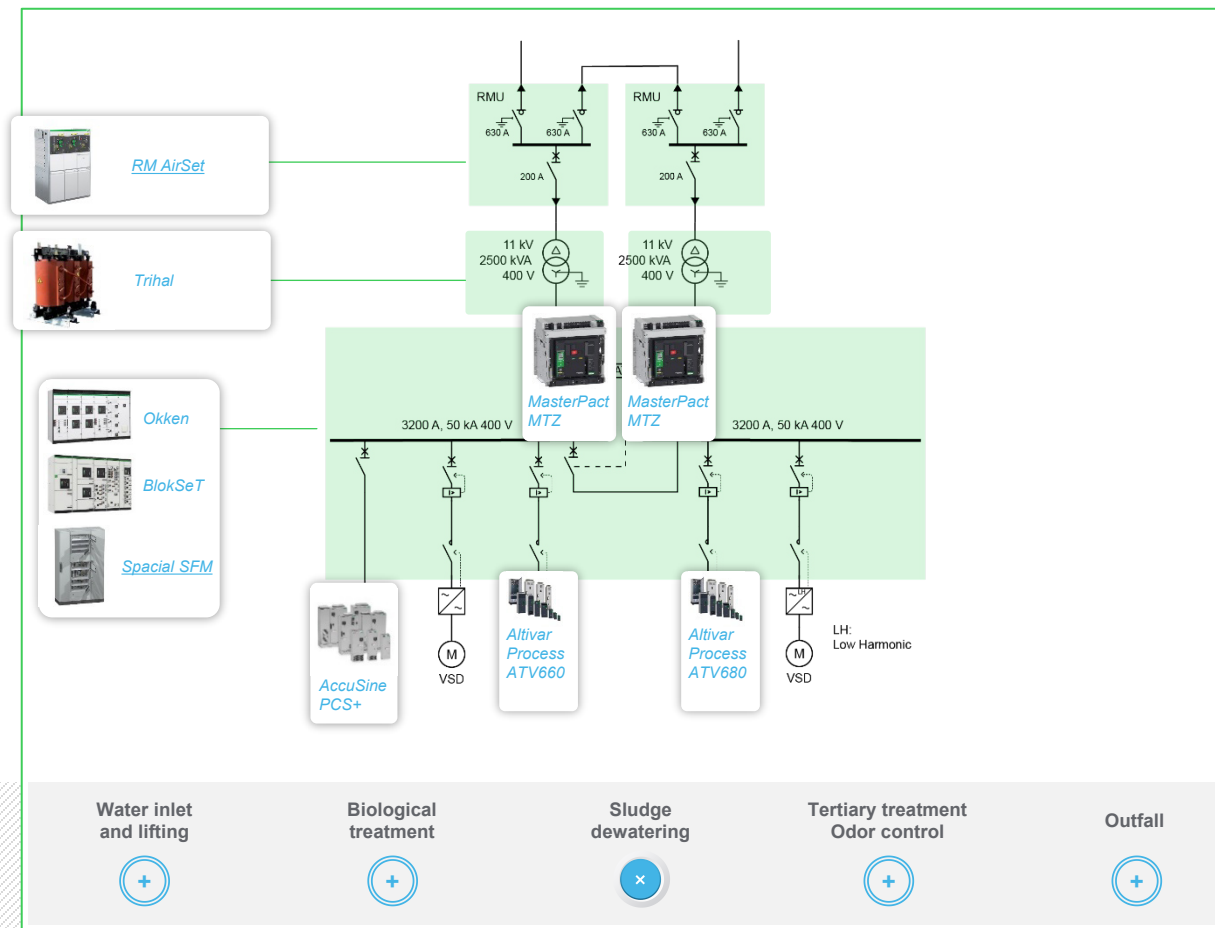
RADIAL

OPEN LOOP

MICROGRID

SINGLE SOURCE

MICROGRID



OPEN LOOP
ARCHITECTURE

BIOLOGICAL TREATMENT



Compact NSX circuit breakers



TeSys T
Protection relays



TeSys Giga
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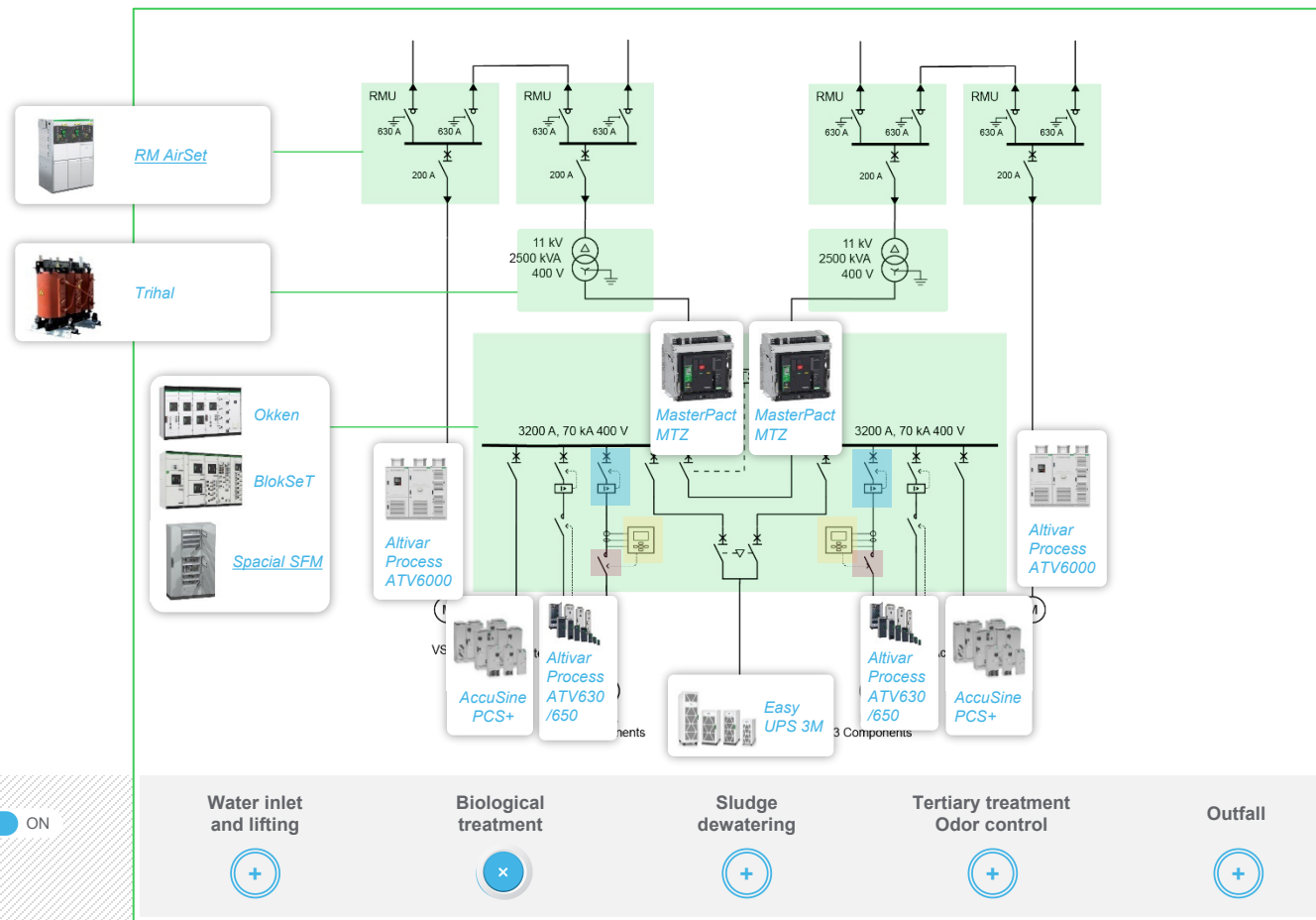
MICROGRID

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SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

WATER INLET AND LIFTING



TeSys Deca -
frame 2



TeSys Deca
contactors



Compact NSX
circuit breakers

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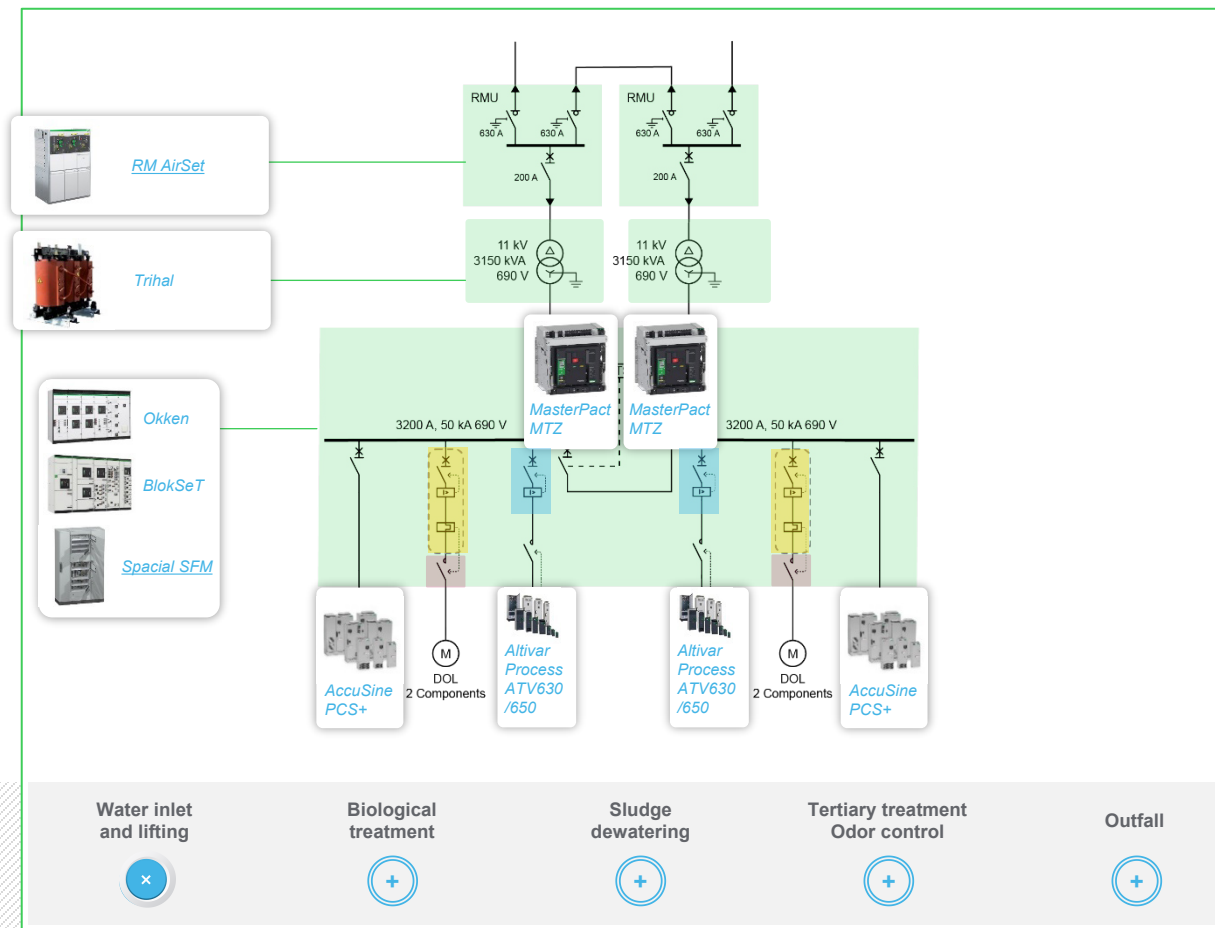
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

SINGLE SOURCE

Continuous monitoring 24/7

- with connected products
- with wireless sensors temperature and environment

Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost

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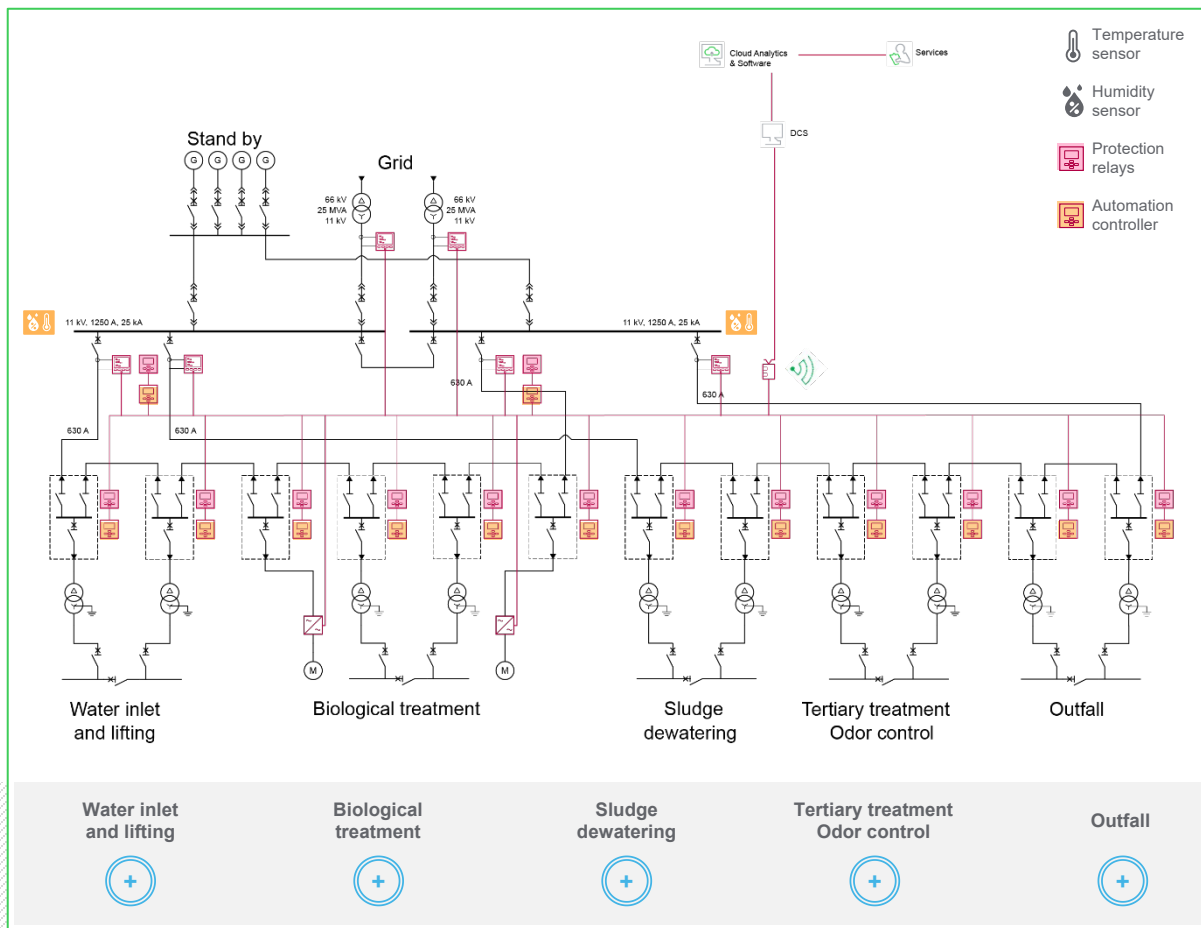
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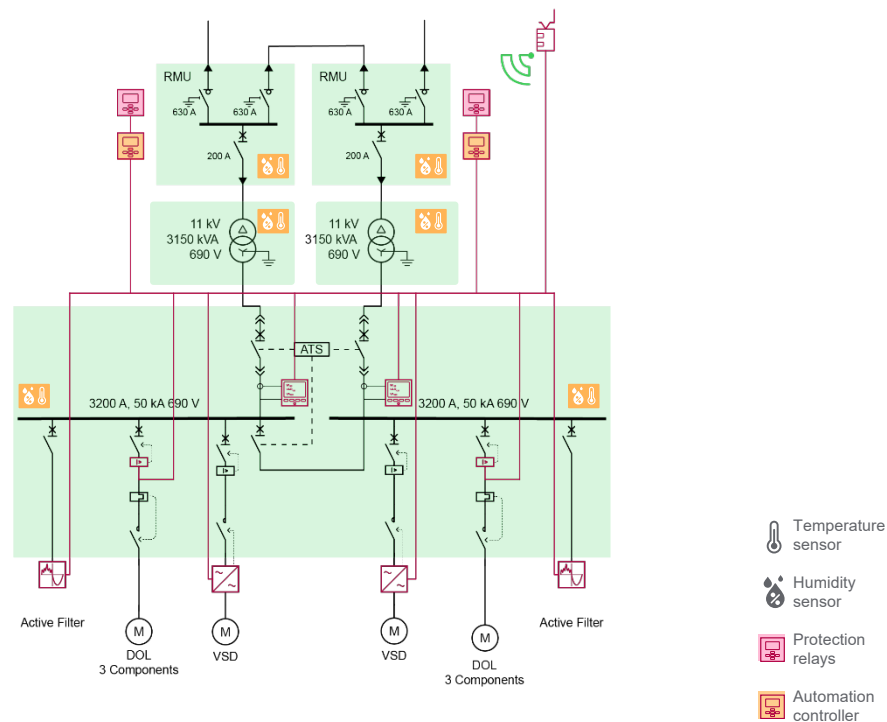
OUTFALL

Can supply water inlet and lifting up to 2000 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW, DOL or soft starters



DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

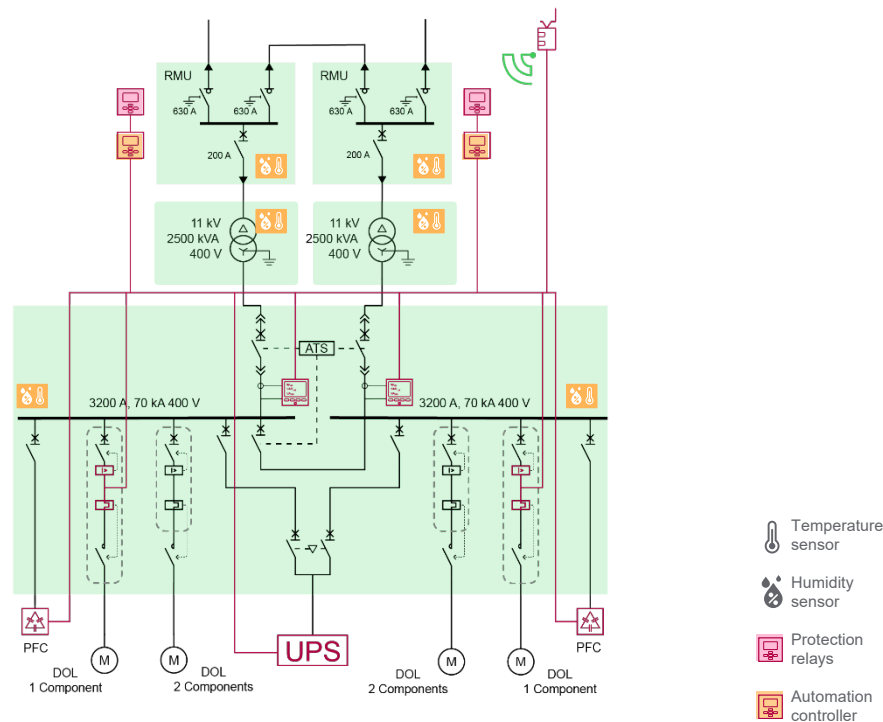
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MICROGRID

Water inlet
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OPEN LOOP

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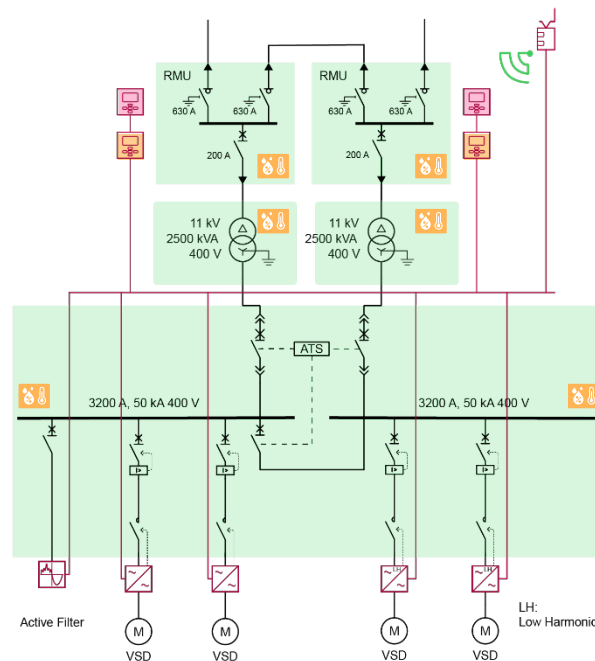
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VSD driven motor from 0,75 to 1200 kW, DOL or soft starters



- Temperature sensor
- Humidity sensor
- Protection relays
- Automation controller

DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

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SINGLE SOURCE

MICROGRID

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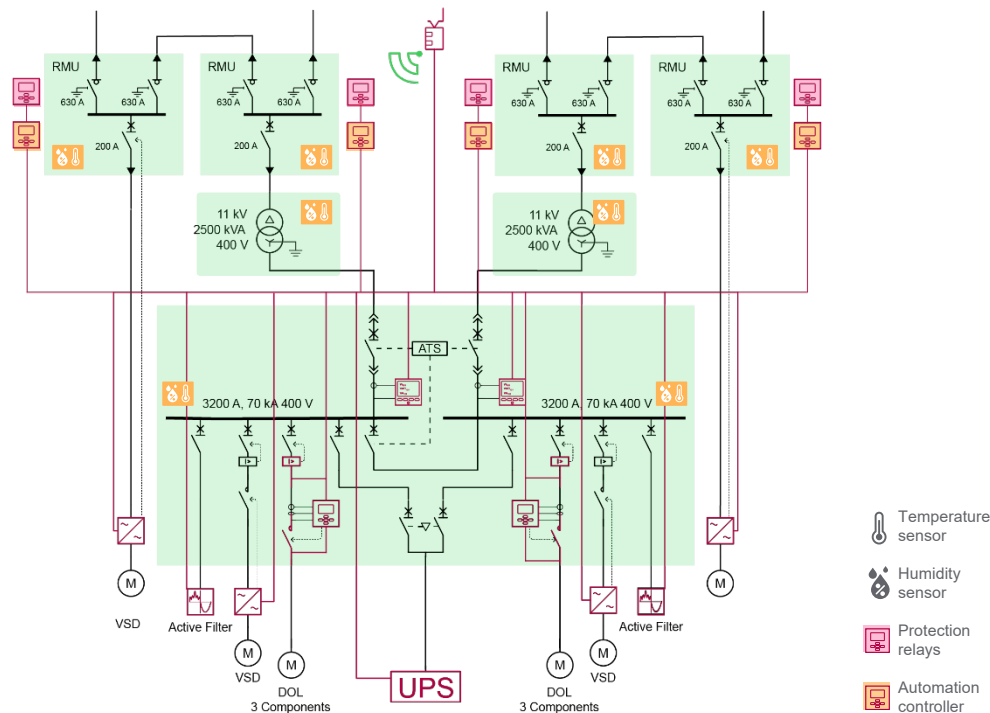
ARCHITECTURE

BIOLOGICAL TREATMENT

Can supply biological treatment up to 6500 kW
The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the cost for most of the connected load, while the medium voltage can supply the most powerful motors for blowing up to 2 x 2500 kW

UPS to support 150 kW critical loads



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP

ARCHITECTURE

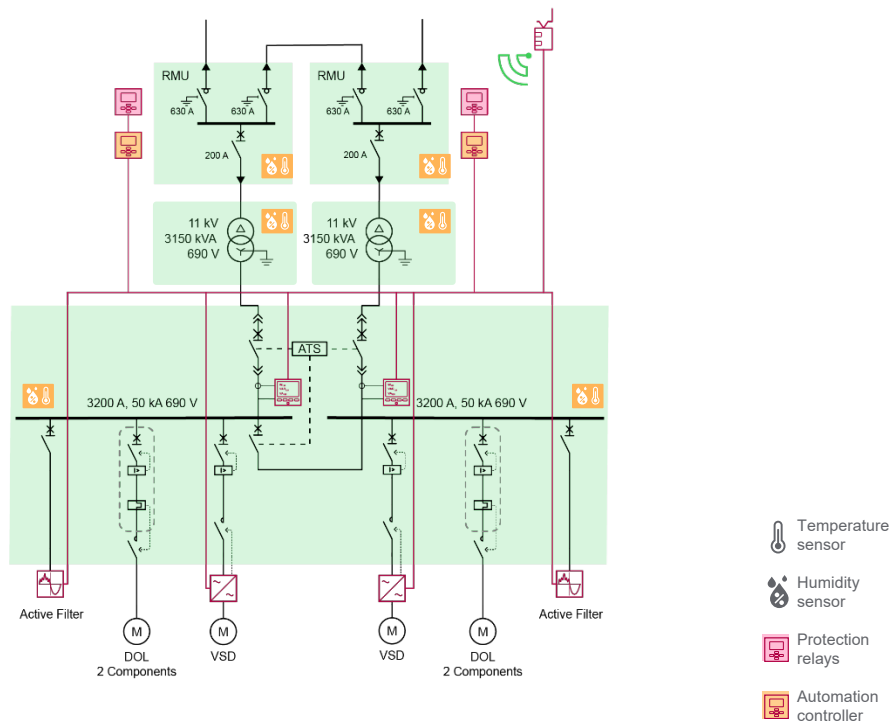
WATER INLET AND LIFTING

Can supply water inlet and lifting up to 2500 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW, DOL or soft starters



DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



OPEN LOOP
ARCHITECTURE



Easergy P3 Protection Relays



Easergy
C53 Automation
Controller 30TE
Model



Minera MP



Premset



RM AirSet



Trihal

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DISPLAY

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DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

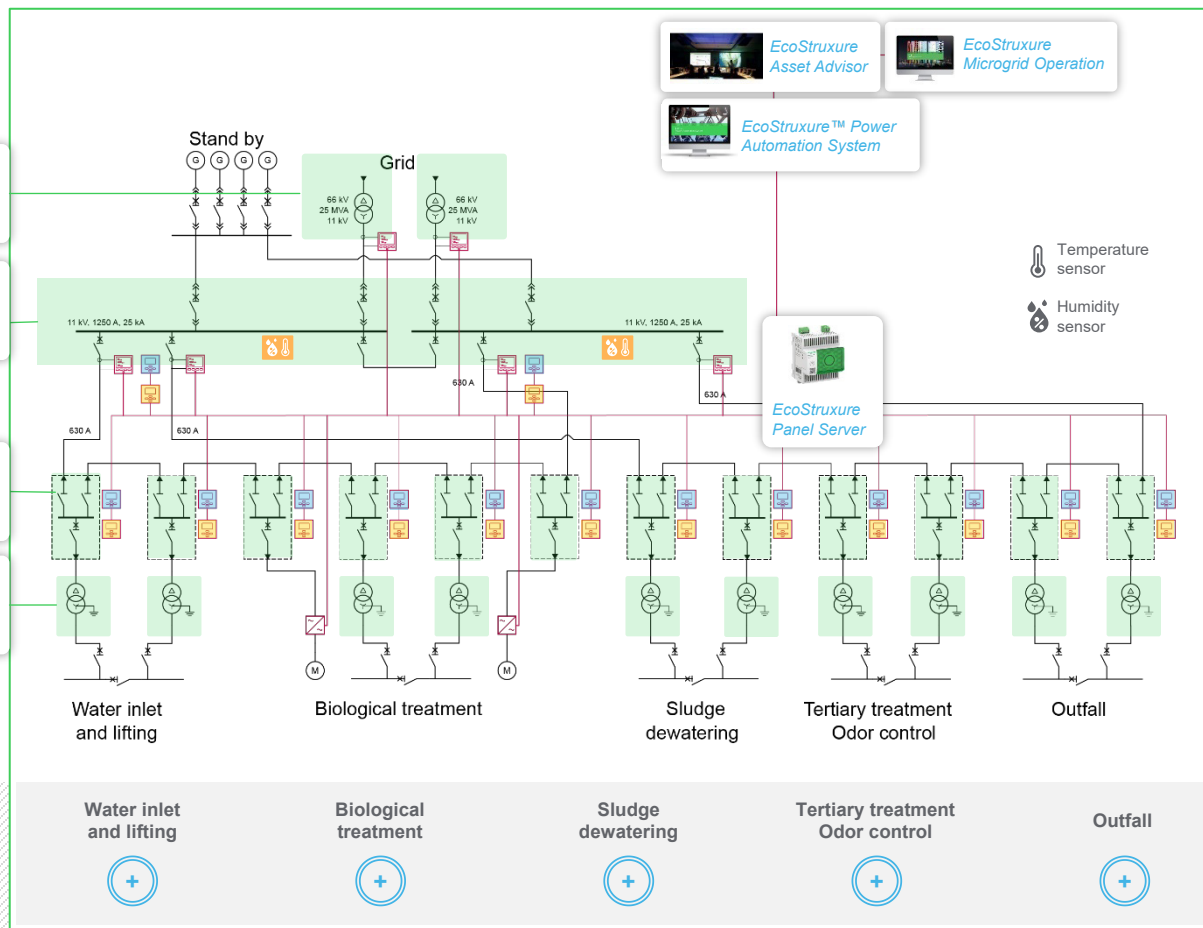
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

OUTFALL



Compact NSX
circuit breakers



TeSys Giga
protection relays



TeSys Giga
contactors



CL110



TH110

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product overview

DISPLAY

DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

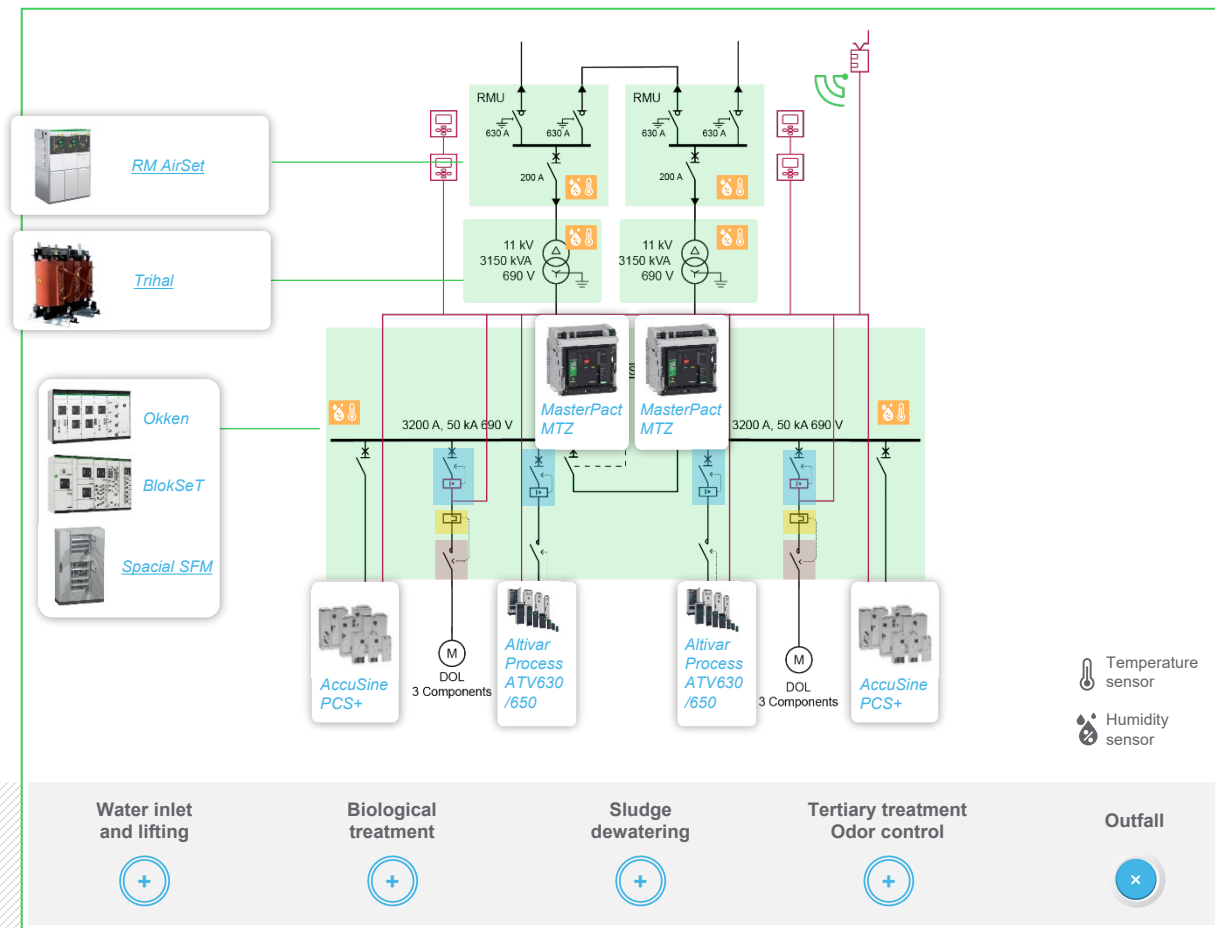
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

TERTIARY TREATMENT ODOR CONTROL



TeSys Ultra

TeSys Deca -
frame 2TeSys Deca
contactors

CL110



TH110

PowerLogic
PFC Capacitor
Banks IEC

RM AirSet



Trihal



Okken



BlokSeT



Spacial SFM

Click here to display
product overview

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DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

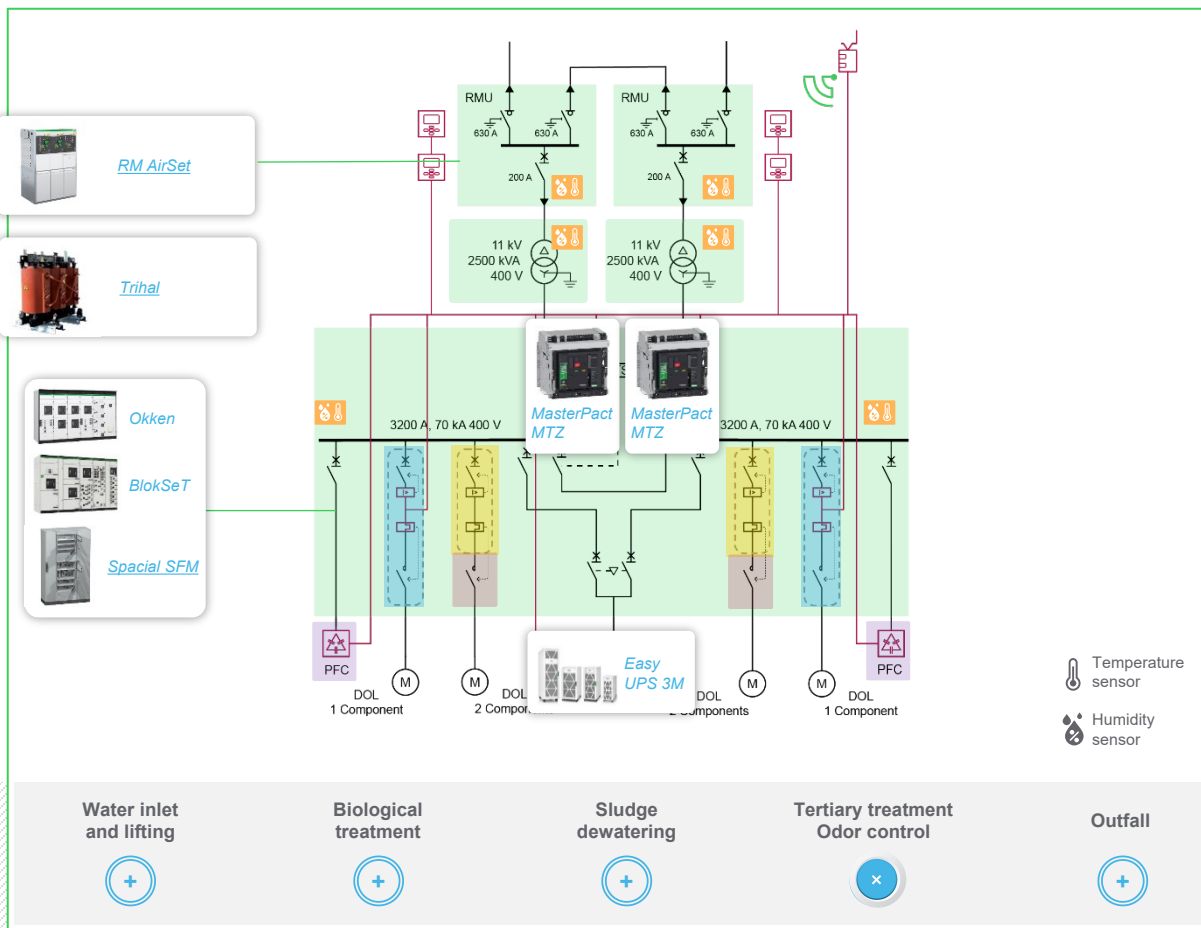
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

SLUDGE DEWATERING



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product overview

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PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

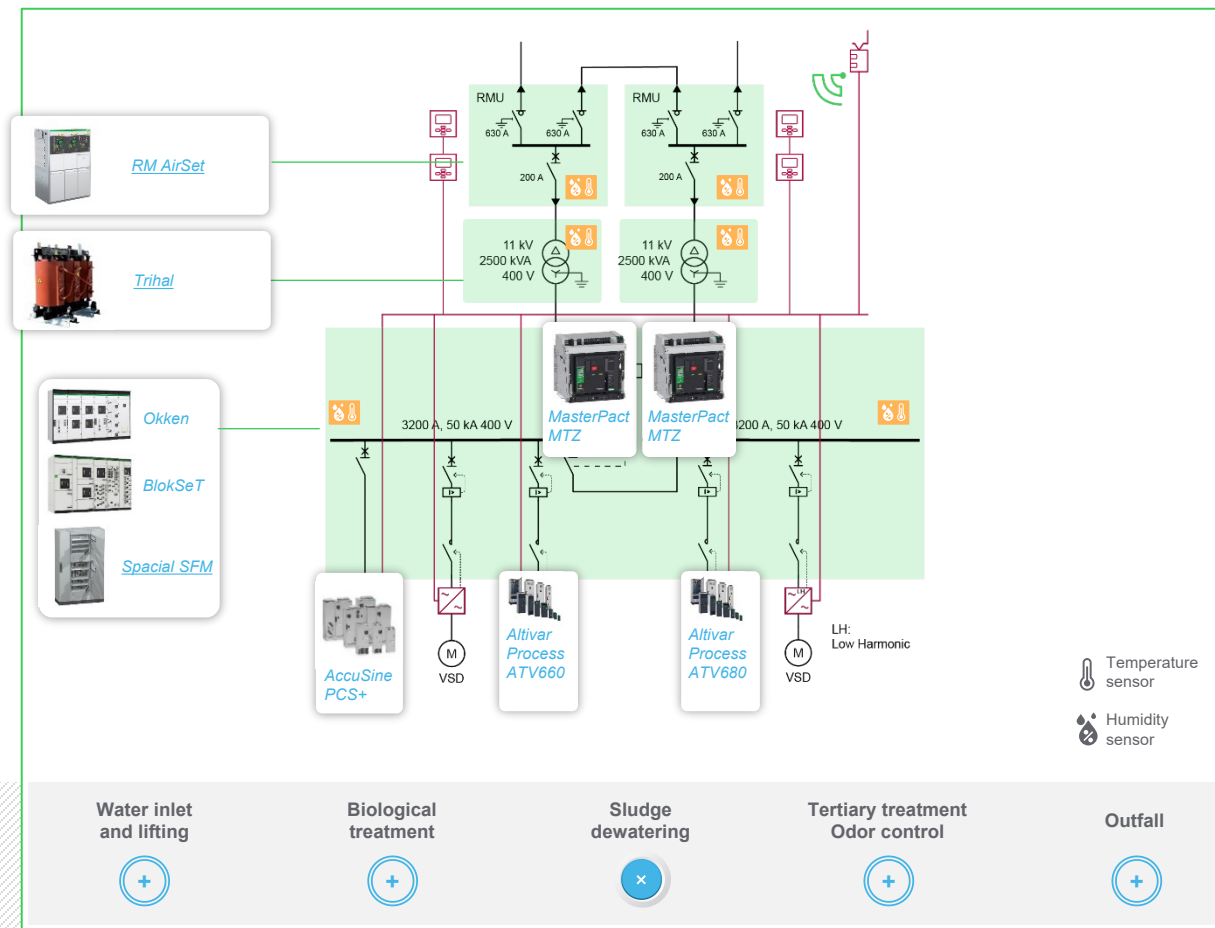
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

BIOLOGICAL TREATMENT



Compact NSX
circuit breakers



TeSys T
Protection relays



TeSys Giga
contactors



CL110



TH110

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PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

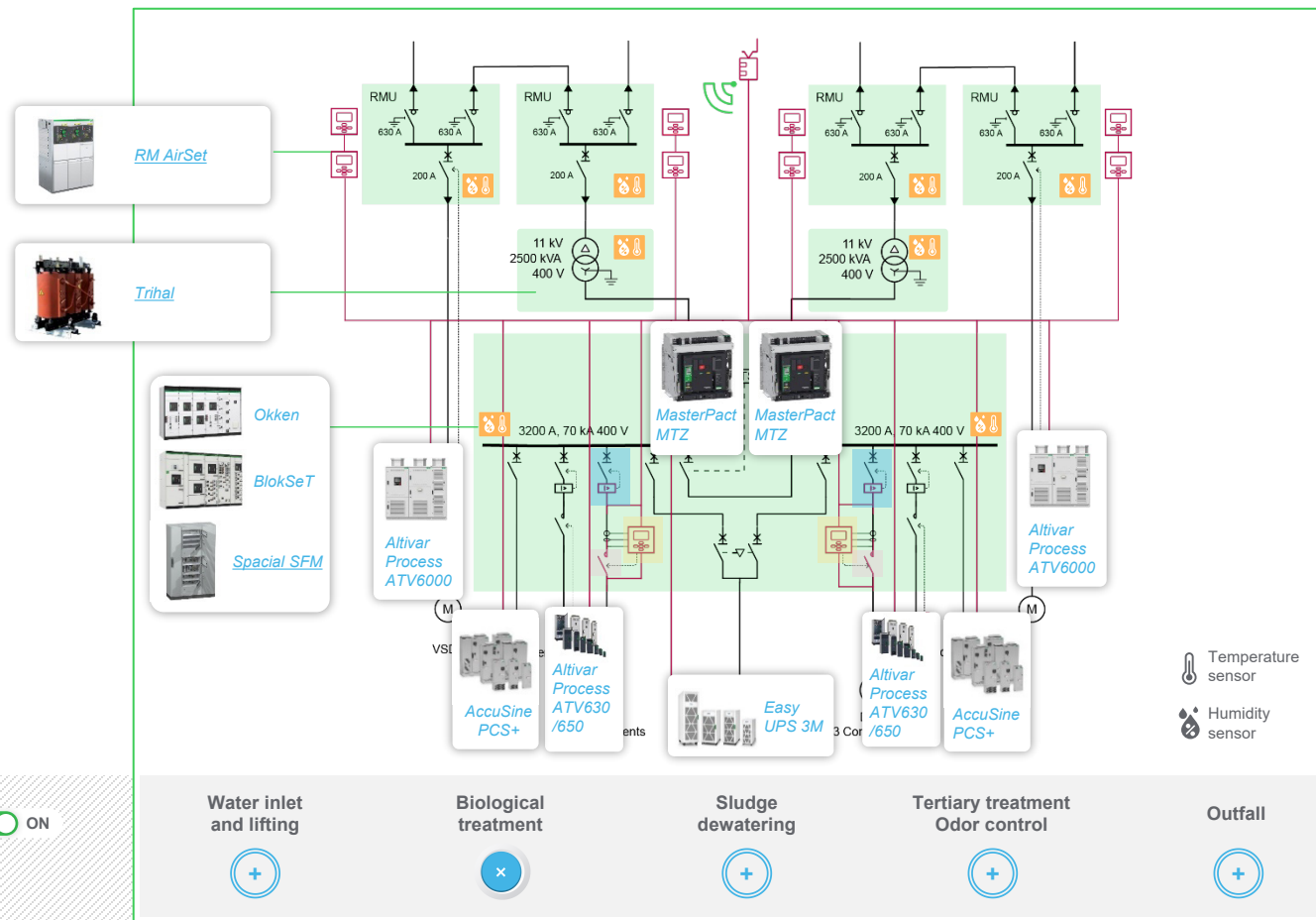
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

WATER INLET AND LIFTING



TeSys Deca -
frame 2



TeSys Deca
contactors



Compact NSX
circuit breakers



CL110



TH110

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PRODUCTS OFF



ON

DIGITAL LAYER OFF



ON

ARCHITECTURE

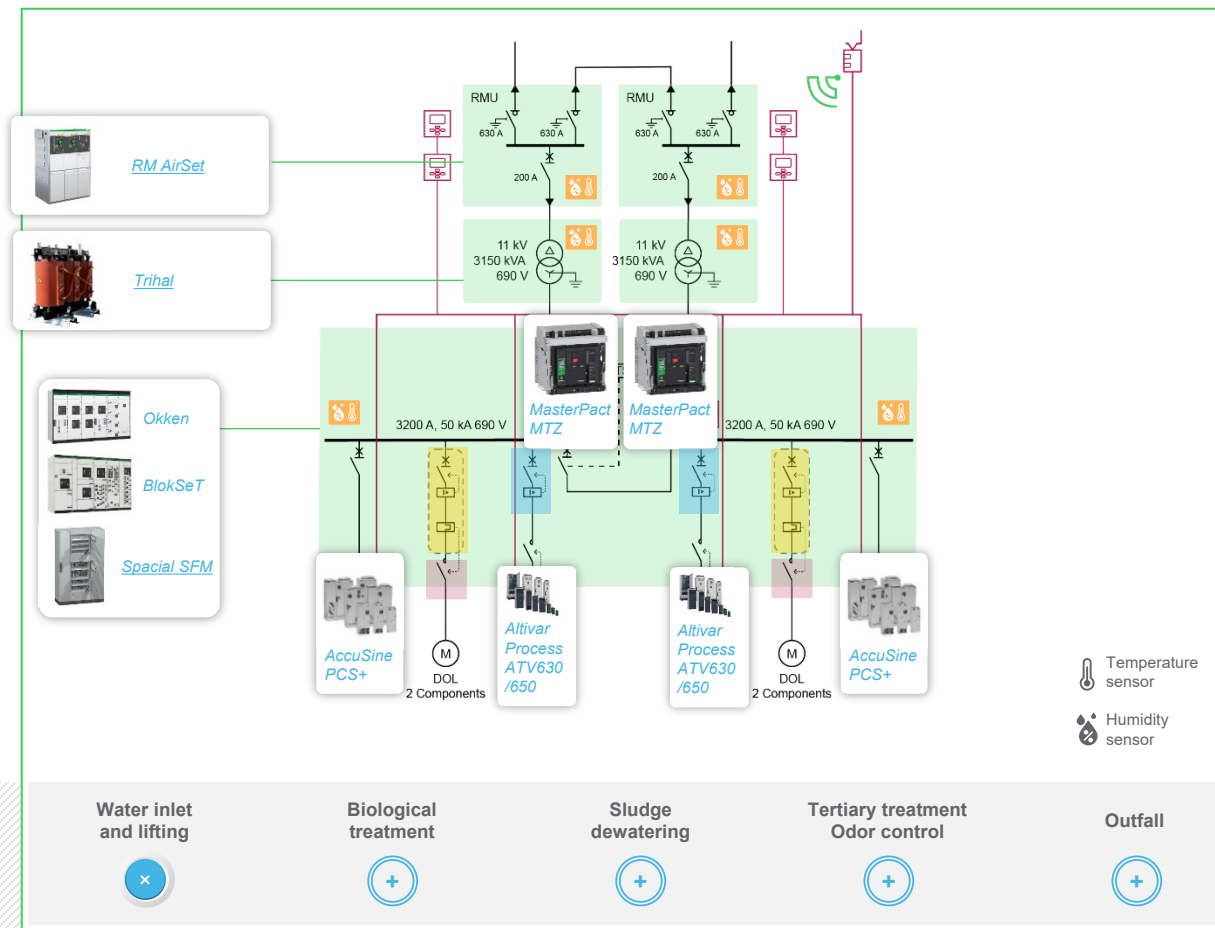
MICROGRID

RADIAL

OPEN LOOP

SINGLE SOURCE

MICROGRID



OPEN LOOP

ARCHITECTURE

SINGLE SOURCE



Apps, Analytics & Services



*EcoStruxure
Asset Advisor*



*EcoStruxure™ Power
Monitoring Expert*



*AVEVA Unified
Operation Center*

AVEVA

Edge Control



*EcoStruxure™ Power
Automation System*

Transformer



Minera MP



Trihal

Power Meter



*EasyLogic
PM2000 series*



*PowerLogic
PM5000 series*

MV Switchgear



PremSet



RM AirSeT

Power controller



*Easergy
C53 Automation
Controller 30TE
Model*



*Easergy P3
Protection
Relays*

Data collection



*EcoStruxure
Panel Server*

OPEN LOOP

ARCHITECTURE

MICROGRID



Apps, Analytics & Services



*EcoStruxure
Microgrid Advisor*



*EcoStruxure
Microgrid Operation*



*EcoStruxure™ Power
Monitoring Expert*



*EcoStruxure
Asset Advisor*



*AVEVA Unified
Operation Center*



Edge Control



EMA controller



*EcoStruxure™ Power
Automation System*

Transformer



Minera MP

Power Meter



*EasyLogic
PM2000 series*



*PowerLogic
PM5000 series*

MV Switchgear



PremSet

Power controller



*Easergy
C53 Automation
Controller 30TE
Model*



*Easergy P3
Protection
Relays*

Data collection



*EcoStruxure
Panel Server*

OPEN LOOP

ARCHITECTURE

ZOOM



LV Incomer Circuit Breaker



MasterPact
MTZ



MasterPact NW

Power Quality



AccuSine PCS+

LV panel



Okken



BlokSeT



Spacial SFM

Variable speed drive



Altivar Process
ATV6000



Altivar Process
ATV630/650

Distribution transformer



Trihal

Ring main units



RM AirSeT

Wireless sensors



CL110



TH110



HeatTag

Motor control and protection



TeSys Ultra



TeSys Deca
contactors



TeSys Giga
contactors



ComPact NSX



TeSys T



TeSys Deca -
frame 2



TeSys Giga
circuit-breakers



TeSys Deca -
frame 3



TeSys Giga
protection relays

UPS



Easy UPS 3M



x10

Trihal

Click on the link to get further information about the product on se.com

Display/Hide all products related to the current architecture

Select Architecture

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ARCHITECTURE

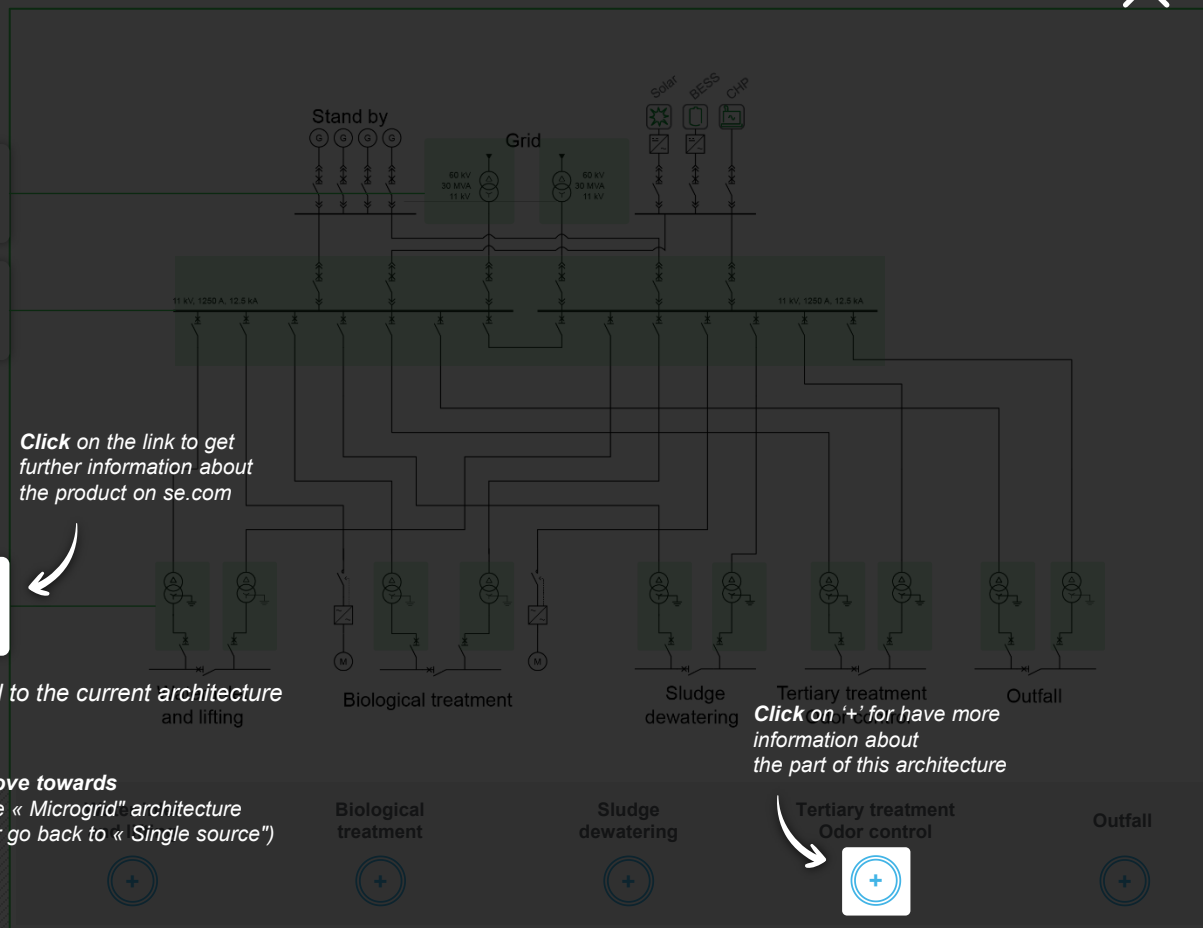
MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID

Move towards
the « Microgrid» architecture
(or go back to « Single source»)

Tertiary treatment
Odor control



RADIAL

ARCHITECTURE

MICROGRID

Double Radial architecture:

- Centralized MV switchboard to feed all loads
- 12 x 630A MV feeders

Major advantages:

- Classical architecture with proven reliability
- Suitable for compact infrastructure

Sustainability:

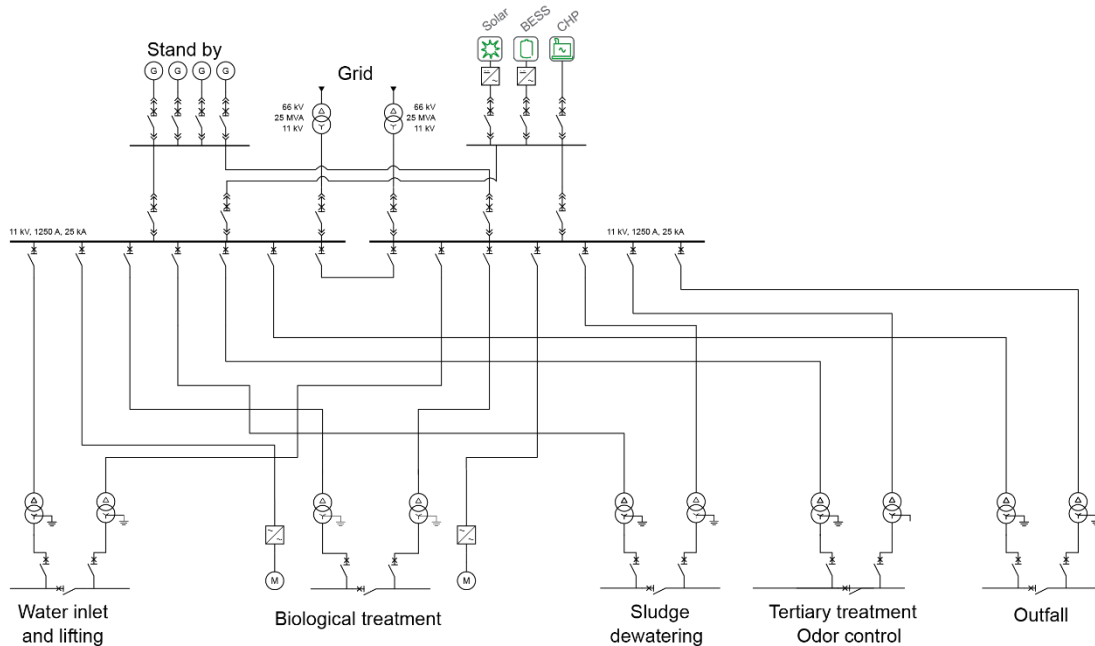
- equipment fit for purpose: no over sizing
- Architecture **compliant** with **SF6 free offer**

Reliability:

- Redundant feeders ensure a continuous supply of connected loads

Microgrid

- Energy **cost optimization**
- Reduces **carbon footprint**
- Short-term continuity enabler
- Process continuity enabler



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

RADIAL [OPEN LOOP](#)

MICROGRID

[SINGLE SOURCE](#) **MICROGRID**

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

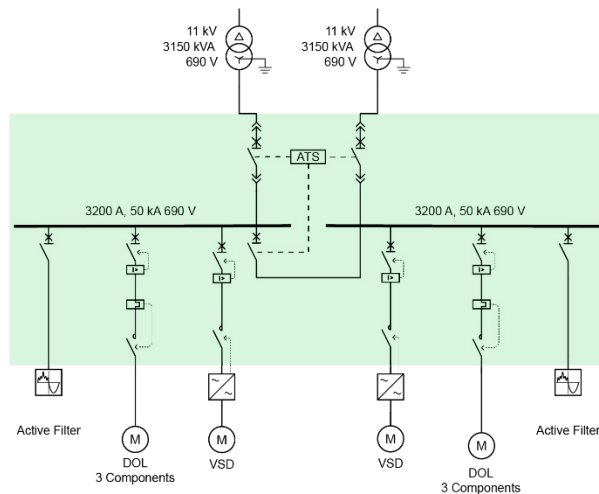
ARCHITECTURE

OUTFALL

Can supply water inlet and lifting up to 2000 kW

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW or Direct On Line.



DISPLAY

PRODUCTS ☐ OFF ☒ ON

DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

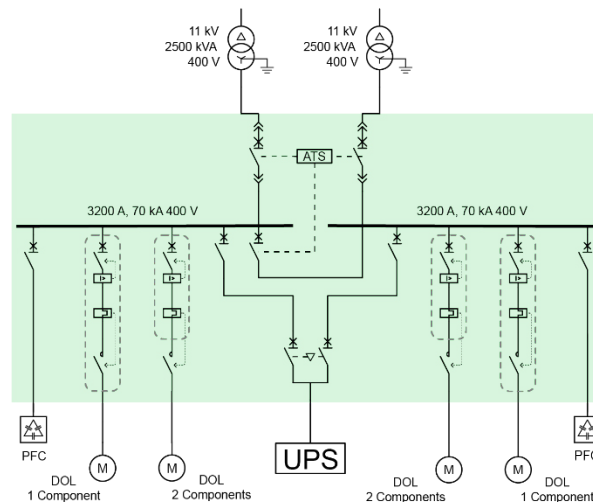
ARCHITECTURE

TERTIARY TREATMENT ODOR CONTROL

Can supply water inlet and lifting up to 1500 kW

Direct On Line 1 component up to 15 kW

Direct On Line 2 components up to 55 kW



DISPLAY

PRODUCTS ☐ OFF ☒ ON

DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

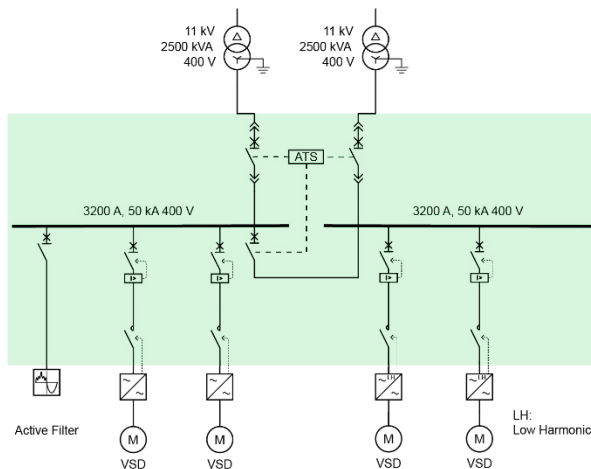
ARCHITECTURE

SLUDGE DEWATERING

Can supply water inlet and lifting up to 1500 kW

VSD driven motor from 0,75 to 1200 kW.

VSD with the Low Harmonic option do not need any harmonic compensation of an active filter.



DISPLAY

PRODUCTS OFF ☒ ON

DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

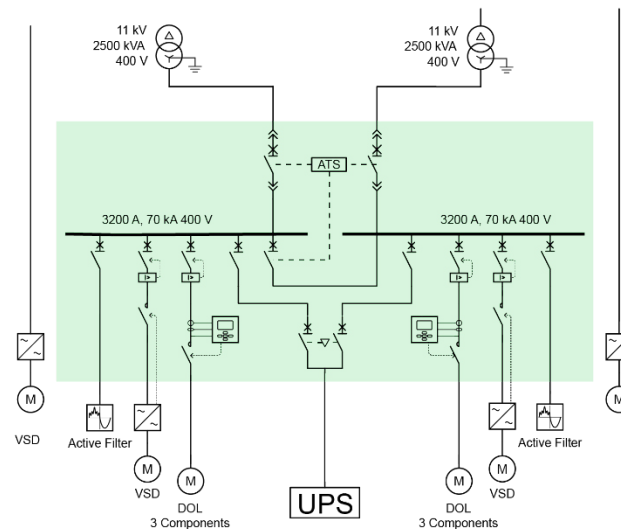
ARCHITECTURE

BIOLOGICAL TREATMENT

Can supply biological treatment up to 6500 kW

VSD or Direct On Line for motors from 0,75 to 1200 kW while the medium voltage can supply the most powerful motors for blowing up to 2 x 2500 kW.

UPS to support 150 kW critical loads



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

RADIAL OPEN LOOP

MICROGRID

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

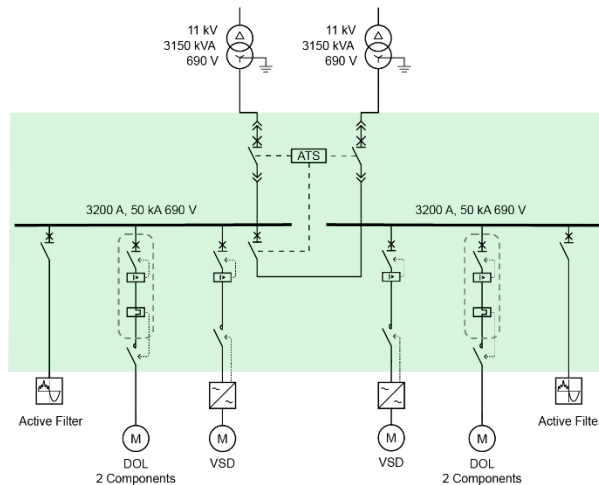
ARCHITECTURE

WATER INLET AND LIFTING

Can supply water inlet and lifting up to 2000 kW

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW or
Direct On Line 2 components up to 55 kW



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

[Minera MP](#)[Premset](#)[Trihal](#)

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product overview

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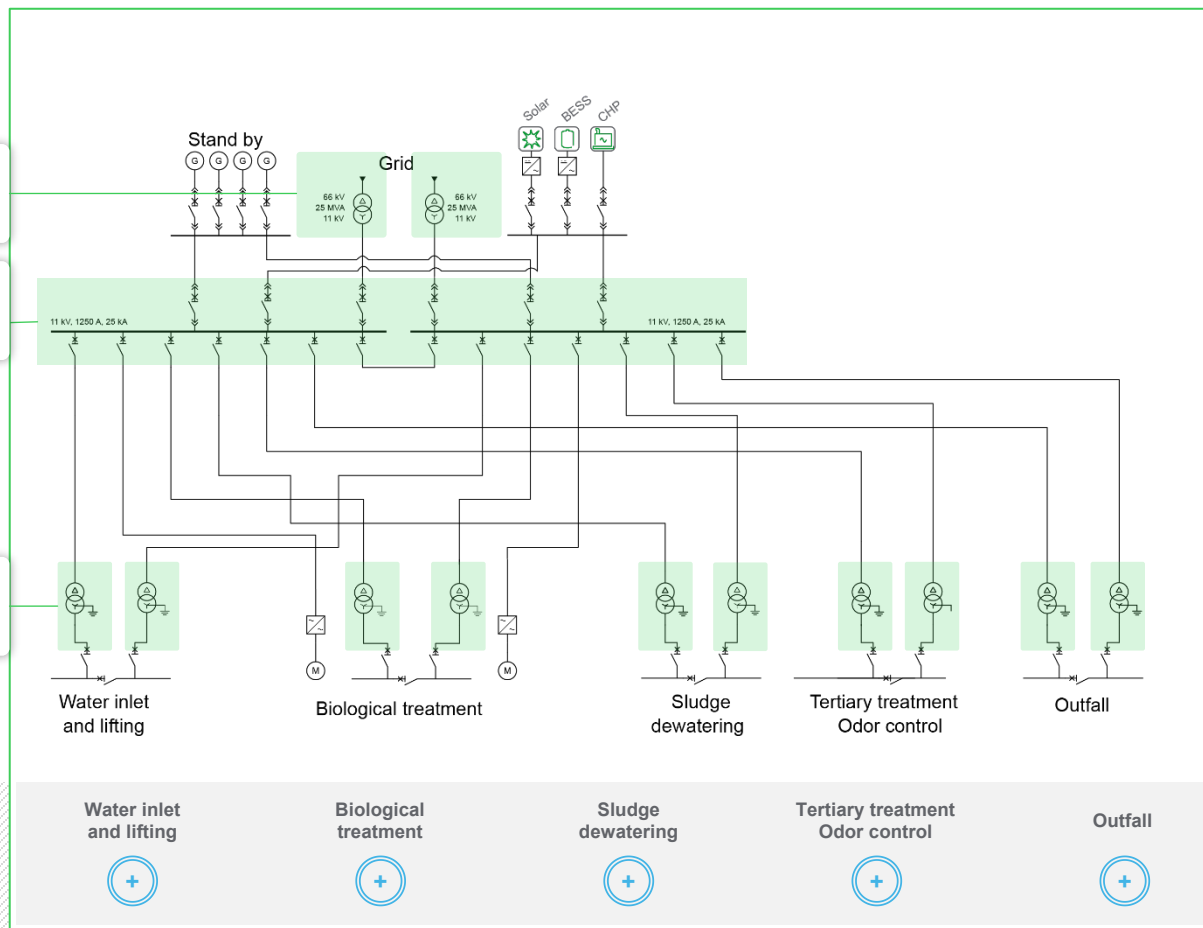
ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID



RADIAL

ARCHITECTURE

OUTFALL



Compact NSX circuit breakers



TeSys Giga
protection relays



TeSys Giga
contactors

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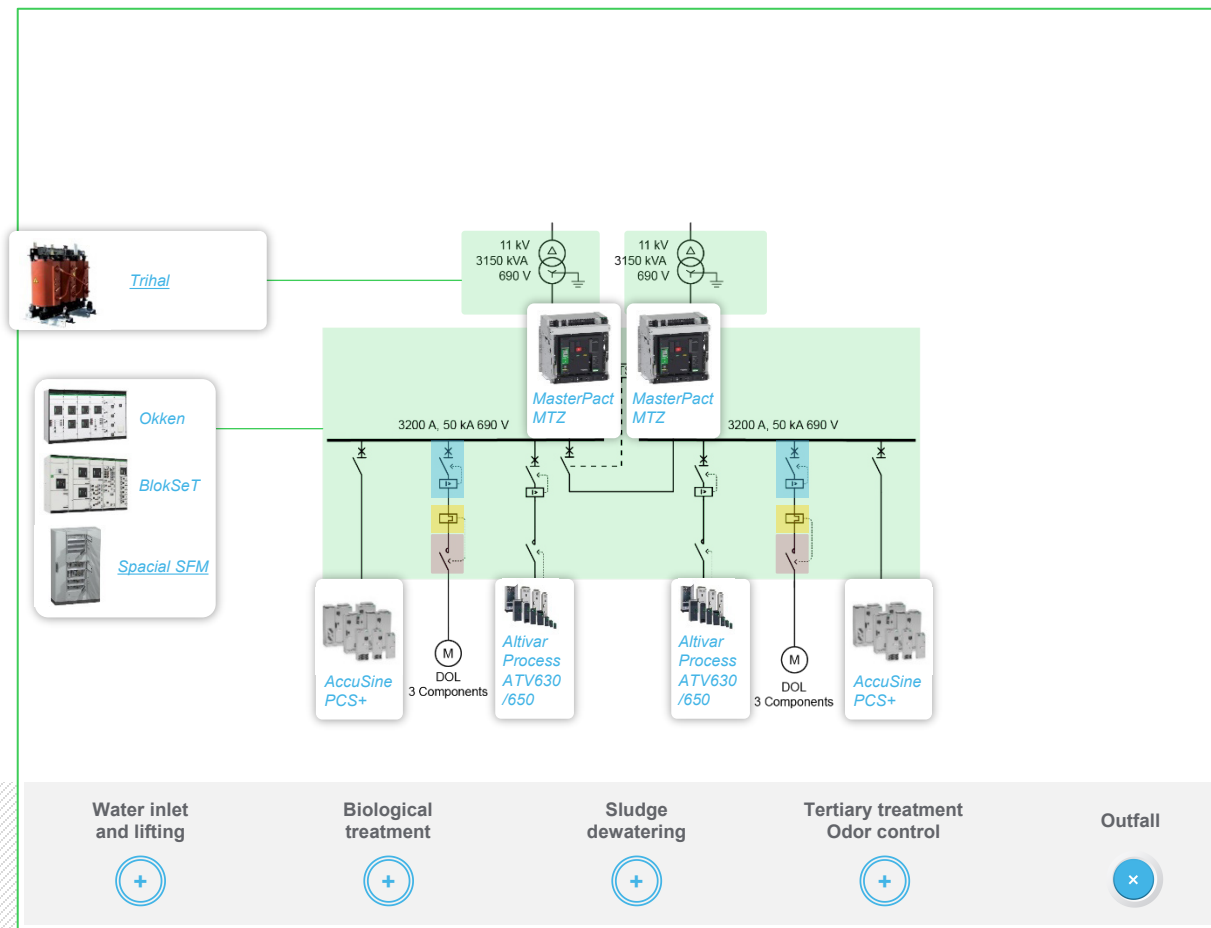
ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID



RADIAL

ARCHITECTURE

TERTIARY TREATMENT ODOR CONTROL



TeSys Ultra



PowerLogic
PFC Capacitor
Banks IEC



Trihal



TeSys Deca -
frame 2



TeSys Deca
contactors



Okken



BlokSeT



Spacial SFM

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PRODUCTS OFF

ON

DIGITAL LAYER OFF

ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



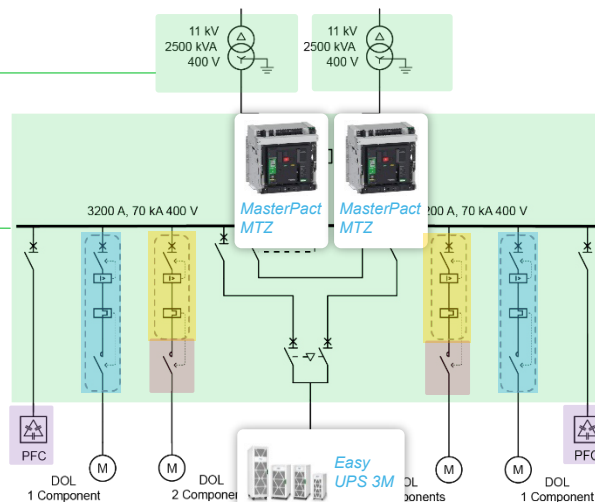
Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

SLUDGE DEWATERING

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product overview

DISPLAY

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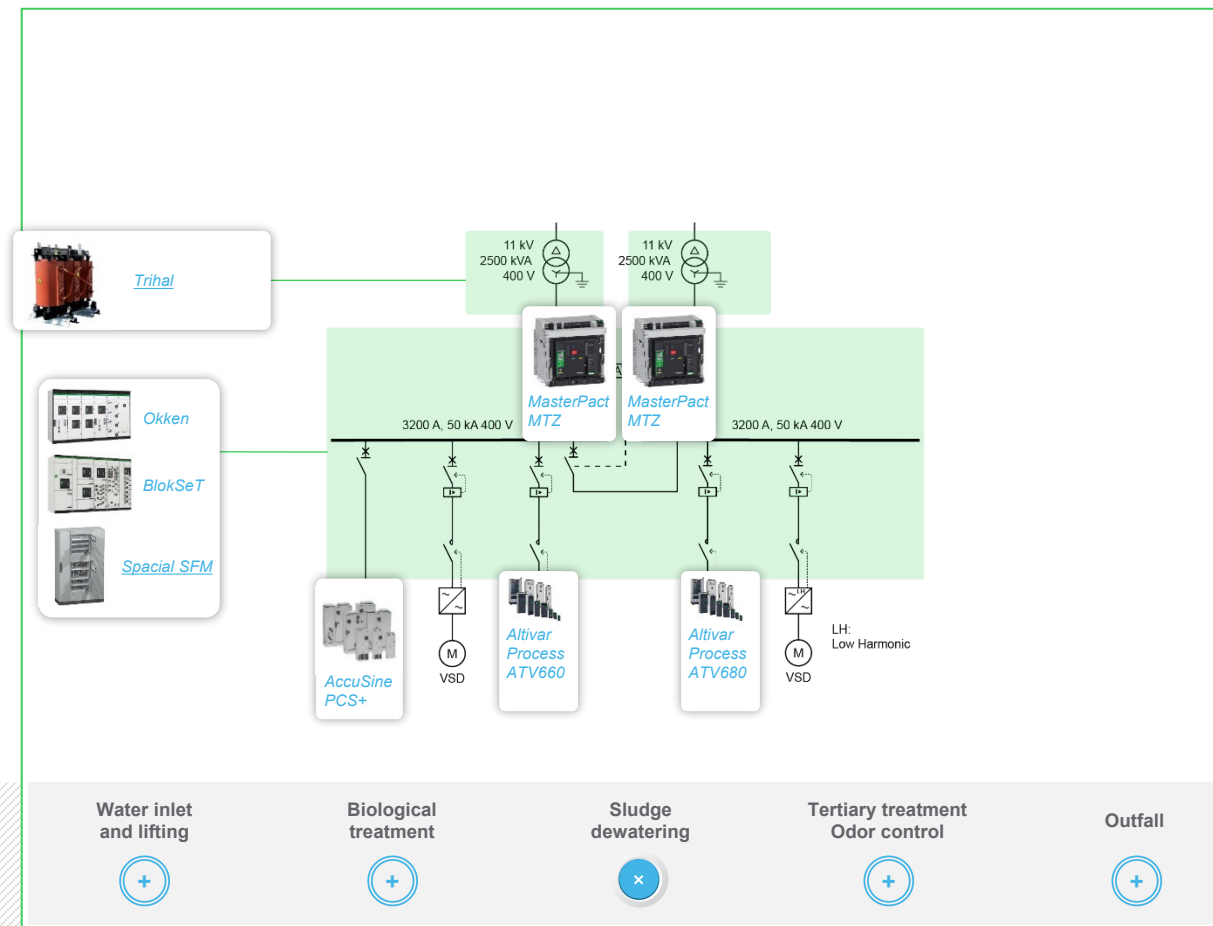
PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☐ ON

ARCHITECTURE

RADIAL OPEN LOOP

MICROGRID

SINGLE SOURCE MICROGRID



RADIAL

ARCHITECTURE

BIOLOGICAL TREATMENT



Compact NSX
circuit breakers



TeSys T
Protection relays



TeSys Giga
contactors

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product overview

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ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID



Trihal



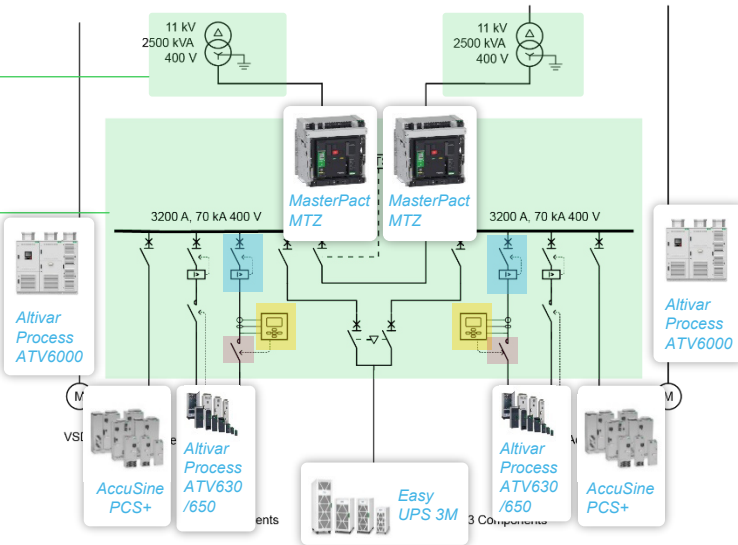
Okken



BlokSeT



Spacial SFM



Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

WATER INLET AND LIFTING

TeSys Deca -
frame 2

TeSys Deca
contactors



Compact NSX circuit breakers

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DIGITAL LAYER OFF  ON

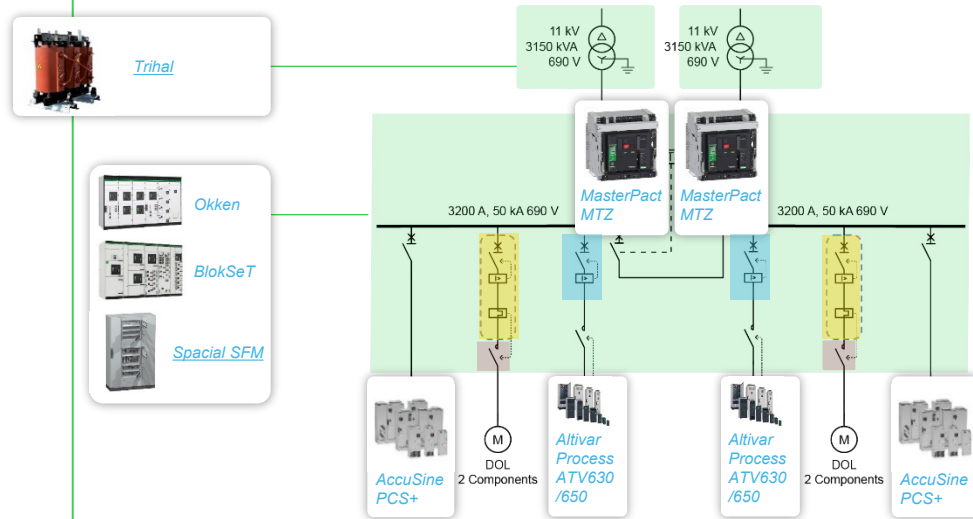
ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID



Water inlet and lifting



Biological treatment



Sludge dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

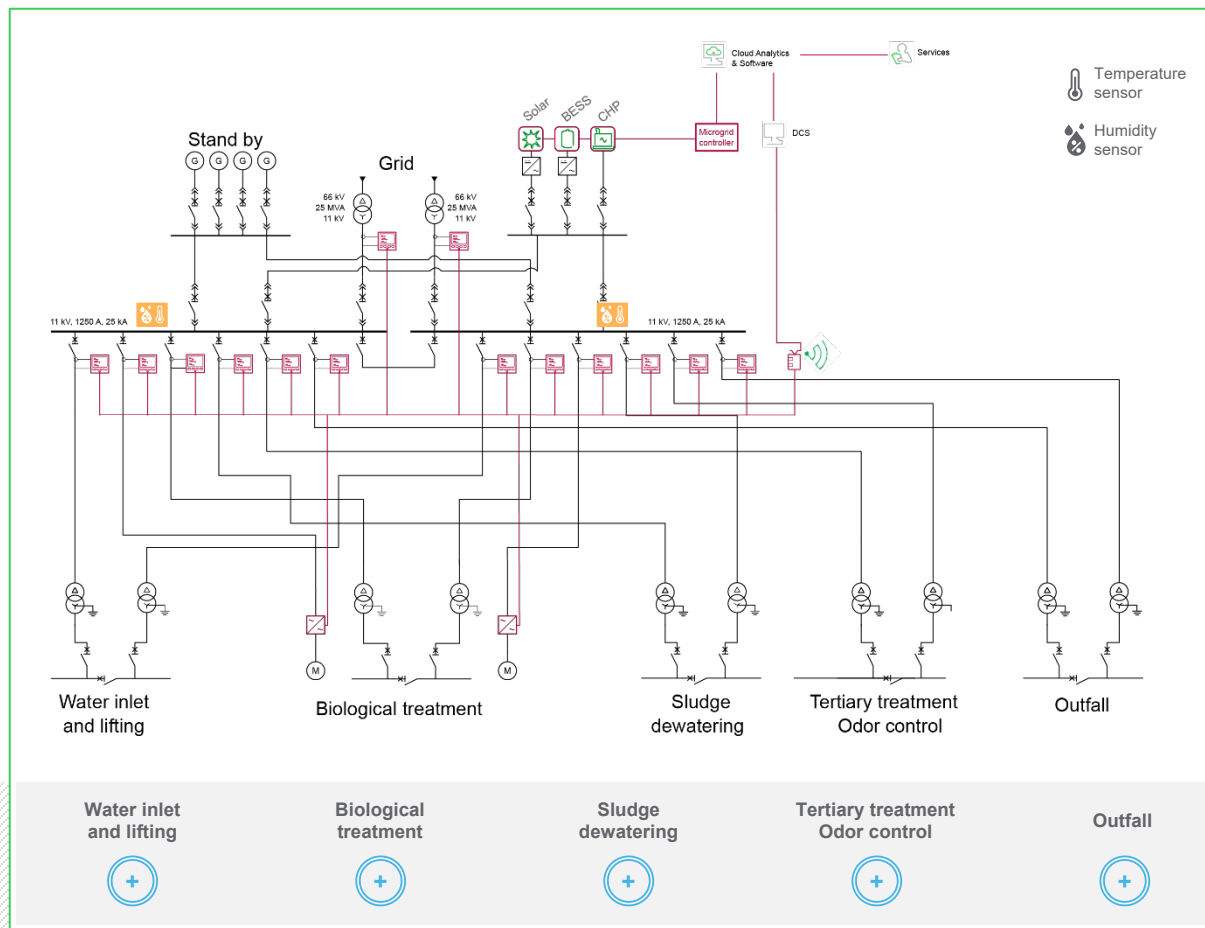
MICROGRID

Continuous monitoring 24/7

- with connected products
- with wireless sensors temperature and environment

Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost



DISPLAY

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ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID

RADIAL

ARCHITECTURE

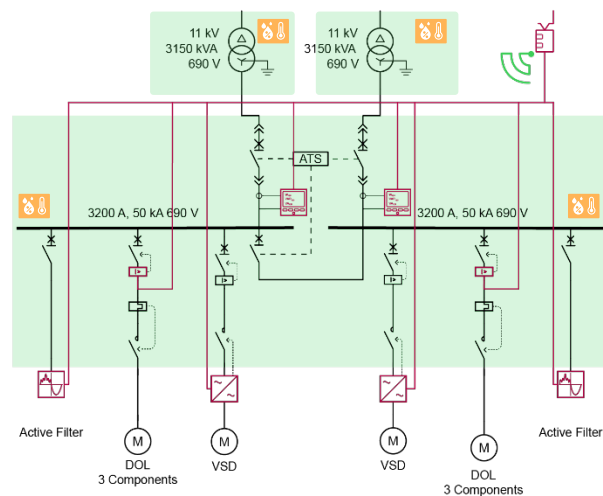
OUTFALL

Continuous monitoring 24/7

- with connected products
- with wireless sensors temperature and environment

Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost



DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

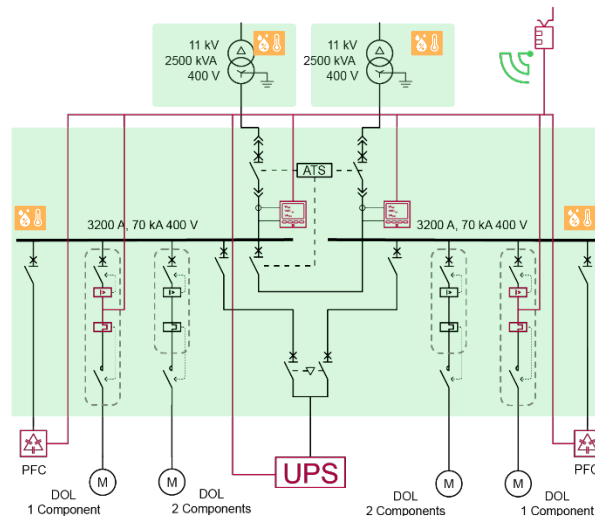
TERTIARY TREATMENT ODOR CONTROL

Continuous monitoring 24/7

- with connected products
- with wireless sensors temperature and environment

Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

RADIAL OPEN LOOP

MICROGRID

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

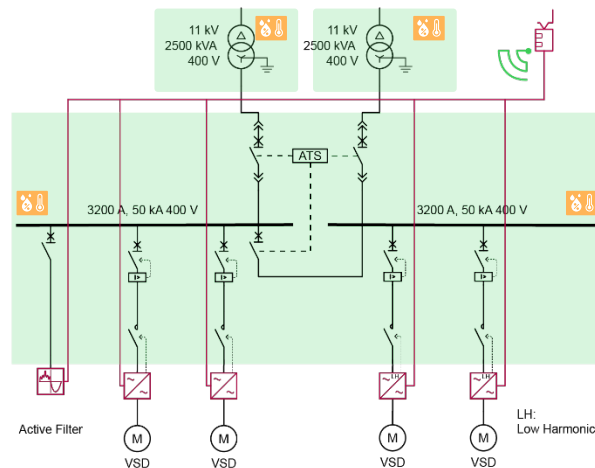
SLUDGE DEWATERING

Continuous monitoring 24/7

- with connected products
- with wireless sensors temperature and environment

Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost



Temperature sensor

Humidity sensor

DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

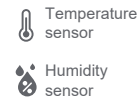
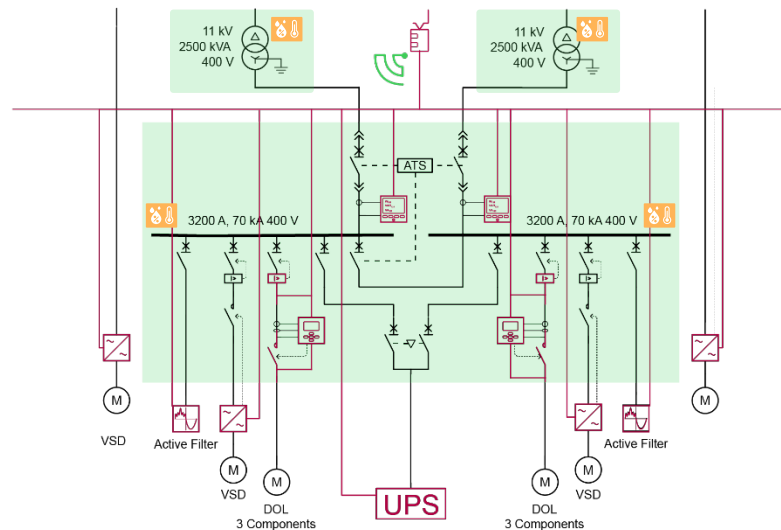
BIOLOGICAL TREATMENT

Continuous monitoring 24/7

- with connected products
- with wireless sensors temperature and environment

Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL ☒ OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

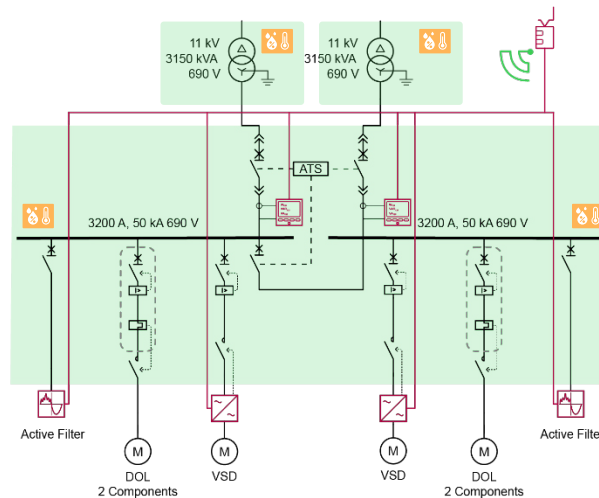
WATER INLET AND LIFTING

Continuous monitoring 24/7

- with connected products
- with wireless sensors temperature and environment

Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost



Temperature sensor

Humidity sensor

DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL ☒ OPEN LOOP

SINGLE SOURCE

MICROGRID

Water inlet
and lifting



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treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE



EMA controller



Minera MP



Premset



Trihal

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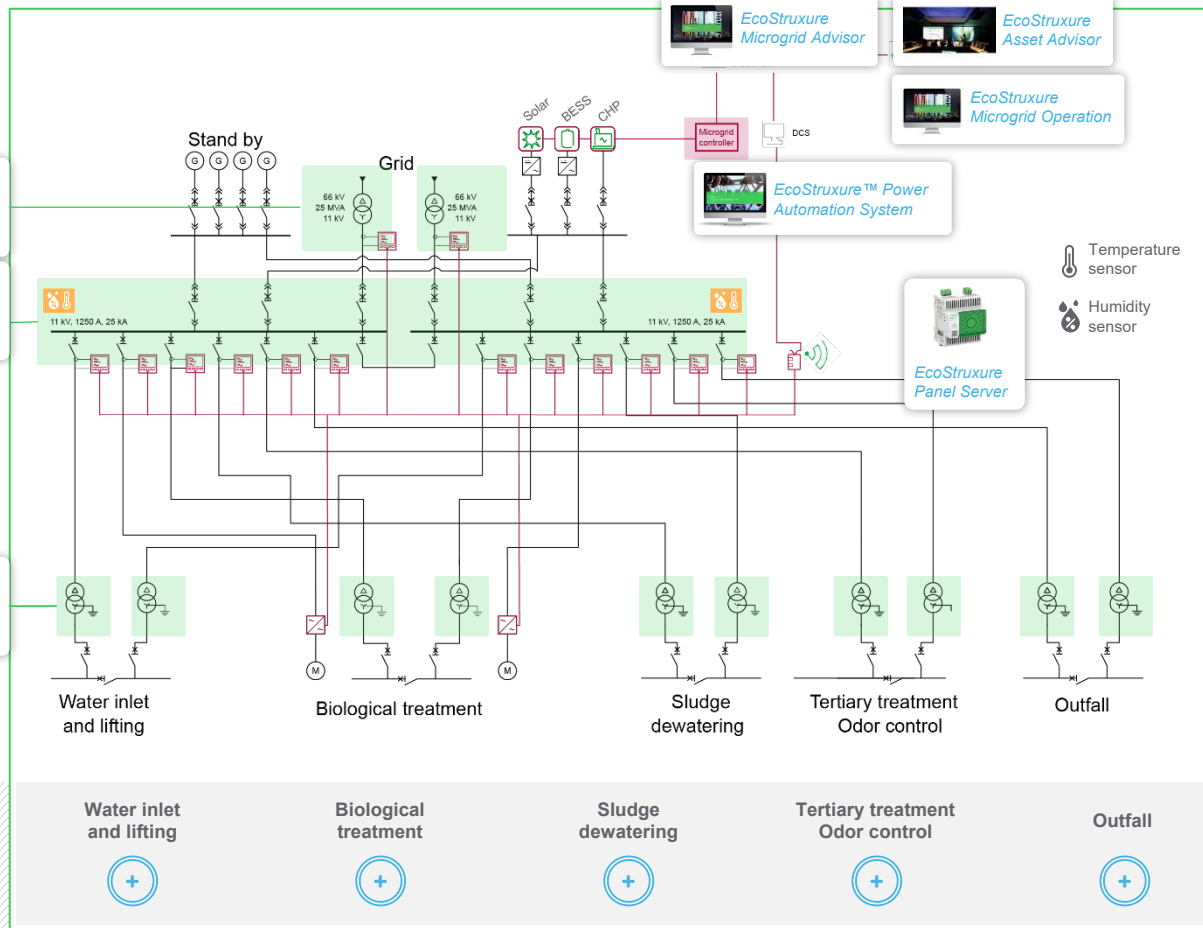
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DISPLAY

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ARCHITECTURE

MICROGRID

[RADIAL](#) [OPEN LOOP](#)[SINGLE SOURCE](#)[MICROGRID](#)

RADIAL

ARCHITECTURE

OUTFALL



Compact NSX
circuit breakers

CL110



TeSys Giga
protection relays

TH110



TeSys Giga
contactors

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product overview

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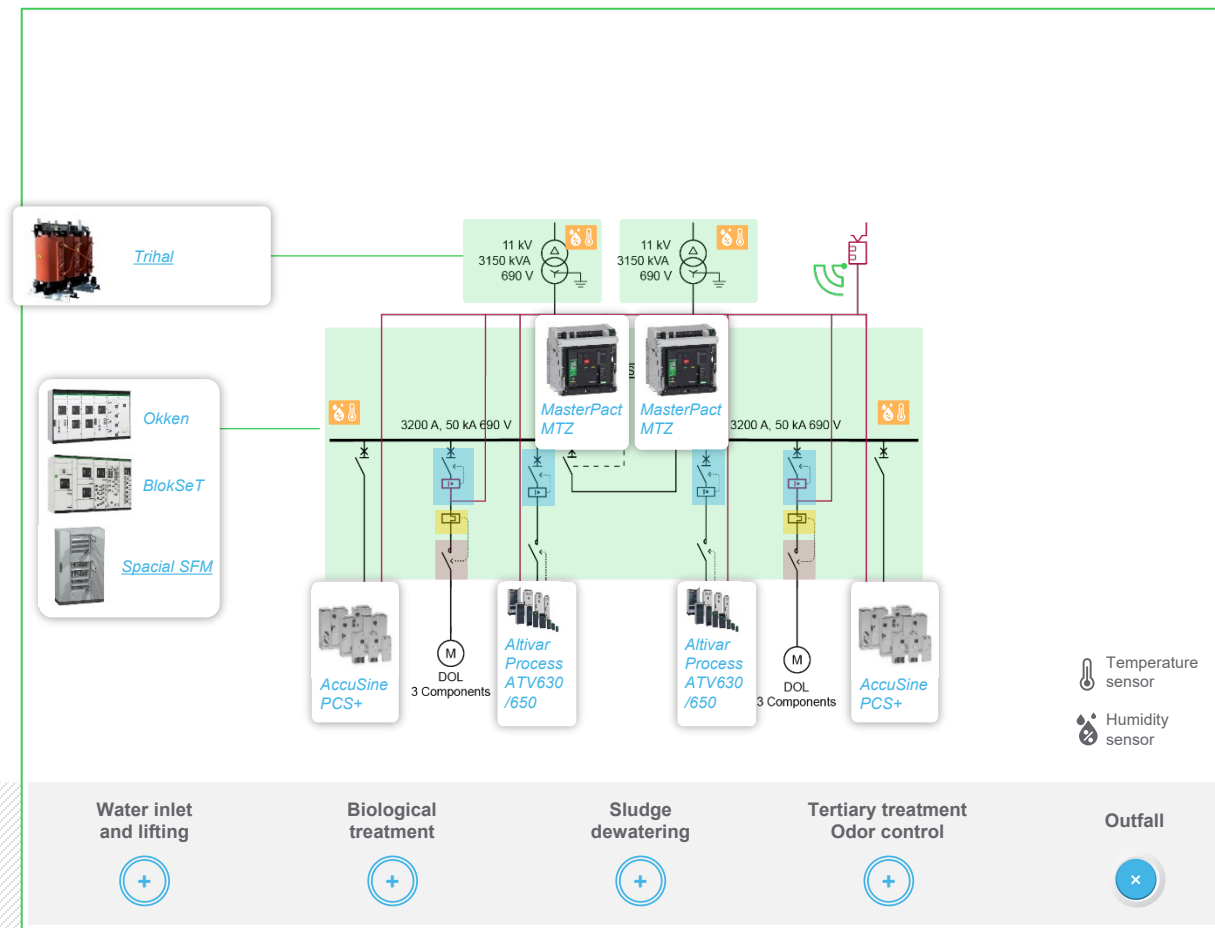
PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

RADIAL OPEN LOOP

MICROGRID

SINGLE SOURCE MICROGRID



RADIAL

ARCHITECTURE

TERTIARY TREATMENT ODOR CONTROL



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product overview

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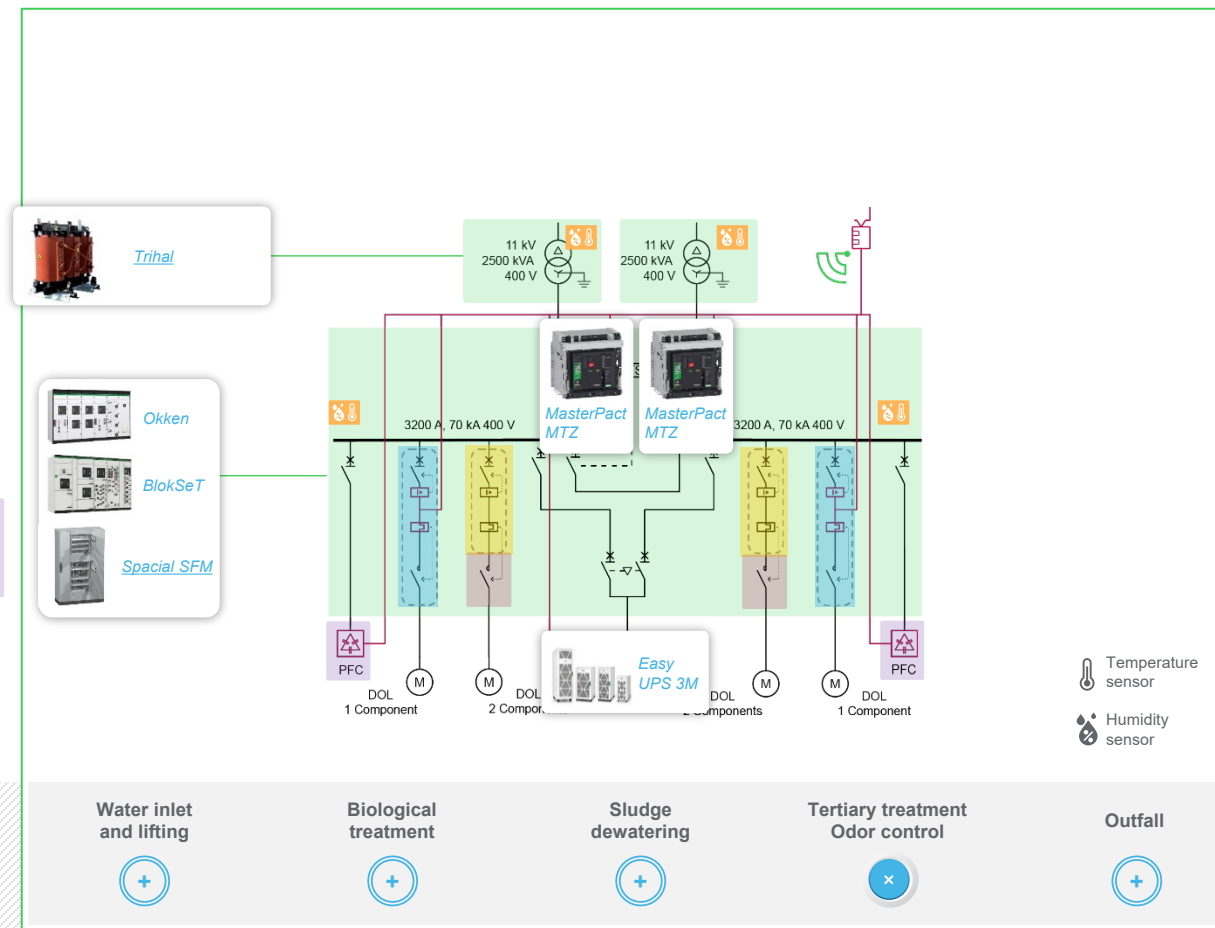
ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID



RADIAL

ARCHITECTURE

SLUDGE DEWATERING



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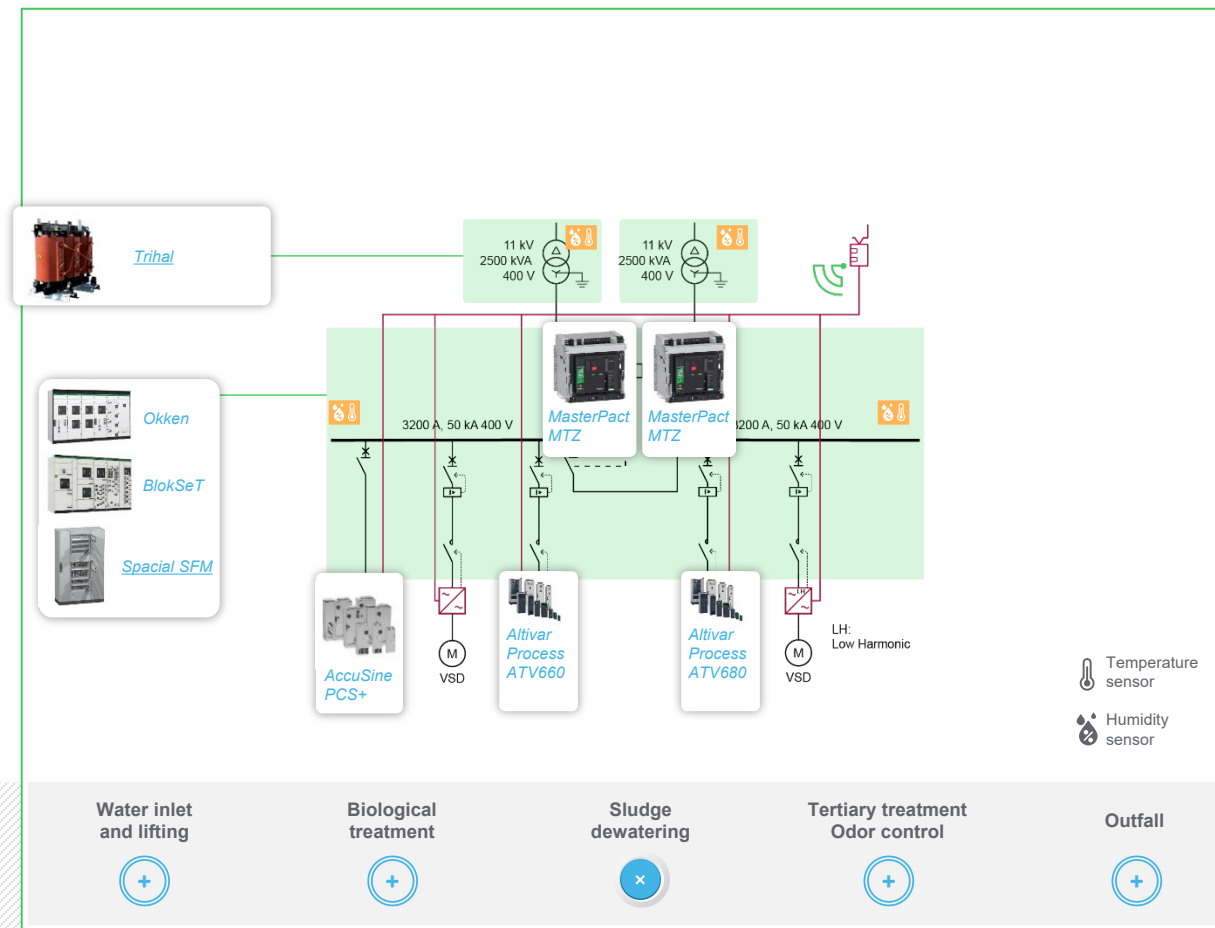
ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID



RADIAL

ARCHITECTURE



Compact NSX circuit breakers



CL110



TeSys T
Protection relays



TH110



TeSys Giga
contactors

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PRODUCTS OFF

ON

DIGITAL LAYER OFF

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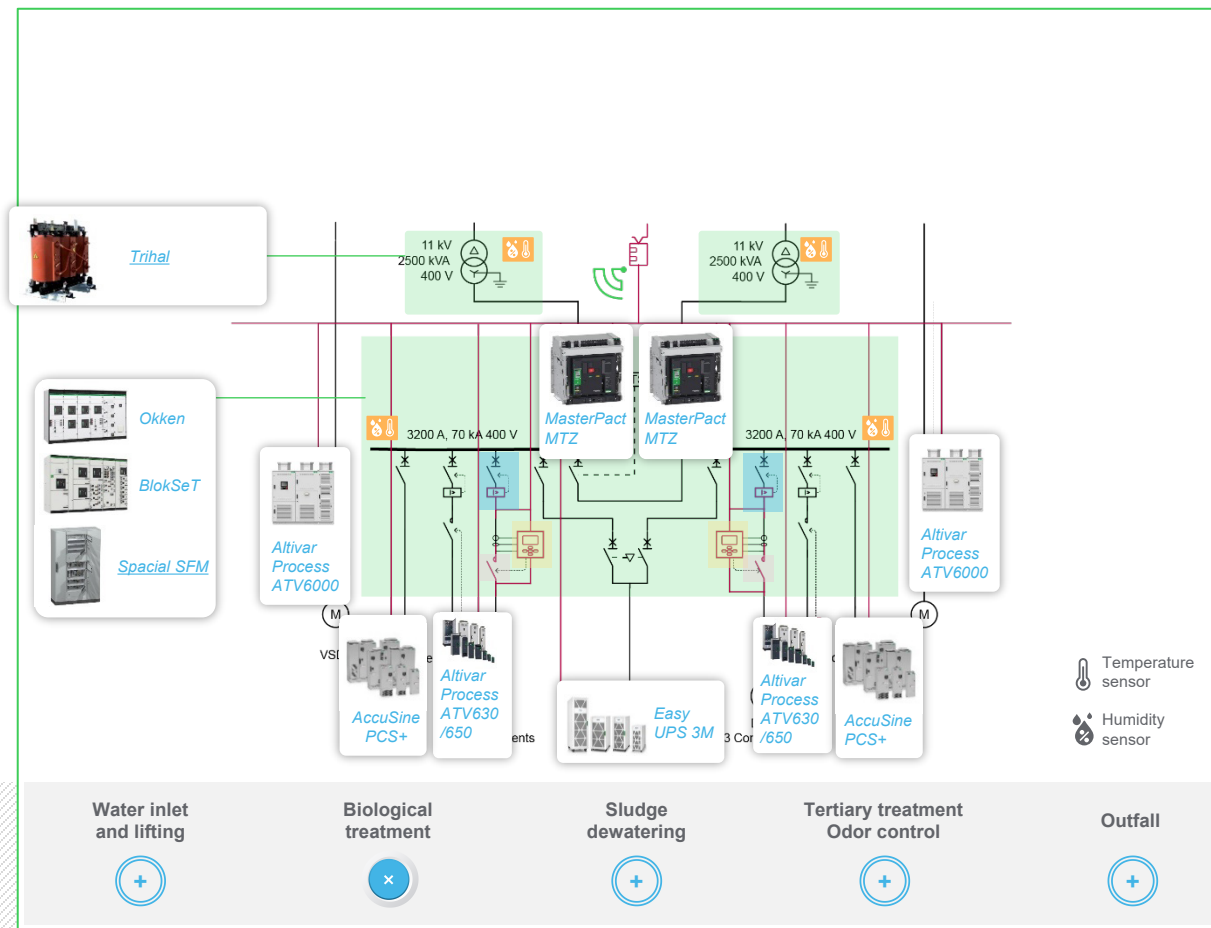
ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID



RADIAL

ARCHITECTURE

WATER INLET AND LIFTING



TeSys Deca -
frame 2



TeSys Deca
contactors



Compact NSX
circuit breakers



CL110



TH110

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DISPLAY

DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

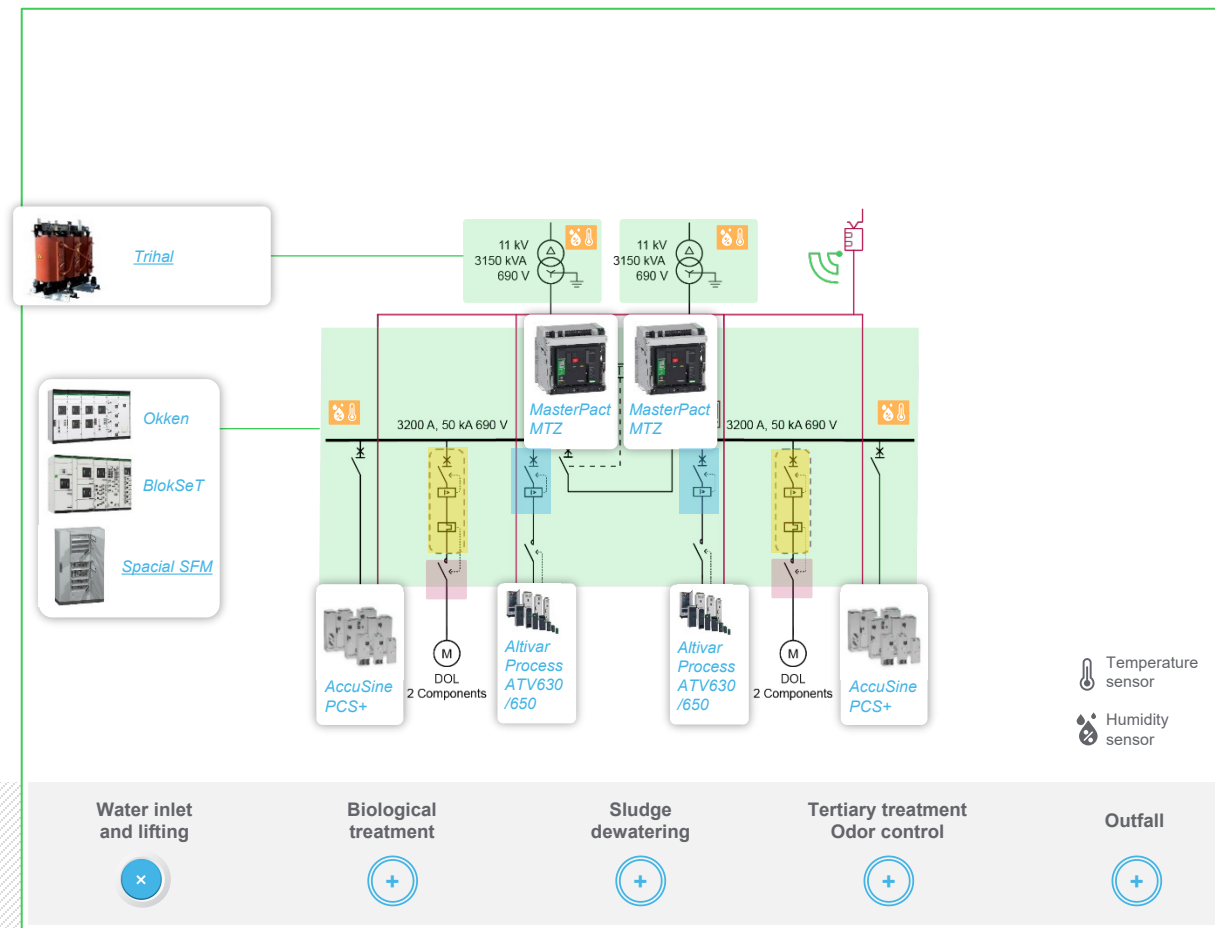
ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE

MICROGRID





Display/Hide all products related to the current architecture

Select Architecture

DISPLAY

PRODUCTS OFF  ON

DIGITAL LAYER OFF  ON

ARCHITECTURE

MICROGRID

RADIAL

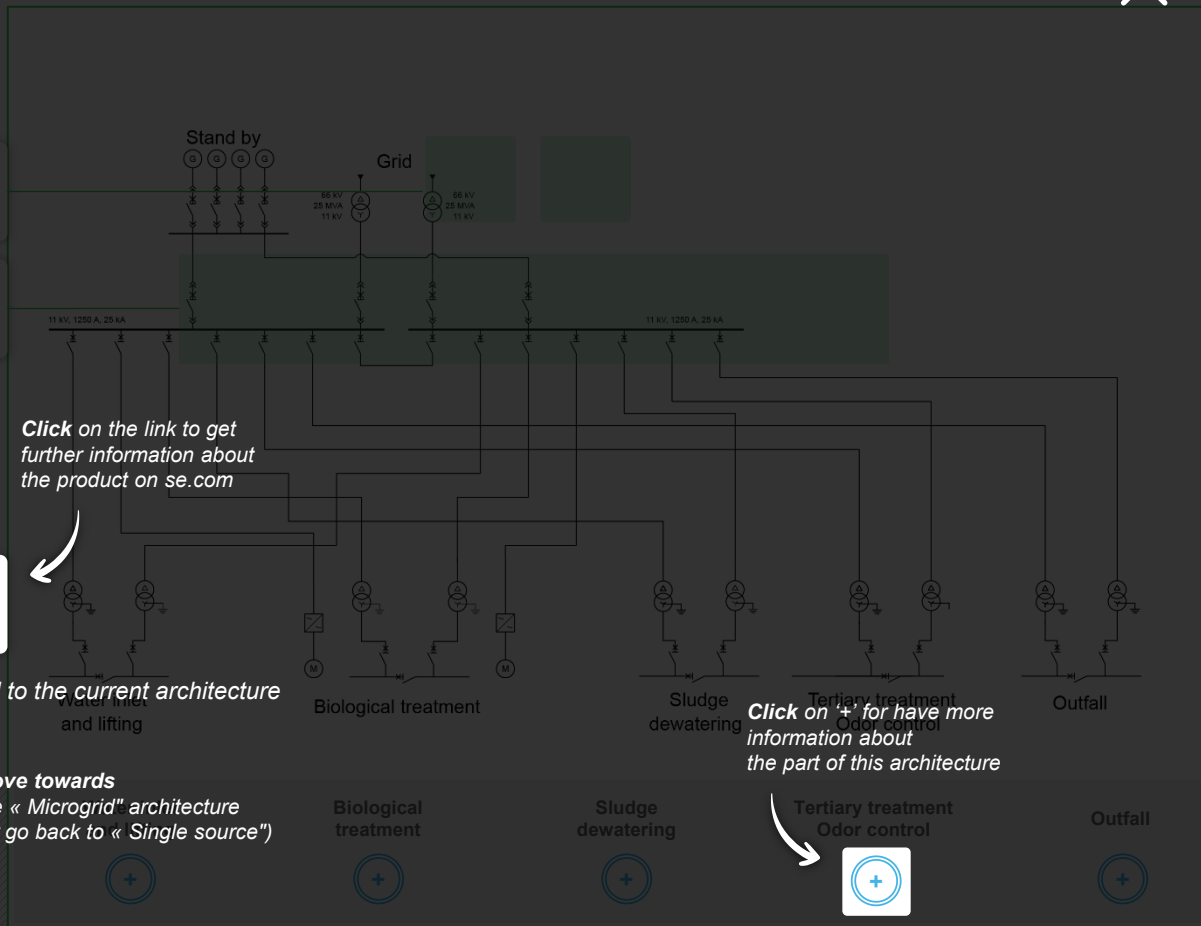
OPEN LOOP

SINGLE SOU

MICROGRID

Move towards
the « Microgrid" architecture
(or go back to « Single source")

Tertiary treatment
Odor control



Click on the link to get further information about the product on se.com

Click on '+' for have more information about the part of this architecture

RADIAL

ARCHITECTURE

SINGLE SOURCE

Double Radial architecture:

- Centralized MV switchboard to feed all loads
- 12 x 630A MV feeders

Reliability:

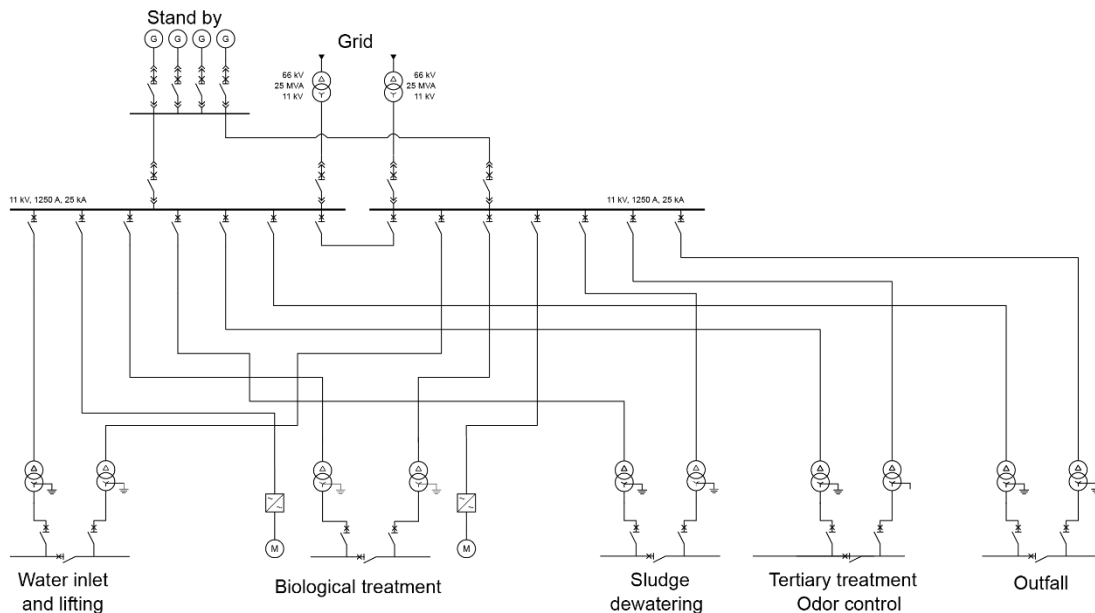
- Redundant feeders ensure a continuous supply of connected loads

Major advantages:

- Classical architecture with proven reliability
- Suitable for compact infrastructure

Sustainability:

- equipment fit for purpose: no over sizing
- Architecture **compliant with SF6 free offer**



DISPLAY

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ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

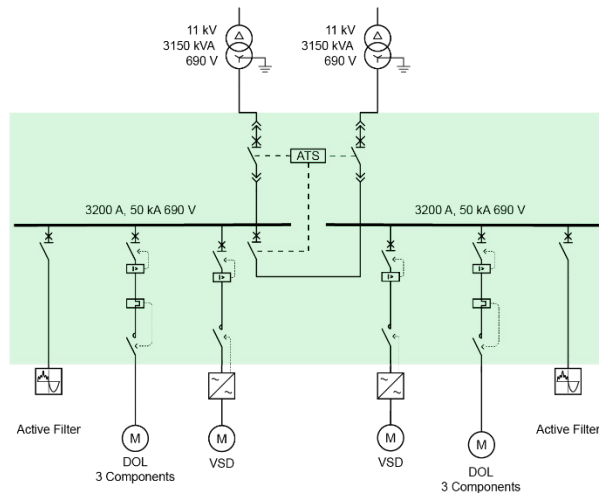
ARCHITECTURE

OUTFALL

Can supply water inlet and lifting up to 2000 kW

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW or Direct On Line.



DISPLAY

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ARCHITECTURE

RADIAL OPEN LOOP

MICROGRID

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

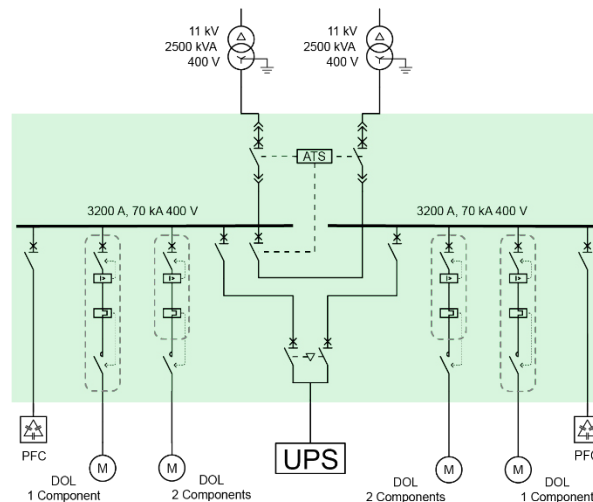
ARCHITECTURE

TERTIARY TREATMENT ODOR CONTROL

Can supply water inlet and lifting up to 1500 kW

Direct On Line 1 component up to 15 kW

Direct On Line 2 components up to 55 kW



DISPLAY

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ARCHITECTURE

RADIAL OPEN LOOP

MICROGRID

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

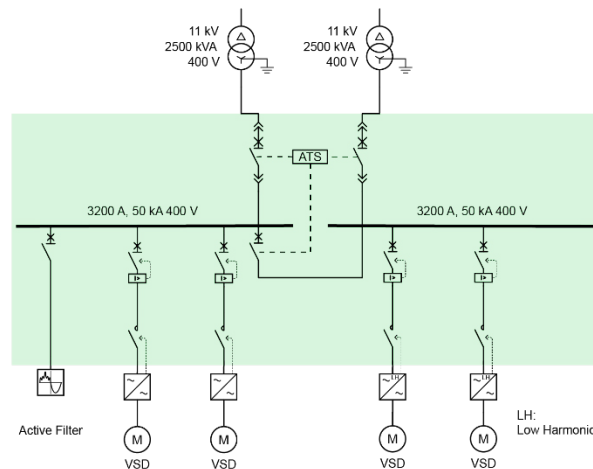
ARCHITECTURE

SLUDGE DEWATERING

Can supply water inlet and lifting up to 1500 kW

VSD driven motor from 0,75 to 1200 kW.

VSD with the Low Harmonic option do not need any harmonic compensation of an active filter.



DISPLAY

PRODUCTS ☐ OFF ☒ ON

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ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

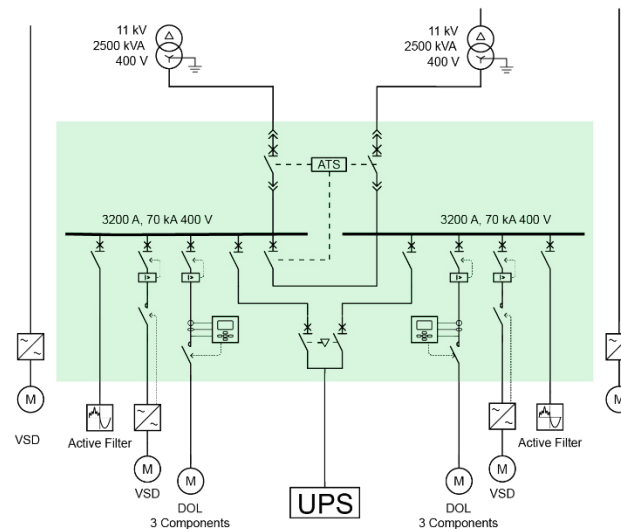
ARCHITECTURE

BIOLOGICAL TREATMENT

Can supply biological treatment up to 6500 kW

VSD or Direct On Line for motors from 0,75 to 1200 kW while the medium voltage can supply the most powerful motors for blowing up to 2 x 2500 kW.

UPS to support 150 kW critical loads



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

RADIAL OPEN LOOP

MICROGRID

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

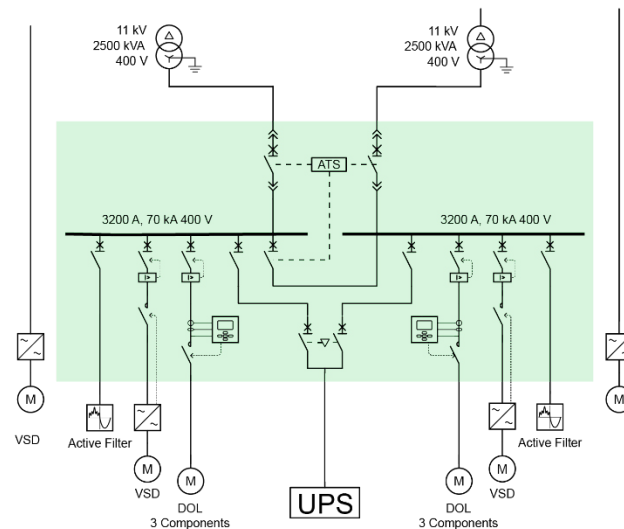
ARCHITECTURE

WATER INLET AND LIFTING

Can supply water inlet and lifting up to 2000 kW

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW or
Direct On Line 2 components up to 55 kW



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

RADIAL [OPEN LOOP](#)

MICROGRID

SINGLE SOURCE [MICROGRID](#)

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

*Minera MP**Premset**Trihal*

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product overview

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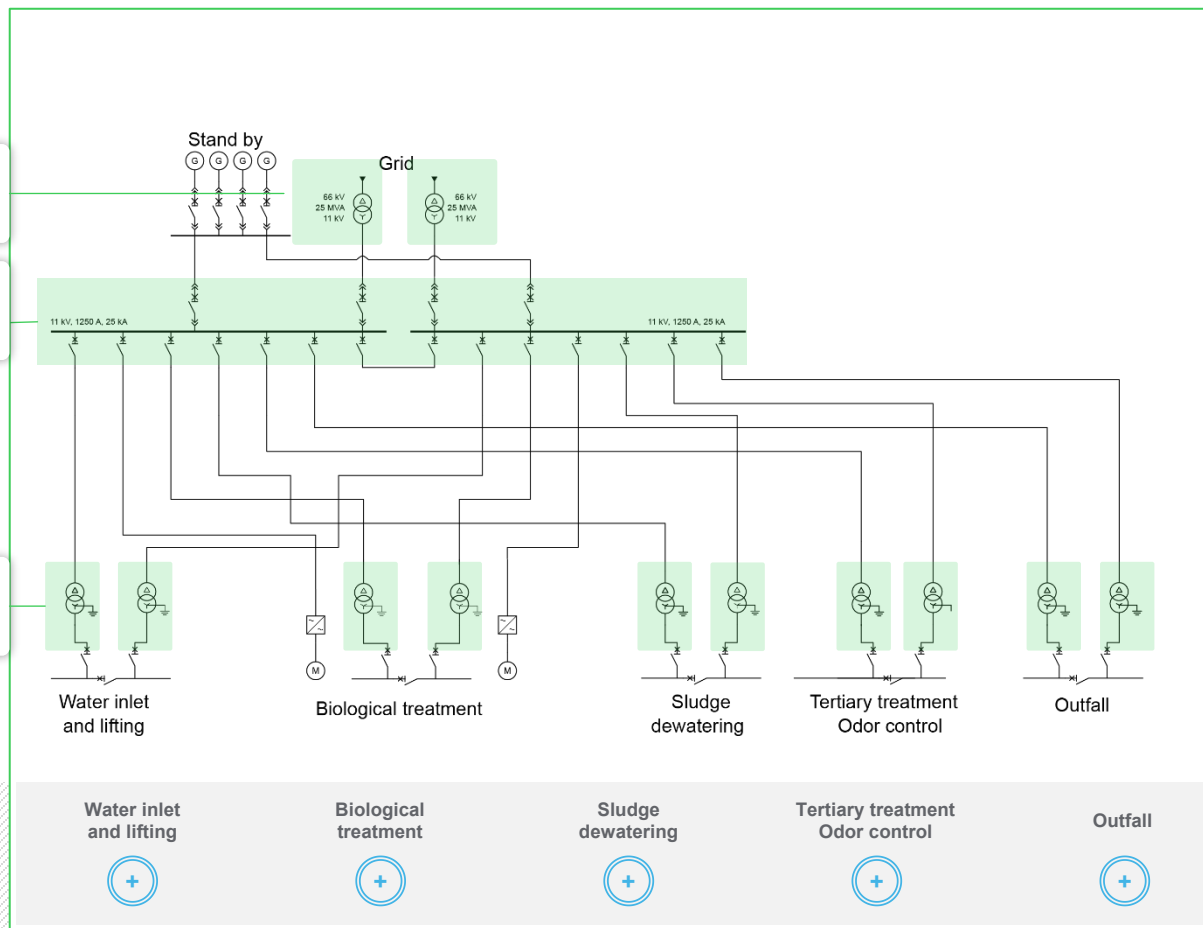
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ARCHITECTURE

MICROGRID

RADIAL [OPEN LOOP](#)

SINGLE SOURCE [MICROGRID](#)



RADIAL

ARCHITECTURE

OUTFALL



Compact NSX
circuit breakers



TeSys Giga
protection relays



TeSys Giga
contactors



Trihal



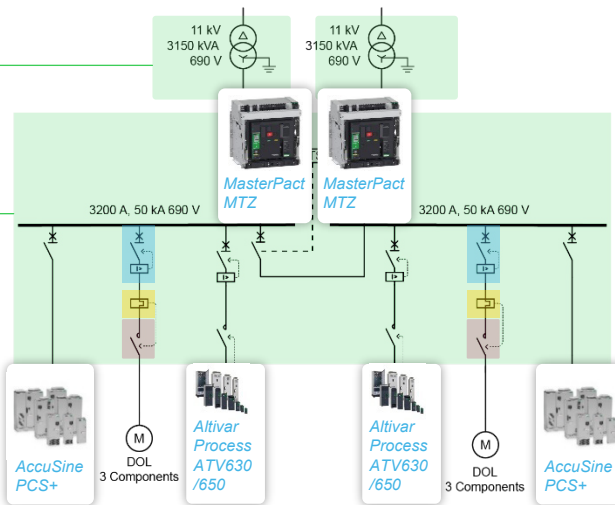
Okken



BlokSeT



Spacial SFM



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product overview

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DIGITAL LAYER OFF ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

TERTIARY TREATMENT ODOR CONTROL

*TeSys Ultra**PowerLogic
PFC Capacitor
Banks IEC**Trihal**TeSys Deca -
frame 2**TeSys Deca
contactors**Okken**BlokSeT**Spacial SFM*

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product overview

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PRODUCTS OFF

ON

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ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



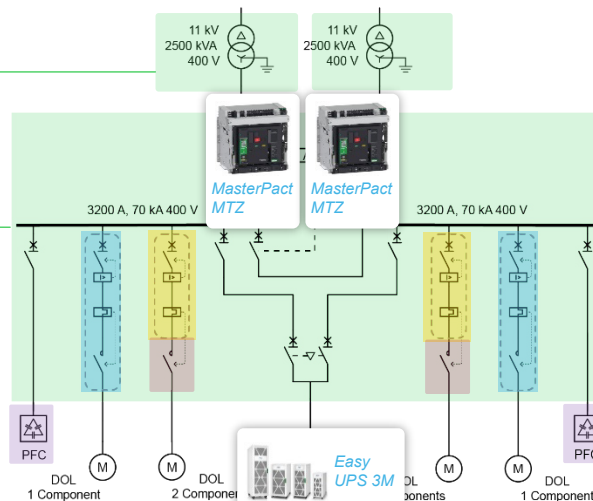
Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

SLUDGE DEWATERING

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product overview

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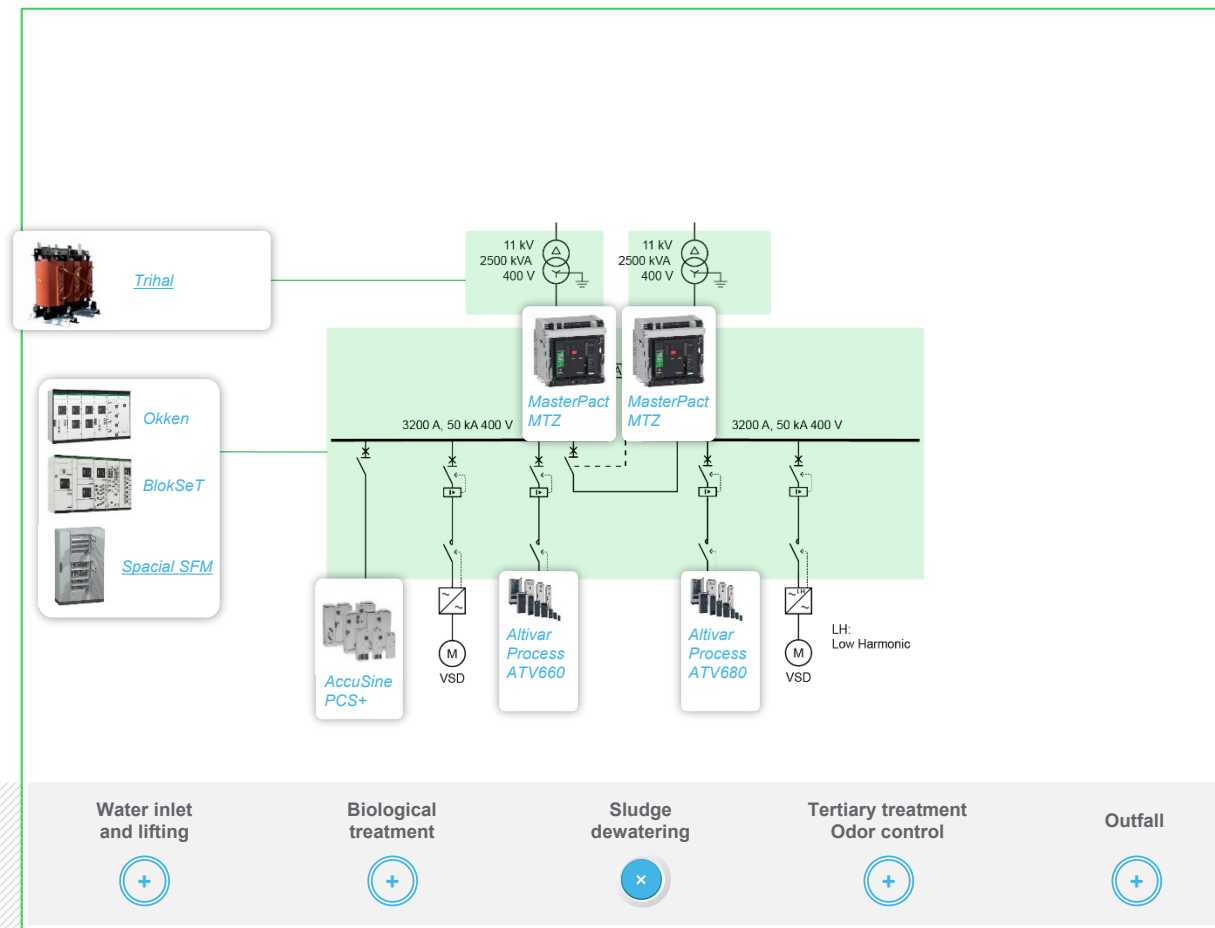
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ARCHITECTURE

RADIAL ☒ OPEN LOOP

MICROGRID

SINGLE SOURCE ☐ MICROGRID



RADIAL

ARCHITECTURE

BIOLOGICAL TREATMENT



Compact NSX circuit breakers



TeSys T

Protection relays



TeSys Giga
contactors

[Click here to display product overview](#)

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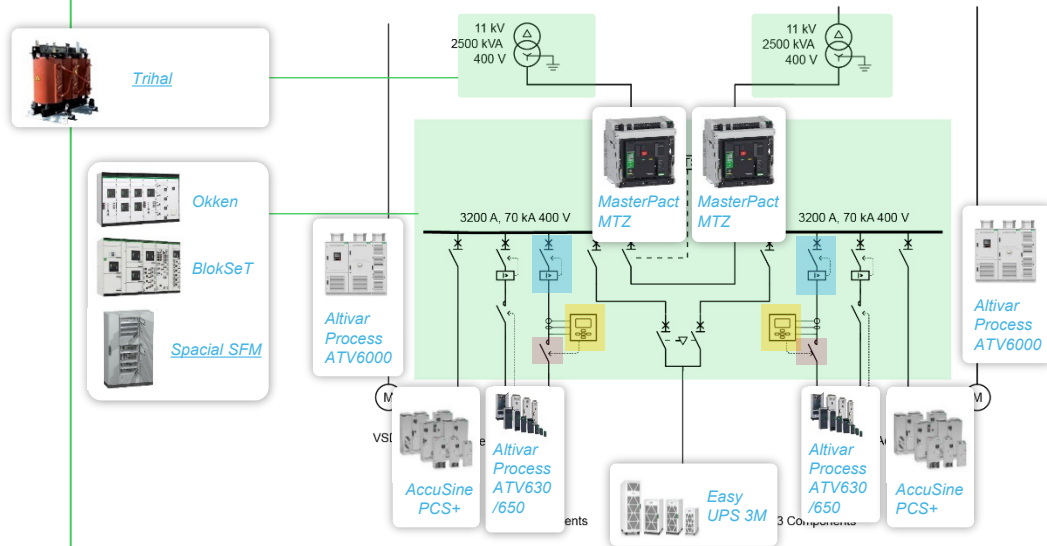
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ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID



Water inlet and lifting



Biological treatment



Sludge dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

WATER INLET AND LIFTING



TeSys Deca -
frame 2



TeSys Deca
contactors



Compact NSX
circuit breakers

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product overview

DISPLAY

DISPLAY

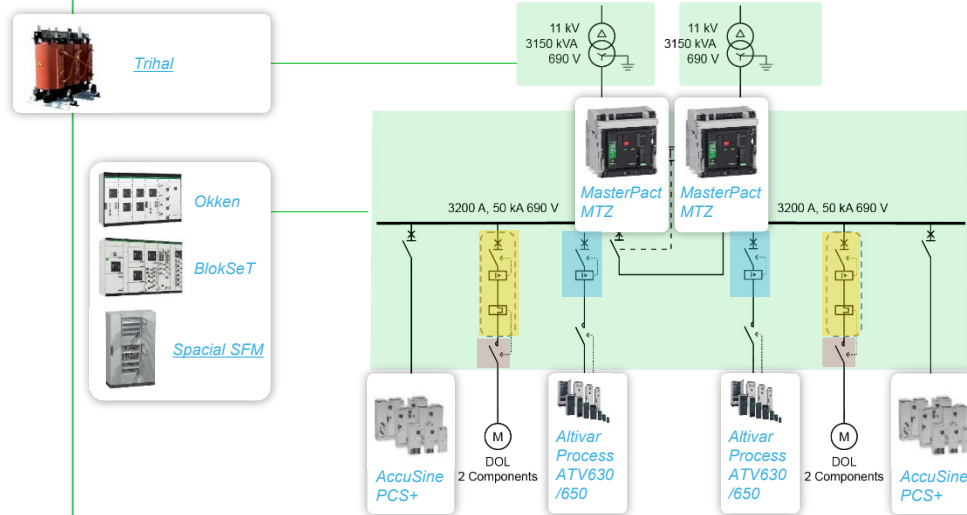
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ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID



Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

SINGLE SOURCE

Continuous monitoring 24/7

- with connected products
- with wireless sensors temperature and environment

Predictive maintenance based the actual condition of the products in their environment

- Extended life span
- Increased reliability
- Reduced service cost

DISPLAY

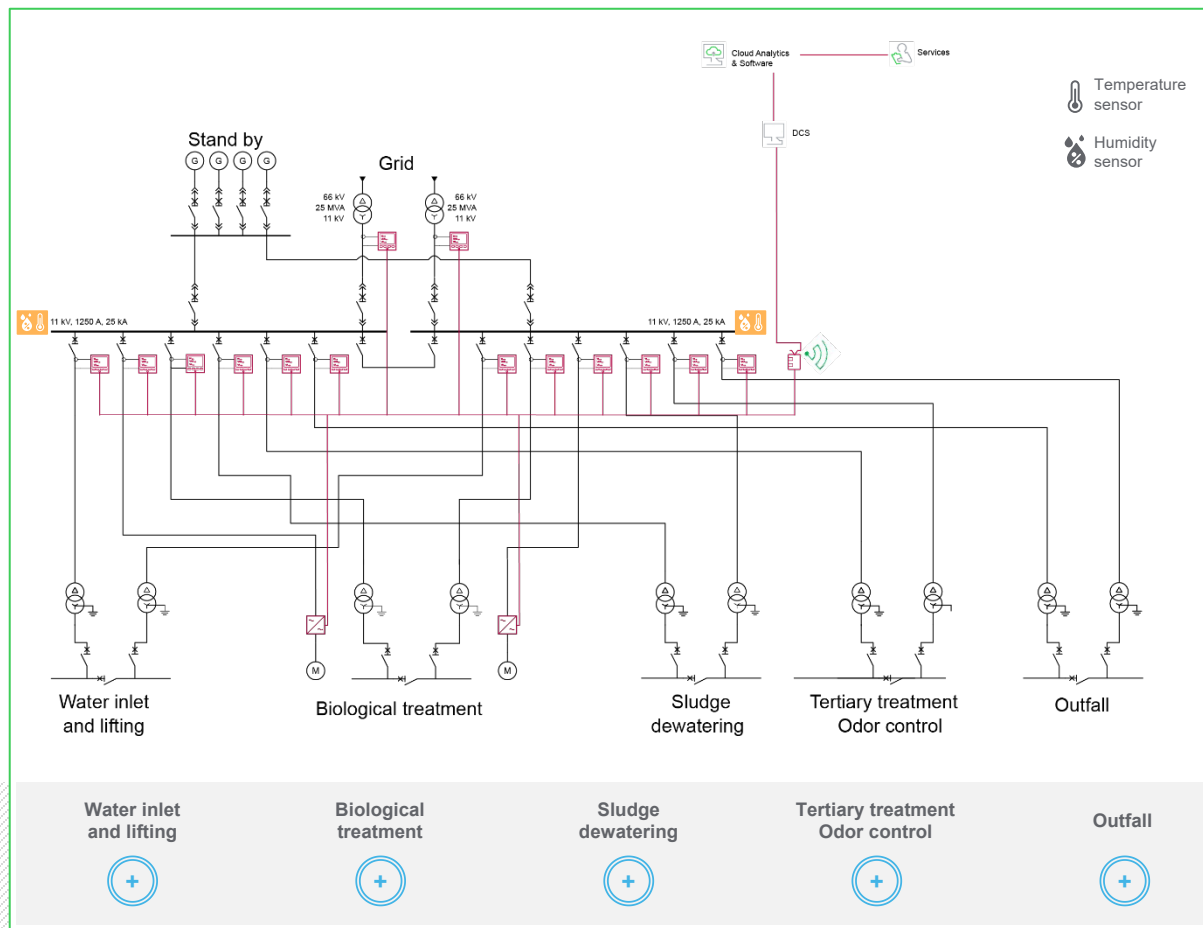
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ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID



RADIAL

ARCHITECTURE

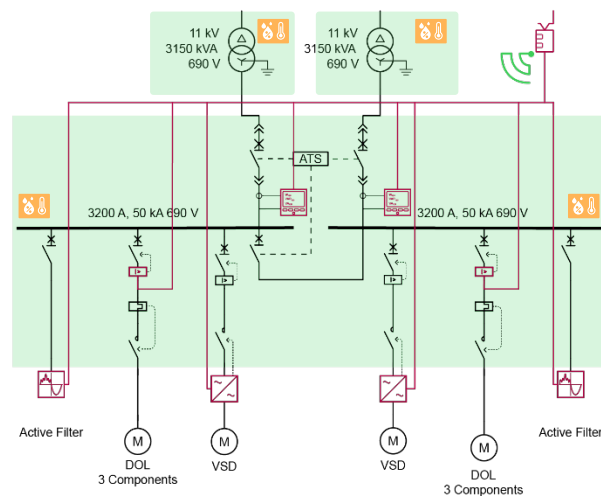
OUTFALL

Can supply water inlet and lifting up to 2500 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW, DOL or soft starters



Temperature sensor

Humidity sensor

DISPLAY

PRODUCTS OFF ☒ ON DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID

Water inlet and lifting



Biological treatment



Sludge dewatering



Tertiary treatment Odor control



Outfall



RADIAL

ARCHITECTURE

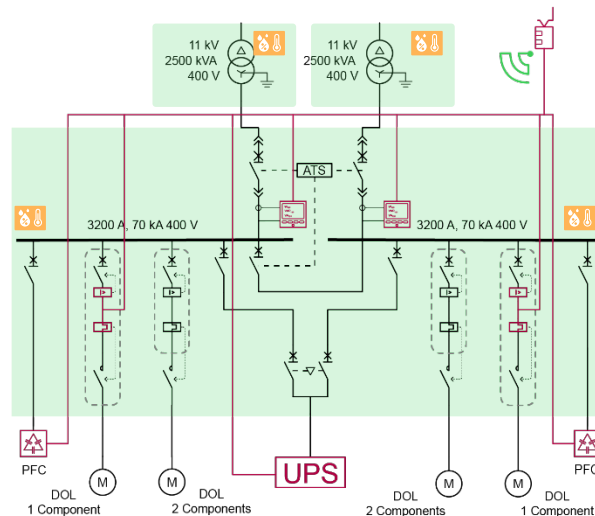
TERTIARY TREATMENT ODOR CONTROL

Can supply water inlet and lifting up to 2500 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW, DOL or soft starters



Temperature sensor

Humidity sensor

DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

RADIAL OPEN LOOP

MICROGRID

SINGLE SOURCE MICROGRID

Water inlet and lifting



Biological treatment



Sludge dewatering



Tertiary treatment Odor control



Outfall



RADIAL

ARCHITECTURE

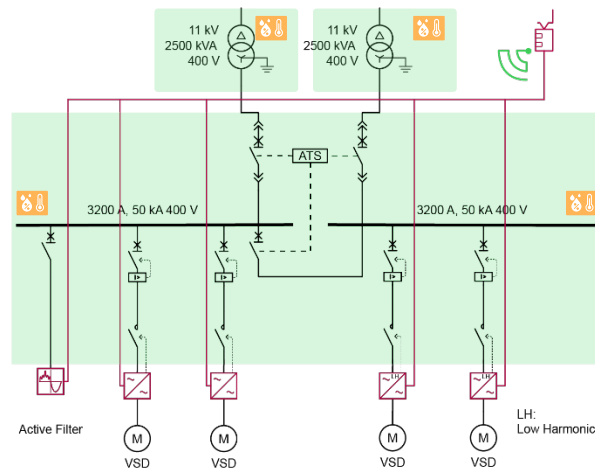
SLUDGE DEWATERING

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The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW, DOL or soft starters



Temperature sensor

Humidity sensor

DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

RADIAL ☐ OPEN LOOP

MICROGRID

SINGLE SOURCE ☐ MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

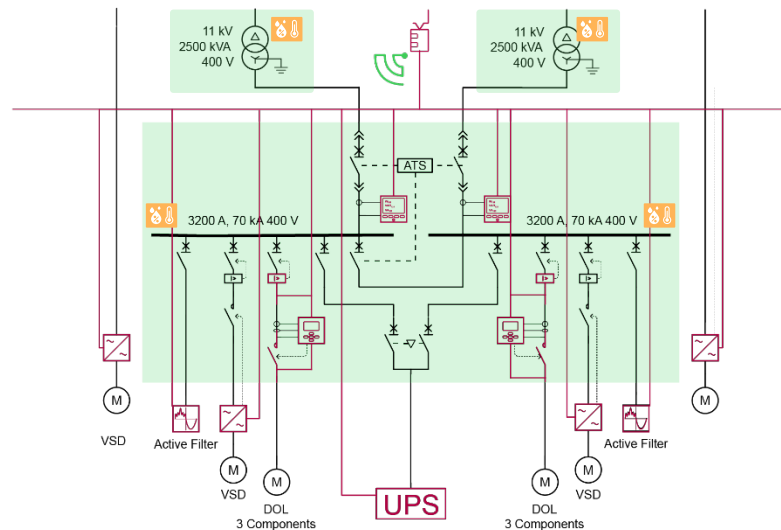
ARCHITECTURE

BIOLOGICAL TREATMENT

Can supply biological treatment up to 6500 kW
The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the cost for most of the connected load, while the medium voltage can supply the most powerful motors for blowing up to 2 x 2500 kW

UPS to support 150 kW critical loads



DISPLAY

PRODUCTS ☐ OFF ☒ ON DIGITAL LAYER ☐ OFF ☒ ON

ARCHITECTURE

RADIAL OPEN LOOP

MICROGRID

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



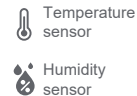
Sludge
dewatering



Tertiary treatment
Odor control



Outfall



ARCHITECTURE

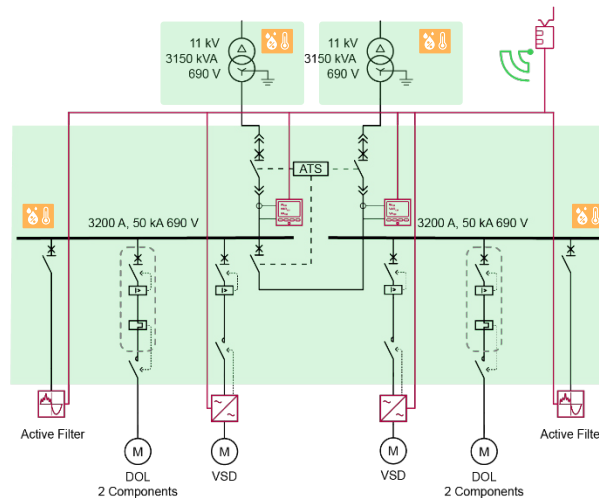
WATER INLET AND LIFTING

Can supply water inlet and lifting up to 2500 kW

The Ring Main Units used for electrical connection in the loop architecture is a cost-effective device with proven reliability

Voltage level of 690V optimizes the overall cost of electrical distribution.

VSD driven motor from 0,75 to 1200 kW, DOL or soft starters



 Temperature sensor

 Humidity sensor

DISPLAY

PRODUCTS OFF ON

DIGITAL LAYER OFF ☒ ON

ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID

Water inlet and lifting



Biological treatment



Sludge dewatering



Tertiary treatment
Odor control



Outfall



RADIAL

ARCHITECTURE

[Minera MP](#)[Premset](#)

x10

[Trihal](#)

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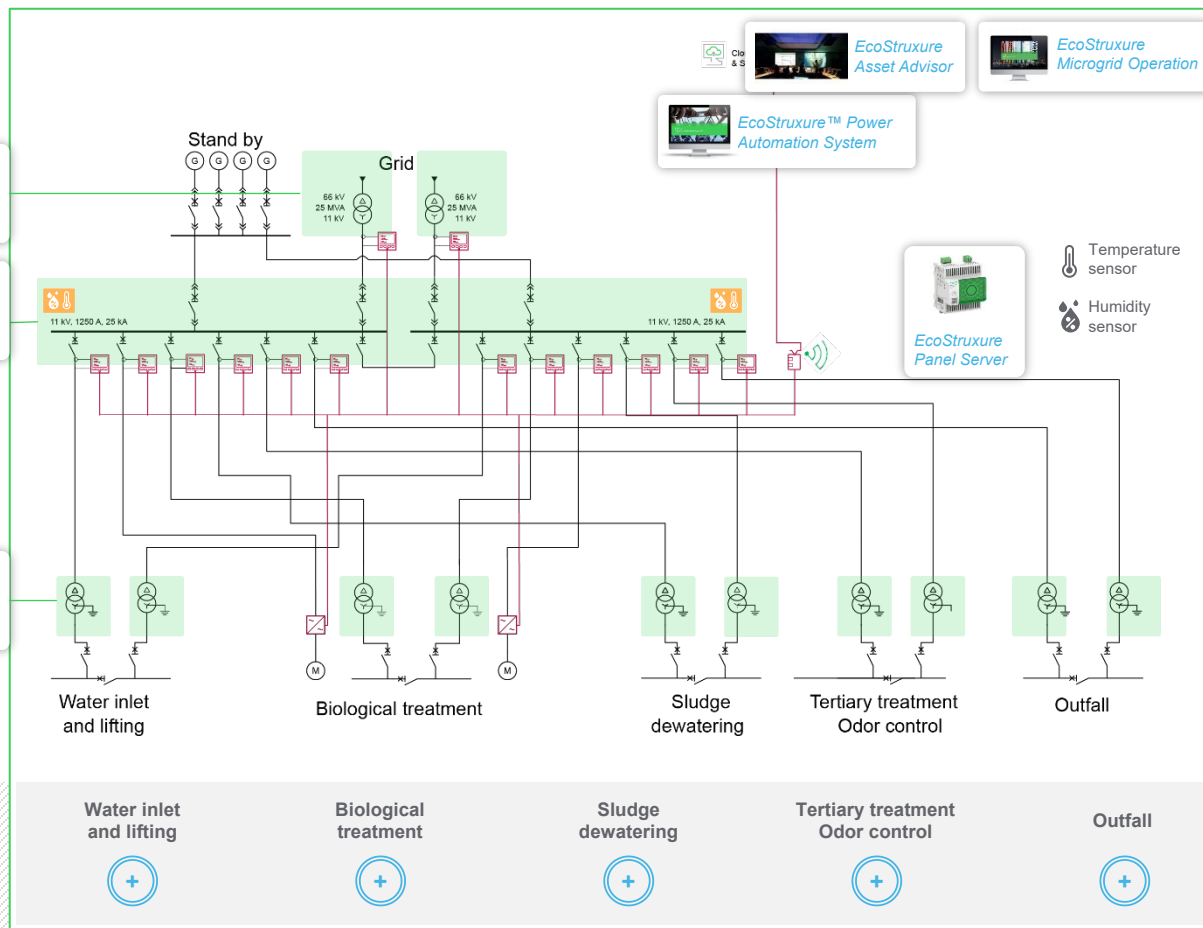
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ARCHITECTURE

MICROGRID

RADIAL [OPEN LOOP](#)SINGLE SOURCE [MICROGRID](#)

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ARCHITECTURE

OUTFALL



Compact NSX
circuit breakers

CL110



TeSys Giga
protection relays

TH110



TeSys Giga
contactors

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product overview

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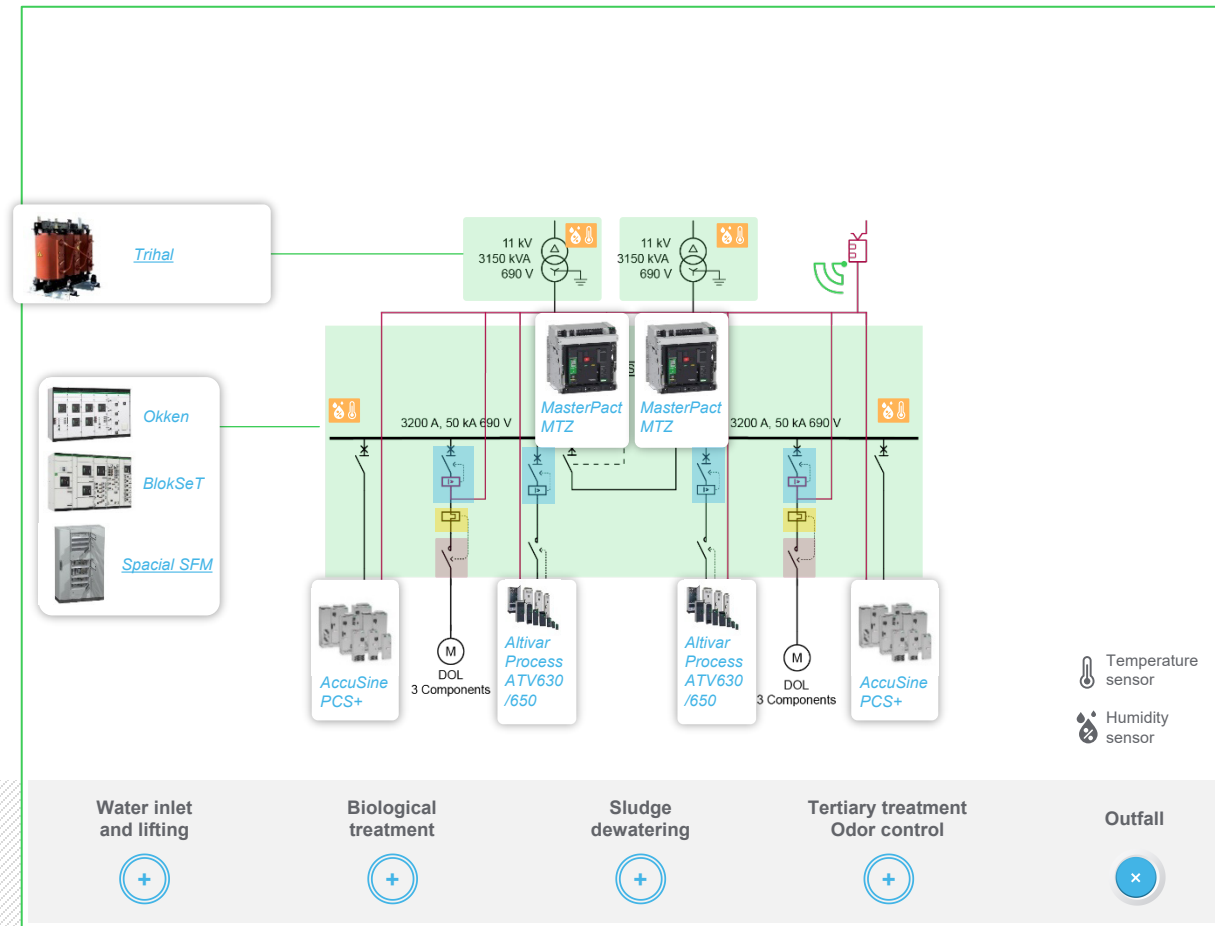
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ARCHITECTURE

MICROGRID

RADIAL [OPEN LOOP](#)

SINGLE SOURCE [MICROGRID](#)



Temperature
sensor

Humidity
sensor

Water inlet
and lifting

Biological
treatment

Sludge
dewatering

Tertiary treatment
Odor control

Outfall

RADIAL

ARCHITECTURE

TERTIARY TREATMENT ODOR CONTROL

*TeSys Ultra**CL110**TeSys Deca -
frame 2**TH110**TeSys Deca
contactors**PowerLogic
PFC Capacitor
Banks IEC**Trihal**Okken**BlokSeT**Spacial SFM**MasterPact
MTZ**MasterPact
MTZ**Easy
UPS 3M*

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ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID

Water inlet
and lifting



Biological
treatment



Sludge
dewatering



Tertiary treatment
Odor control

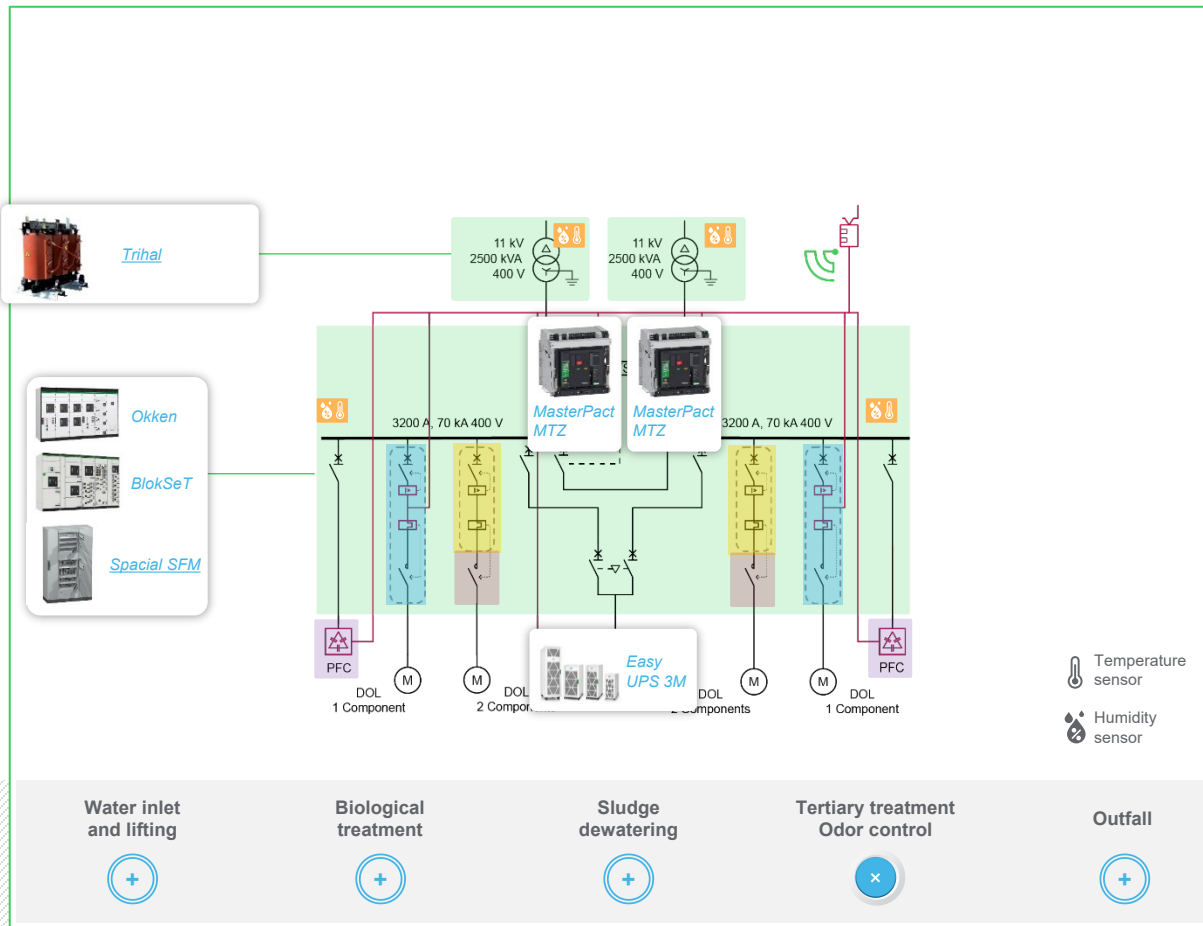


Outfall



Temperature
sensor

Humidity
sensor



RADIAL

ARCHITECTURE

SLUDGE DEWATERING



CL110



TH110

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product overview

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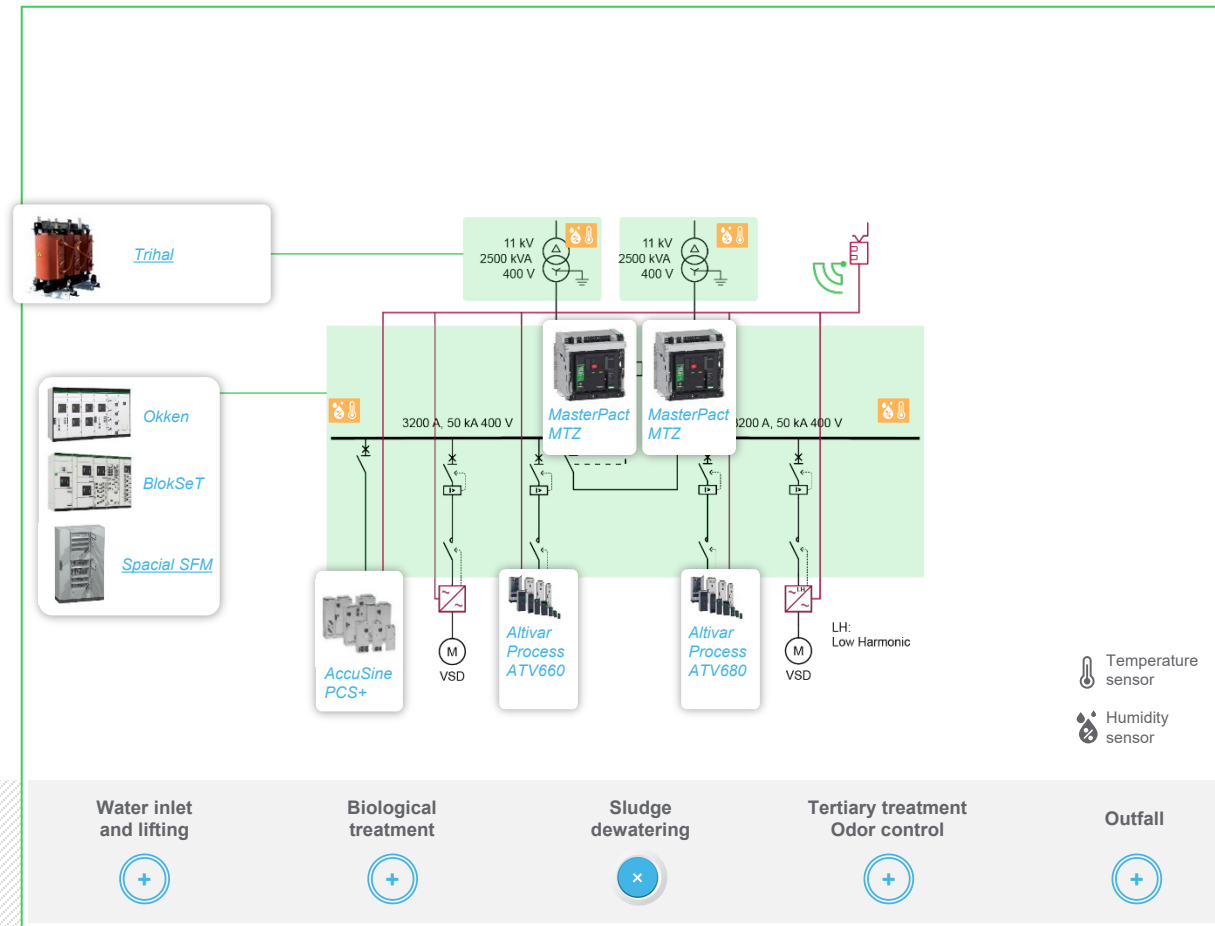
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ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID



RADIAL

ARCHITECTURE

BIOLOGICAL TREATMENT



Compact NSX
circuit breakers



TeSys T
Protection relays



TeSys Giga
contactors



CL110



TH110

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DISPLAY

DISPLAY

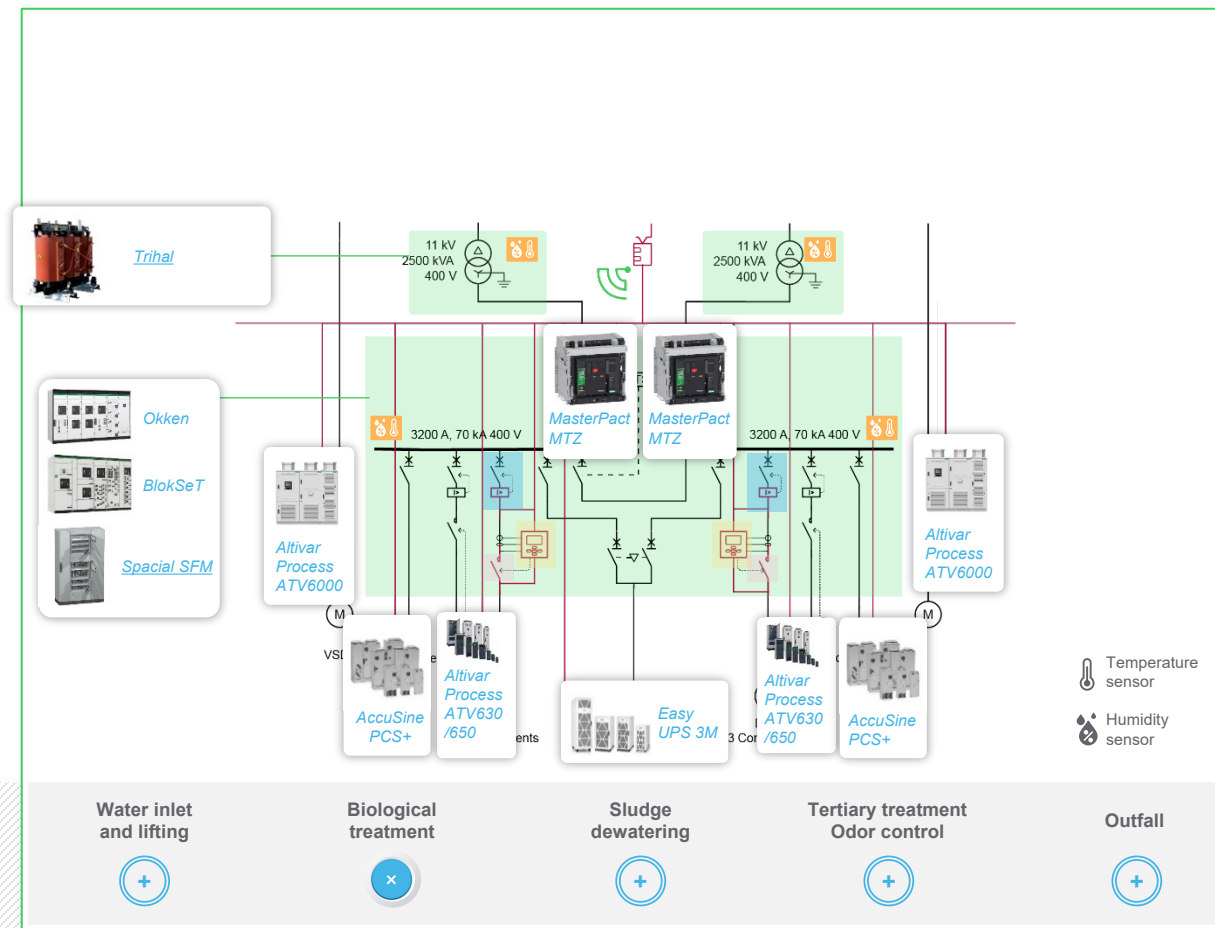
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ARCHITECTURE

MICROGRID

RADIAL OPEN LOOP

SINGLE SOURCE MICROGRID



RADIAL

ARCHITECTURE

WATER INLET AND LIFTING



TeSys Deca -
frame 2



TeSys Deca
contactors



Compact NSX
circuit breakers



CL110



TH110

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product overview

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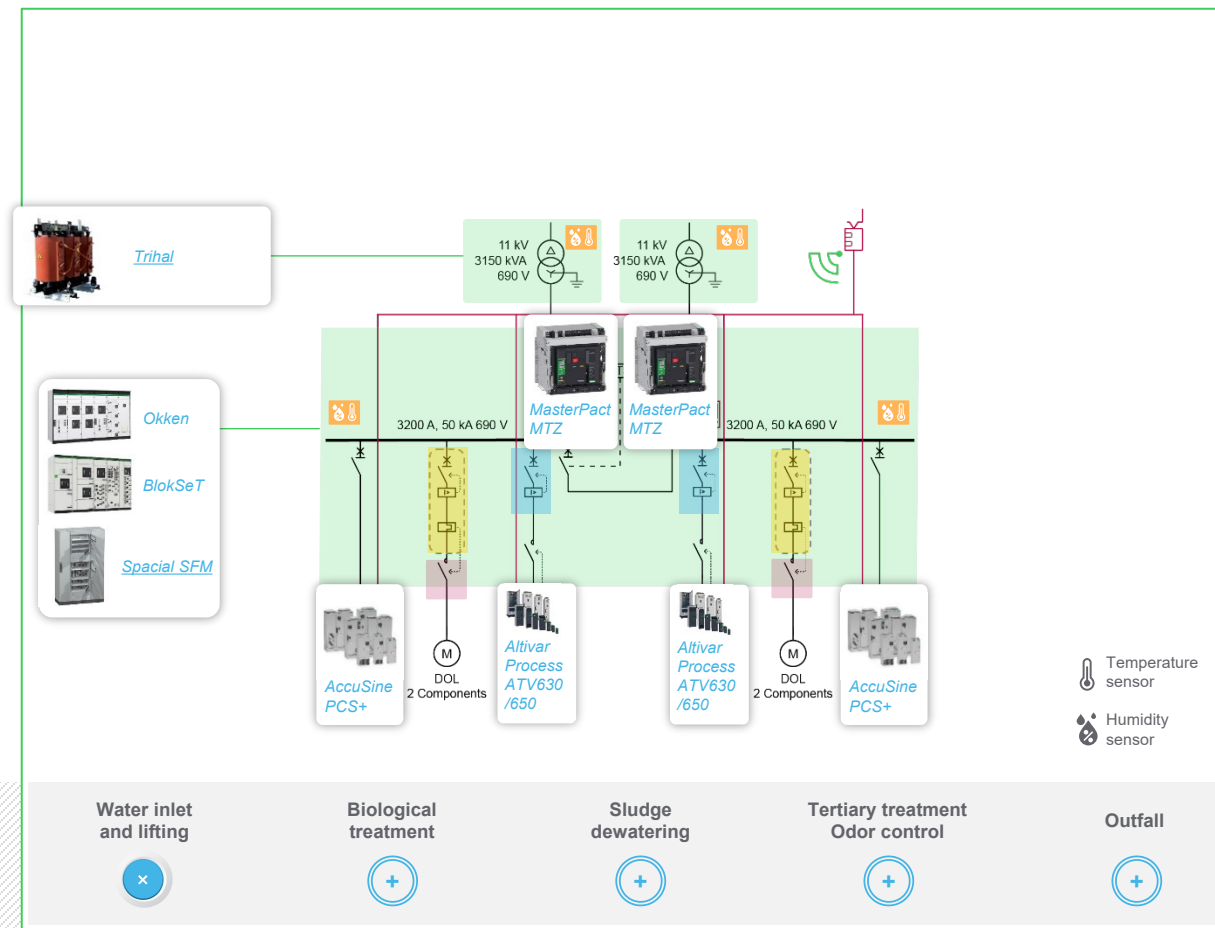
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ARCHITECTURE

MICROGRID

RADIAL [OPEN LOOP](#)

SINGLE SOURCE [MICROGRID](#)



Apps, Analytics & Services



*EcoStruxure
Asset Advisor*



*EcoStruxure™ Power
Monitoring Expert*



*AVEVA Unified
Operation Center*

AVEVA

Edge Control



*EcoStruxure™ Power
Automation System*

Transformer



Minera MP



Trihal

Power Meter



*EasyLogic
PM2000 series*



*PowerLogic
PM5000 series*

MV Switchgear



PremSet

Power controller



*Easergy
C53 Automation
Controller 30TE
Model*



*Easergy P3
Protection
Relays*

Data collection



*EcoStruxure
Panel Server*

Apps, Analytics & Services

*EcoStruxure
Microgrid Advisor**EcoStruxure™ Power
Monitoring Expert**EcoStruxure
Asset Advisor**AVEVA Unified
Operation Center*

Edge Control

*EMA controller**EcoStruxure™ Power
Automation System**EcoStruxure
Microgrid Operation*

Transformer

*Minera MP**Trihal*

Power Meter

*EasyLogic
PM2000 series**PowerLogic
PM5000 series*

MV Switchgear

*PremSet*

Power controller

*Easergy
C53 Automation
Controller 30TE
Model**Easergy P3
Protection
Relays*

Data collection

*EcoStruxure
Panel Server*

LV Circuit Breaker

*MasterPact
MTZ**ComPact NS**ComPact NSX**EcoStruxur™
Automation Expert*

Power Quality

*AccuSine PCS+*

LV panel

*Okken**BlokSeT**Spacial SFM*

Variable speed drive

*Altivar Process
ATV6000**Altivar Process
ATV630/650*

Distribution transformer

*Trihal*

Ring main units

*RM AirSeT*

Wireless sensors

*CL110**TH110**HeatTag*

Motor control

*TeSys Ultra**TeSys Deca
contactors**TeSys Giga
contactors**TeSys T**TeSys Deca -
frame 2**TeSys Giga
circuit-breakers**TeSys Deca -
frame 3**TeSys Giga
protection relays*

UPS

*Easy UPS 3M*



Go Further

Upscale your skills with additional technical resources written by our motor management experts.

Power Quality issues

Types of PQ disturbances and impacts on motors and equipment, key steps to perform PQ management, and SE offers.

[GO](#)

Power Factor correction

What's power factor, impact on Wastewater Treatment Plant, recommended solution, and SE offers.

[GO](#)

Open Loop distribution

Typical MV protection, key principles and takeaways for Open Loop distribution.

[GO](#)

Microgrid

What's a Microgrid, what are its typical use-cases, and the related Schneider Electric's solutions.

[GO](#)

Levers for current rating optimization

Tender specifications may use excessively restrictive design criteria leading to oversized equipment out of economic range of product.

[GO](#)

Voltage level choice

The choice of voltage level is connected to the voltage insulation, the nominal current and the short circuit current. And will have a strong consequences on the cost of equipment.

[GO](#)[PDF leaflet](#)[Video](#)[On-line course](#)[Blog](#)

Power Quality issues

Introduction



Power quality disturbances

- Voltage dips
- Overvoltages
- Harmonics
- Unbalance
- Transients

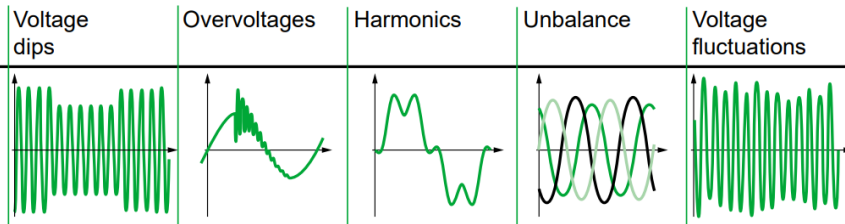


Impacts on electrical system & equipment

- Power outage
- Device damage
- Failure
- Overheating
- Degraded performance
- Reduced equipment lifetime

Disturbances

Characteristic waveforms



Power quality is **particularly critical for the Wastewater treatment plant performance**

Consequences: from **poor water treatment** due to electrical downtime to **equipment damage** and **additional operating costs**



Power quality

refers to both **voltage** and **current quality** determined from criteria like **magnitude, frequency, waveform, and symmetry.**

Disturbances to any of these factors are considered power quality problems



Power Quality issues

Impact & Application

Motors are sensitive to power quality disturbances

- Voltage unbalance
- Harmonics
- Transients
- Voltage sags
- Voltage & frequency variations



Impacts on the motors

- Losses
- Heat
- Stress



Motors connected in Direct On Line (DOL) are also **generating power quality disturbances** because they **consume reactive energy**

Installing a **Variable Speed Drive** is a solution to:

- **Correct** the displacement power factor and reduce reactive energy consumption
- **Avoid** voltage sags during motor starting
- **Filter** the power quality disturbances coming from the network

... but it may increase the harmonic pollution in the power system



Motors represent more than

80%

of the electric loads in a Wastewater treatment plant.

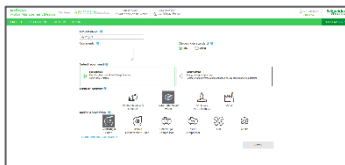
About Motor Management Design application

[EcoStruxure™ Motor Management Design application](#)

EcoStruxure™ Motor Management Design application



3 STEPS TO MOVE PROJECT TO SOLUTION



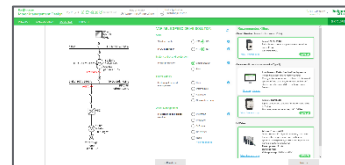
PROJECT

Define your project by objective, activity and application type



CALCULATION

Compare alternatives for starting and operation, considering their impact on the electrical network parameters



SOLUTION

Build your motor management architecture with recommended offers



PROJECT REPORT

Get an exhaustive project report (.pdf)

ALL ALONG YOUR JOURNEY

GET SUPPORT
to use the tool

Detailed explanations to understand the inputs and outputs

GET HELP
to make choices

Decision tables with qualitative criteria

GO FURTHER
with digital content in connection

Blog posts, Guides, White papers, online tools, etc.



Save time and gain efficiency in electrical design when upgrading/extending with motors



Benefit from simplified offer selection procedures to build a complete motor management architecture (from starting & control to services)



Access to the most relevant digital content for a concrete case

Power Quality issues

Recommended solution



3 key steps to perform power quality management

1

Measurement
and monitoring

- Detect and understand power quality issues
- Verify that the corrective actions are working

2

Results
interpretation
& analysis

- Interpret the measured results
- Design the proper corrective solutions

3

Corrective &
preventive actions

- May impact design architecture, equipment choice, or settings
- May also require the installation of additional power quality correction or protection equipment

Analysis usually requires skilled professionals who are experts in power quality

Measurement
is the 1st and
fundamental step

"You cannot manage what you do not measure."

Power Quality issues

Schneider Electric offers



For...

1

**Measurement
and monitoring****Power quality metering
devices: ION 9000**

- Capture and record short-term power quality events
- Provide current and voltage, continuous disturbance measurements
- Enable power quality compliance evaluations

**Power Monitoring Expert**

- Collect and connect the information of all available sources into a single system
- Provide tools that evaluate, analyze, report, and alarm on power quality issues



2

**Results interpretation
& analysis****Power Monitoring Expert**

- Embeds analysis and expertise capabilities
- Provide meaningful dashboards and appropriate widgets
- Enable comprehensive and more cost-effective power quality management

3

**Corrective & preventive
actions****Transients**

- Transient voltage surge suppressor

Voltage sags and interruptions

- UPS and other energy storage systems
- Back-up generator or self-generation to manage sustained interruptions

Harmonics

- Active filter



**Each power
quality issue
requires specific
corrective
equipment**

More about SE solutions[Harmonic mitigation](#)



Let's **continue** with

**POWER FACTOR
CORRECTION**

or

Go back

to 'Go Further'
main menu

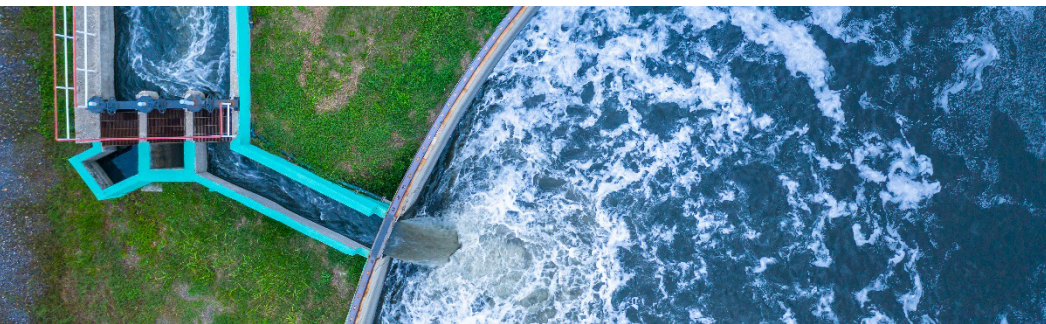
Power Factor correction

Introduction



Power factor of an installation has a **direct effect on its energy efficiency and electricity costs.**

A **power factor close to 1 means** that the line current is at a minimum for the given active power.



Power factor

Ratio of the **real or active power flowing to a load** divided by the **apparent power in the circuit.**

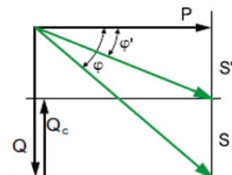
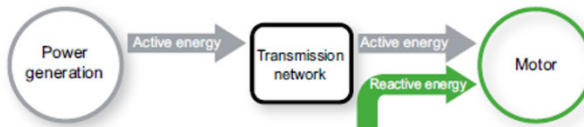
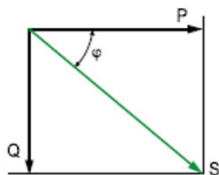
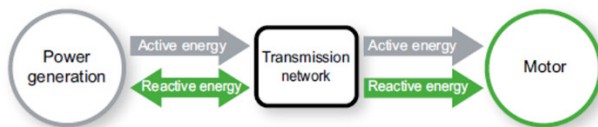
Is a unitless number between 0 and 1.



Power Factor correction **Impact & Application****Power factor correction consists of**

Increasing a plant's power factor so that it approaches to 1, usually with a **target of 0.92 to 0.95**.

Lower power factor may incur a surcharge by the electric utility supplying the plant.

**Wastewater Treatment Plants (WWTP)**

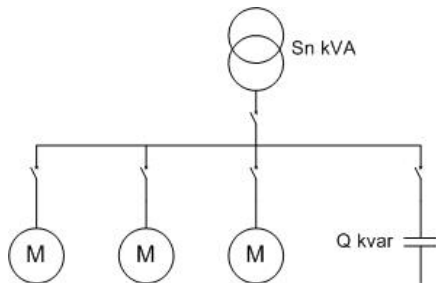
They typically **have low power factor** due to many inductive loads they contain, like motors and transformers.

Power factor correction is often necessary.

Power Factor correction **Recommended solution**

Power factor correction is done generally, **by installing power factor correction capacitors** that maintain the plant's power factor above a value agreed upon with the electric utility.

Capacitors also **enhance the performance** of some of a **plant's electrical system components** such as cables and transformers.



Compensation is provided by:

Fixed value capacitors, usually **applied at motor terminals**.

Or

Automatic capacitor banks, connected for example **to the main distribution busbar**.

***Note:** This solution can adapt dynamically the correction to the reactive power demand variation.*



Connected and integrated to an Electrical monitoring system*

It becomes a plug-and-play solution that makes:

- **Maintenance easier**
- **Follow-up is more intuitive** thanks to preconfigured capacitor banks, dashboard and reports

**EcoStruxure™ Power Monitoring Expert*



Power Factor correction

Schneider Electric offers



Fixed and automatic capacitor banks

VarSet range



Dynamic compensation

PowerLogic Accusine PFV



More about SE solutions

[AccuSine+ Active Power
Correction Solution
Catalogue 2021](#)

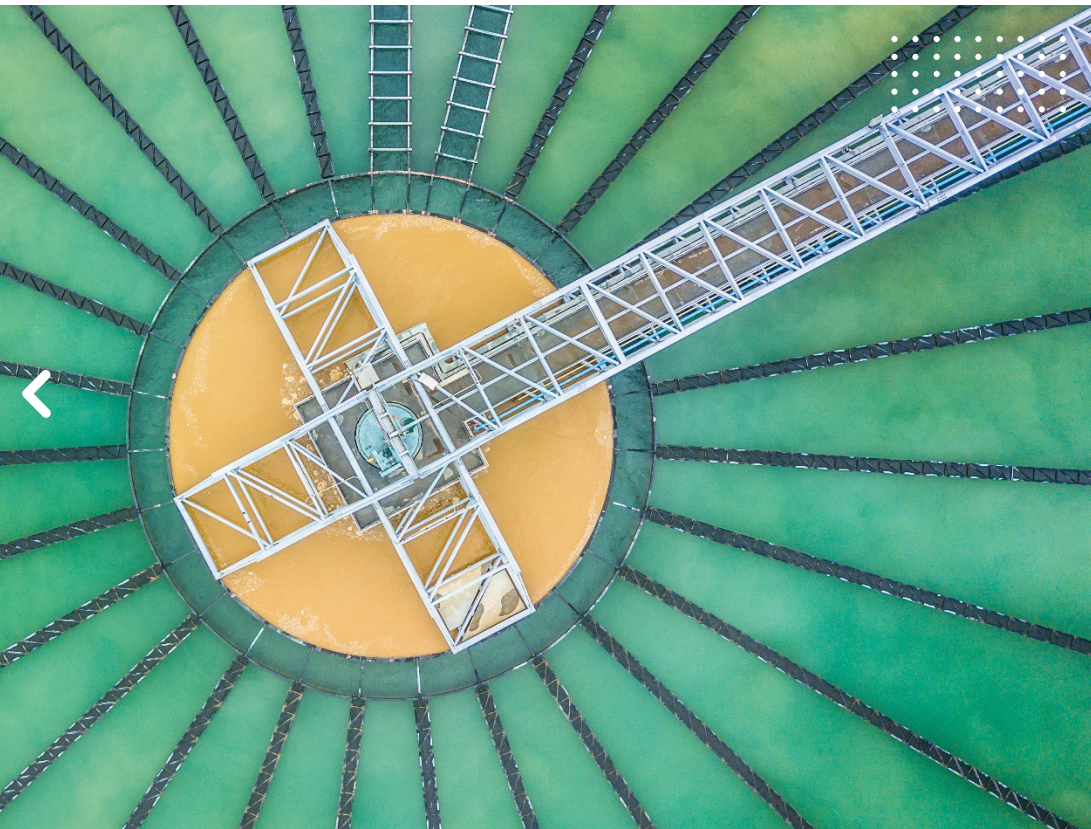


[VarSet LV
Batterie de condensateurs
basse tension](#)



[EcoStruxure™ Power
Monitoring Expert](#)





Let's **continue** with

OPEN LOOP
DISTRIBUTION

or

Go back

to 'Go Further'
main menu

Open-Loop Distribution

Introduction



Typical principle of open-loop electrical distribution systems

Open-loop electrical distribution systems are **used in industrial applications where reliability is critical.**

The **power is supplied to the loop from two sources.**

In case of fault, the **faulty load can be isolated.** The loop allows power to flow from the other sources, therefore all loads are supplied again. This is done by opening or closing switches at strategic locations in the loop.

Automatic reconfiguration

The **automatic reconfiguration system will detect and isolate the fault and repower the rest** of the system.

It does not need any human intervention.



Advantages of Open-Loop electrical distribution

Increased reliability

In the event of a power outage at one source, the other source will continue to supply power.

Reduced downtime Open-loop systems can help to reduce downtime caused by power outages.



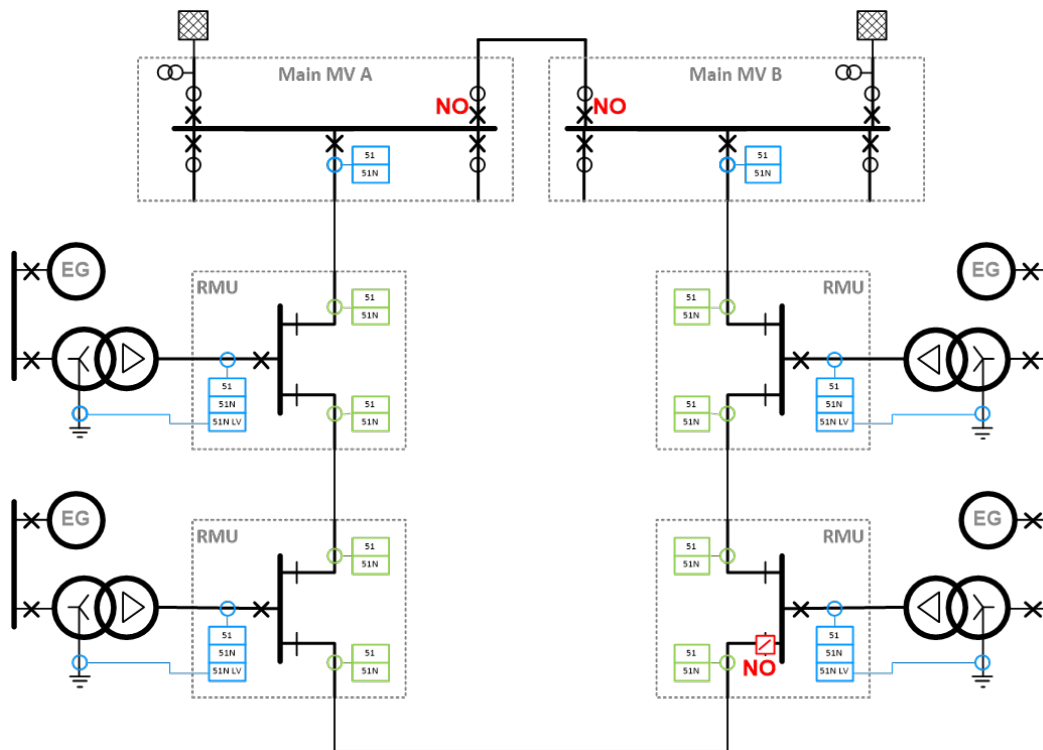
Open-Loop Distribution

Typical MV protection

Simple RMU
<630A / <20kA

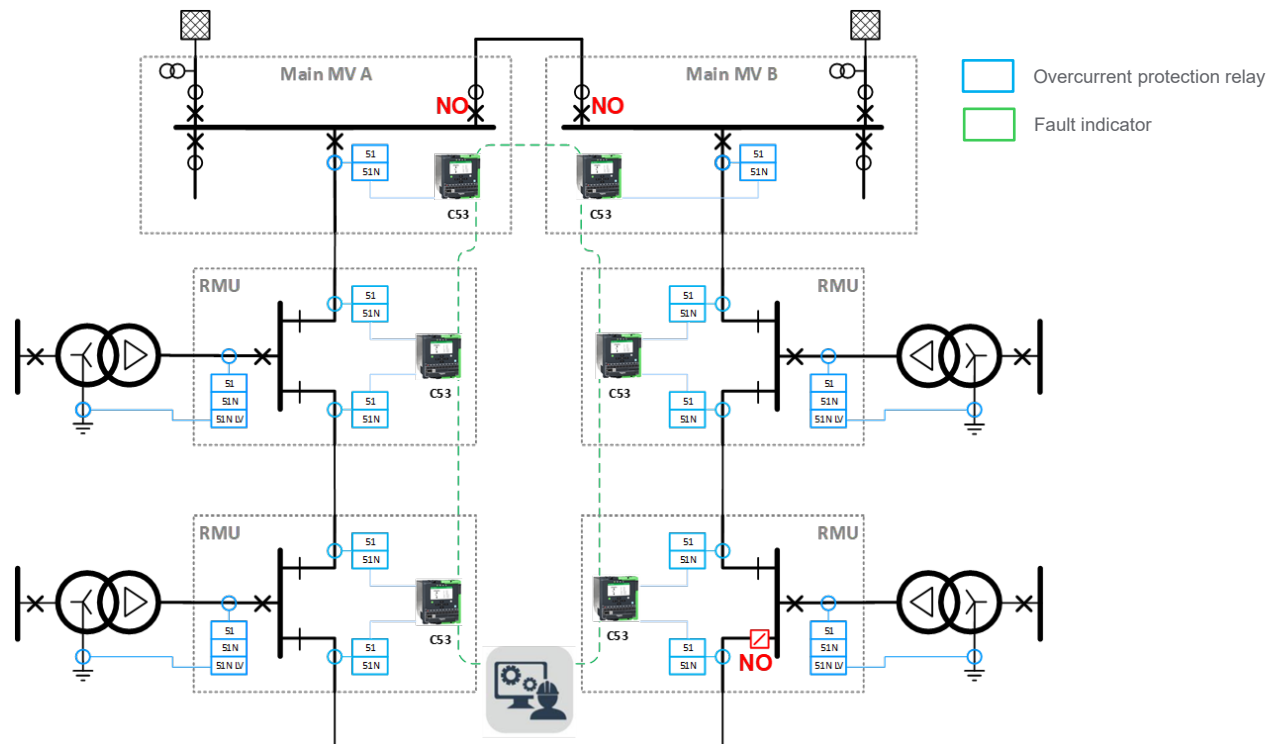
Overcurrent protection relay

Fault indicator



Open-Loop Distribution

Automatic Reconfiguration

Automatic
reconfiguration

Reconfiguration time <1s
(with Circuit breakers instead of
Switches)

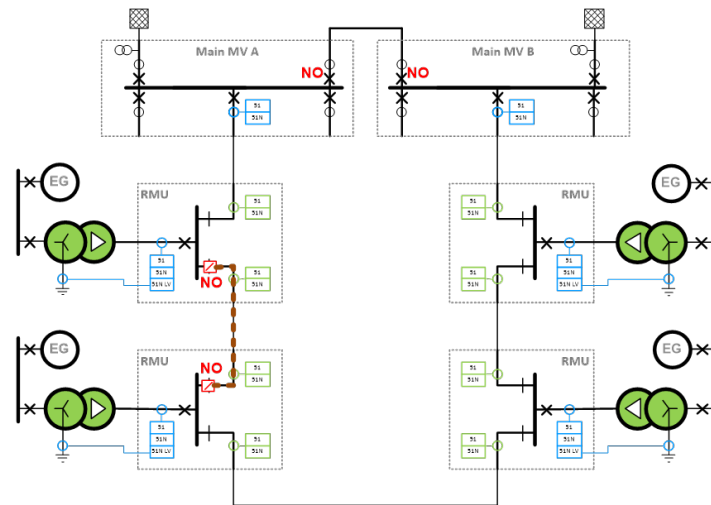
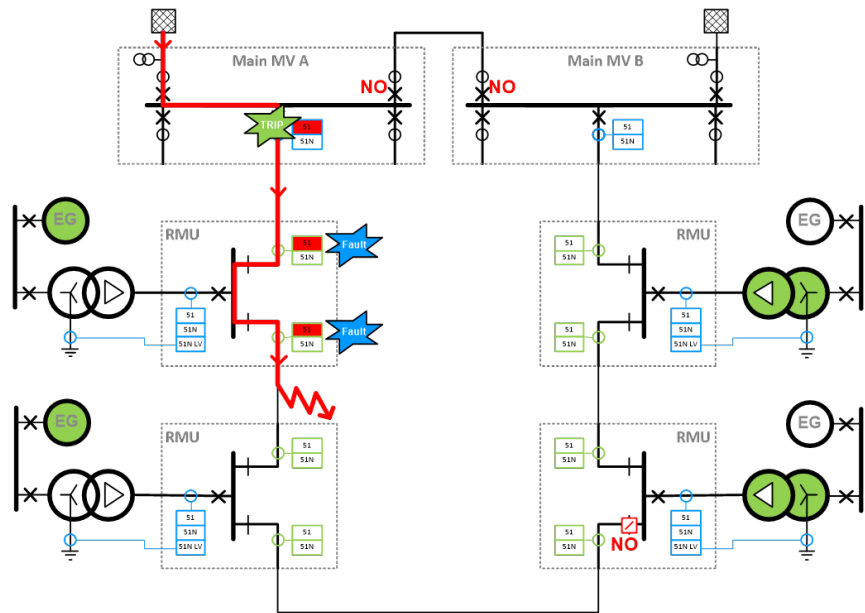
Fully redundant control
system

- No need of manual operation
- No need to start genset during the failure



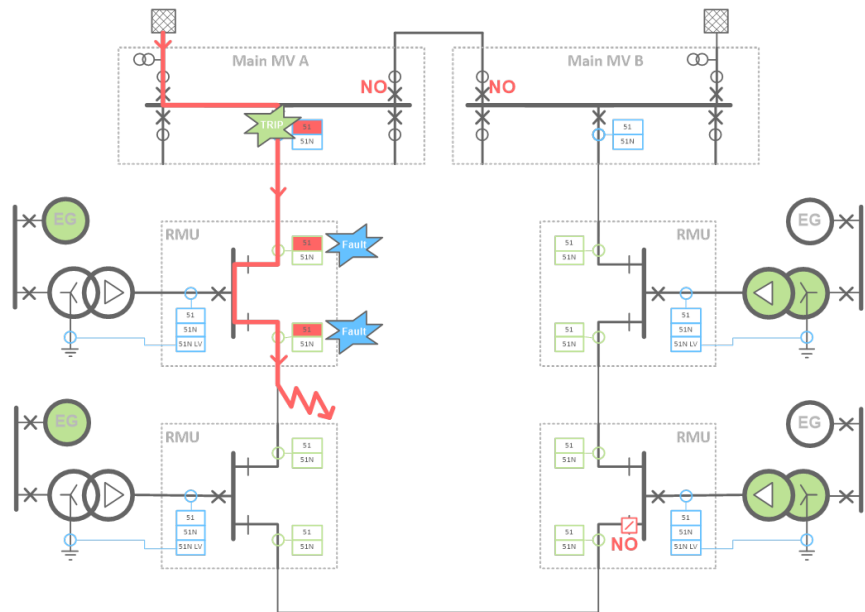
Open-Loop Distribution

Protection System Principles

 Overcurrent protection relay Fault indicator[READ ME](#)

Open-Loop Distribution

Protection System Principles



Overcurrent protection relay

Fault indicator

Trip

Only the Loop feeders on the Main MV switchgear will trip.

Fault indication

The fault indicators around the loop warn if they have seen the fault.

Reconfiguration

With the information given by the fault indicators, the operator can:

- 1 **Locate the fault**
- 2 **Isolate the fault with the switch/CB on each end**
- 3 **Reclose the main breaker**

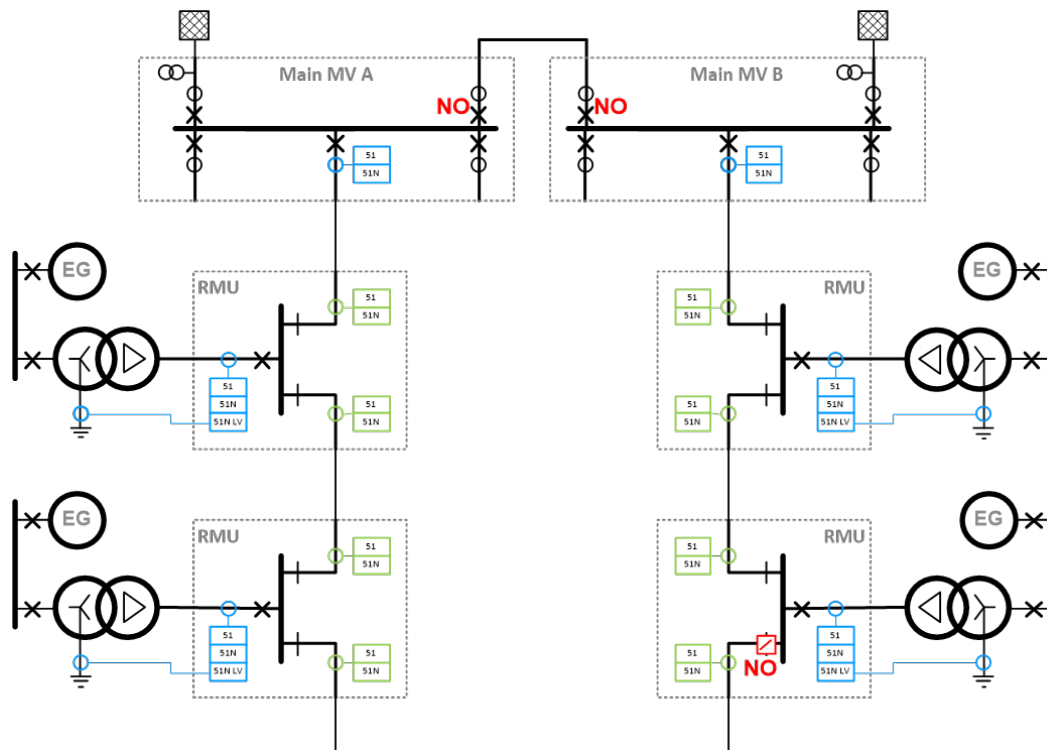
Note : For longer interruptions, the load may be supplied by local LV gensets.

Open-Loop Distribution

Typical MV protection



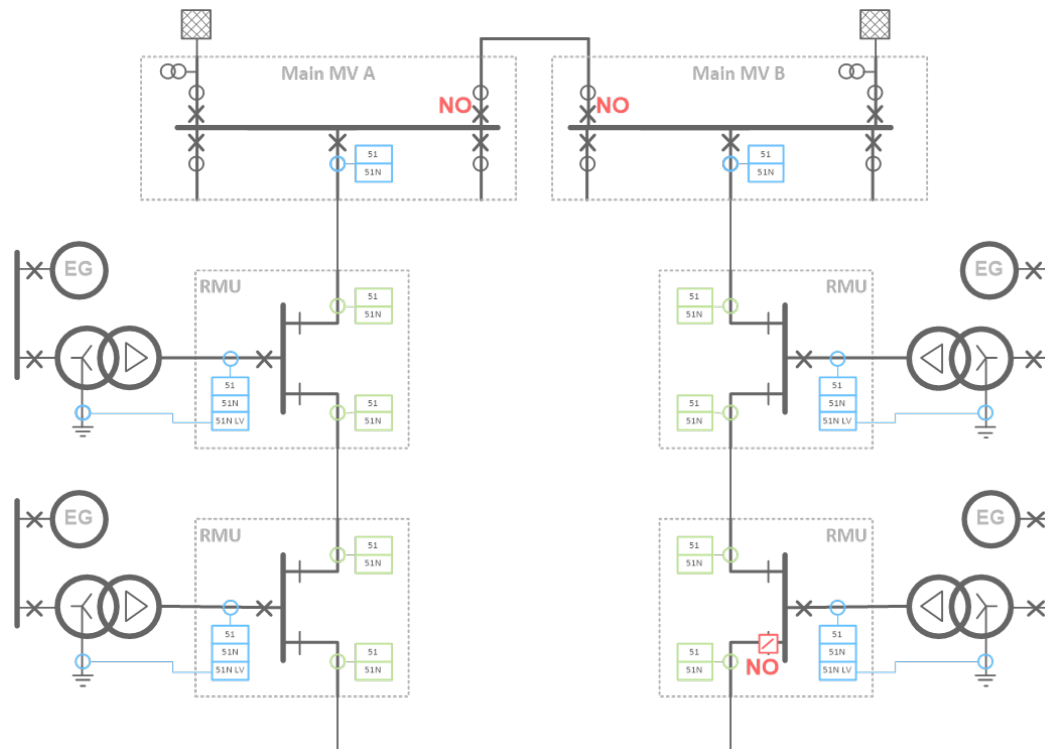
Simple RMU
<630A / <20kA



Display

Open-Loop Distribution

Typical MV protection

[RM AirSeT](#)[Easergy P3
\(Protection Relays\)](#)[Easergy C53
\(Automation Controller\)](#)



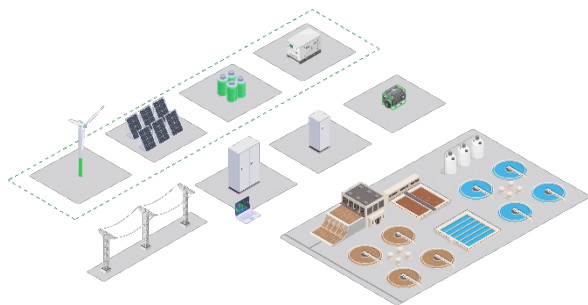
Let's **continue** with

MICROGRID

or

Go back

to 'Go Further'
main menu

Microgrid **Introduction****Key values****Sustainability****Economic Performance****Resilience and Independence****ZOOM***The Benefits of Microgrid and its Applications with Examples***Microgrid for Wastewater**

A **local electrical distribution network with Distributed Energy Resources (DER)**:

Generation, storage and loads interconnected and coordinated by Intelligent Management Systems.

**Grid-tied**

Microgrid

Introduction



Key values



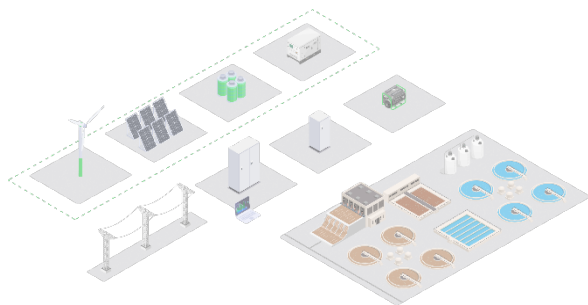
Sustainability



Economic Performance



Resilience and Independence



ZOOM

The Benefits of Microgrids

Sustainability



Water facilities are large consumers of electricity. To comply with national and local decarbonization initiatives, integrating on-site renewables becomes critical.

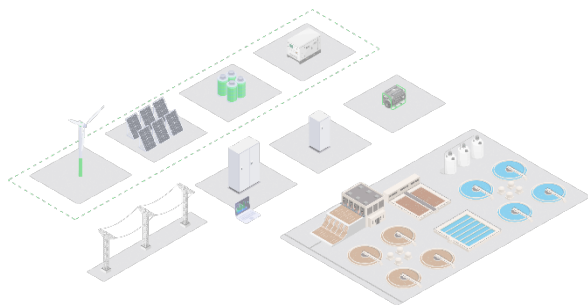
Microgrid control systems allow water facilities to be hyper-efficient and to do more while using less.

Microgrid for
Wastewater

A local electrical distribution network with distributed Energy Resources (DER): generation and storage and interconnected and managed by Intelligent Management Systems.



Grid-tied

Microgrid **Introduction****Key values****Sustainability****Economic Performance****Resilience and Independence**

ZOOM

The Benefits of Microgrids**Economic Performance**

With features like Tariff Management, Grid Ancillary Services, and Smart Self consumption of on-site energy resources, water facilities can drastically reduce their spend on energy without sacrificing necessary processes.

**Microgrid for Wastewater**

A local electrical distribution network with distributed Energy Resources (DER): generation and storage and interconnected and managed by Intelligent Management Systems.

**Grid-tied**

Microgrid

Introduction



Key values



Sustainability



Economic Performance



Resilience and Independence

Resilience and Independence



In the event of a power outage, water facilities can island themselves from the power grid using their own on-site energy resources to ensure the function of critical operations.

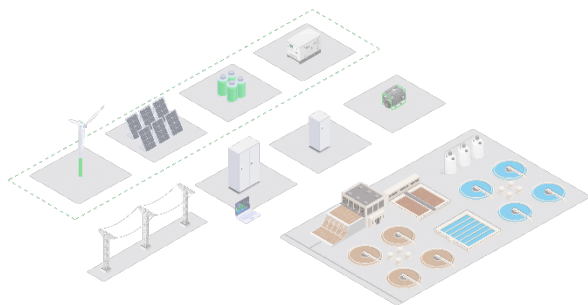


Microgrid for Wastewater

A local electrical distribution network with Distributed Energy Resources (DER):
generation and storage and interconnected and managed by Intelligent Management Systems.



Grid-tied

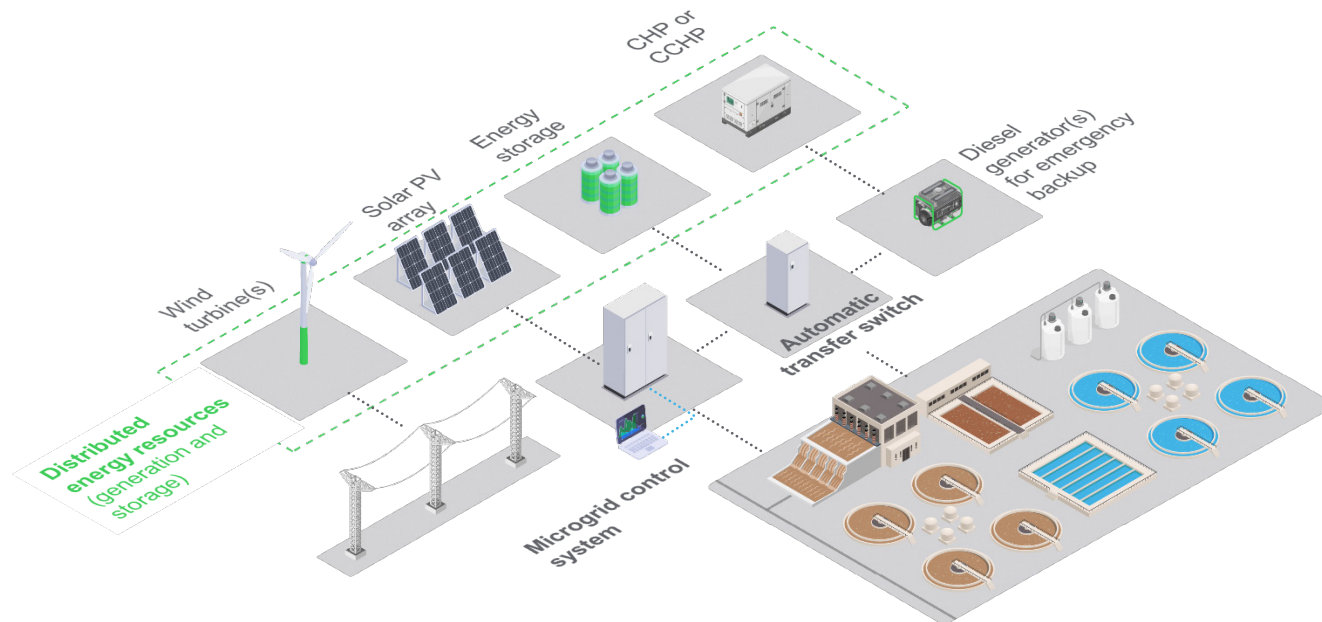


ZOOM

[The Benefits of Microgrids](#)

Microgrid

Introduction



Microgrid **Typical use-cases**

Sustainability

Economic
performanceResilience
& independence**Economic
Arbitrage**

Control local DERs* based on utility tariff scheme (load shifting, peak shaving)

**Grid Ancillary
services**

Monetize site's flexibility by participating in D/R* and/or FFR/FCR* mechanisms to contribute to grid stability

**Non-wire
alternative**

Add local capacity to cope with the increasing power demand

**Self-
consumption**

Consume as much as possible from local sustainable DERs*

**Back-up
power**

Increase site's resilience by adding local renewable back-up power

**Access to
energy**

Enable a remote location without access to the Distribution grid to supply the different location mostly with renewable energy



*D/R Demand/response - FFR/FCR : Fast Frequency Reserve, Frequency Containment Reserve - DER : Distributed Energy Resource

Microgrid **Offers overview (IEC example)**Size of
Microgrid

> 3,000 kW

Offer types

Projects and reference design

Electrical
Distribution

Energy Control Center Okken



Inverter offer

Storage Power Block



Control

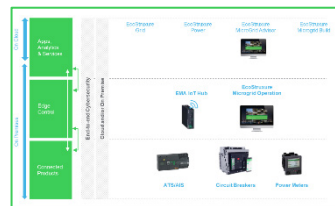
EcoStruxure™ Microgrid Operation
with EcoStruxure™ Microgrid BuildForecast and optimize when
to consume, produce, store,
or sell energyAsset
ManagementAlarming / Remote Maintenance Access / Predictive
Maintenance / Digital Logbook / Asset ManagementOptimization
forecast

EcoStruxure™ Microgrid Advisor

Manage island mode and
optimize DER in real-time

EcoStruxure™ Microgrid Advisor

Cloud-based demand side energy platform that enables you to dynamically control on-site energy resources and loads to optimize your system's performance.



Features

Time-of-use/Tariff Management

allows to efficiently control and manage DERs based on a site's variable electricity tariffs.

Demand Charge

helps you to reduce site power consumption during peak periods, determining when to consume, produce, or store energy.

Demand Response

advises when and how to reduce your demand based on demand response requests shared by a commercial aggregator.

Frequency Regulation

generates revenues from the market using battery flexibility to help maintain the grid frequency at nominal value.

Benefits

Up to 30% CapEx
reduction for power equipment

Up to 30% energy cost reduction

Enhance Sustainability

Easy connection to Distributed Energy Resources (DER)

EcoStruxure™ Microgrid Advisor

Cloud-based demand side management solution that enables you to dynamically adjust loads to optimize your energy consumption.

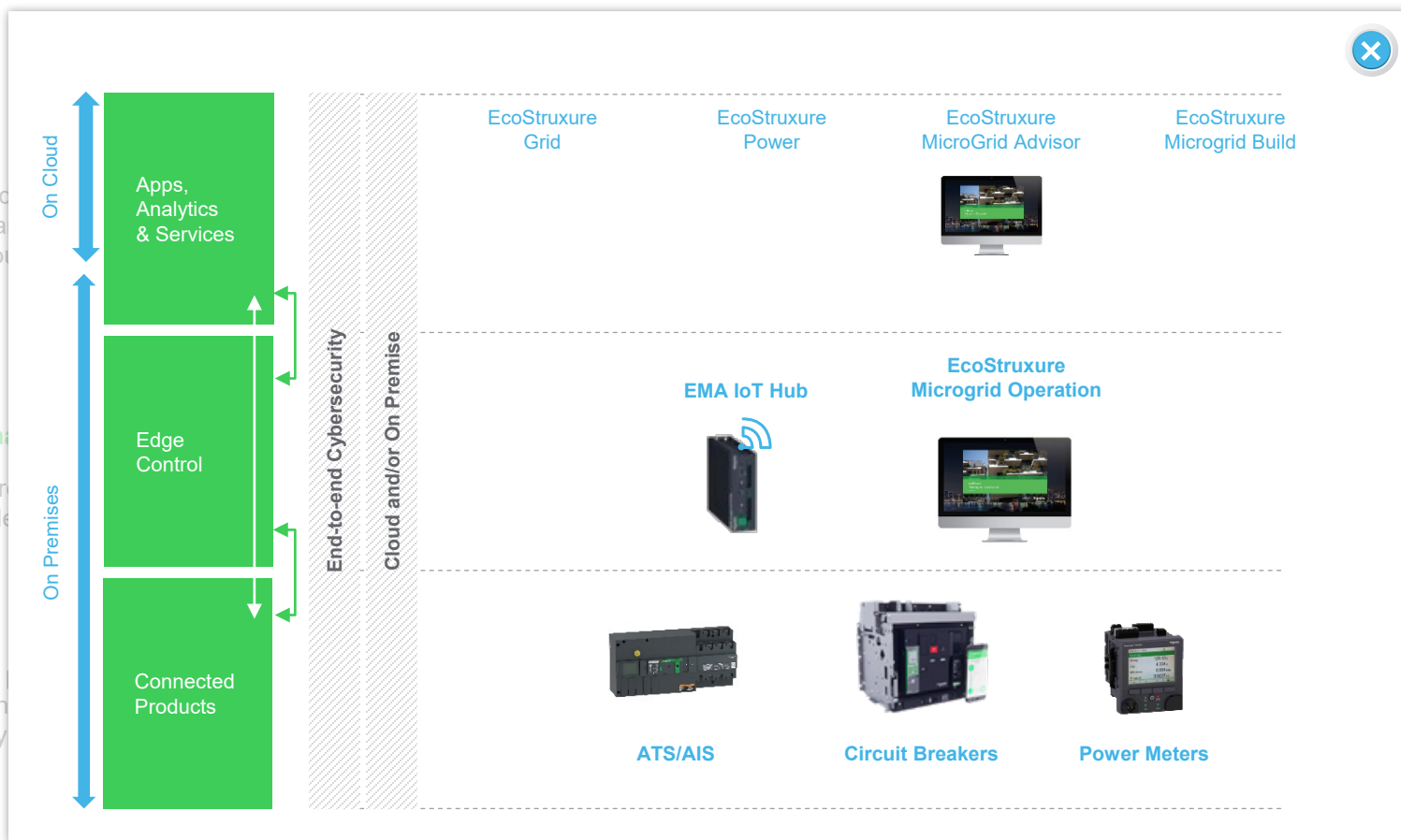
Features

Time-of-use/Tariff Management

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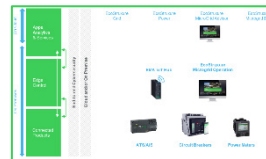
*D/R Demand/response - FFR/FCR : Fast Frequency Reserve, Frequency Containment Reserve - DER : Distributed Energy Resource

EcoStruxure™ Microgrid Operation - Large Sites

Continuity and stability

Constantly monitors the grid and automatically switches the mode of operation in case of abnormal electrical conditions.

Synchronizes load voltage and frequency to preserve microgrid power supply continuity and stability

[ZOOM](#)

Features

Seamless communication between EMO / EMA using MQTT protocol

Advanced algorithms

- Curtail PVs in grid-connected mode
- Switch BESS from Current Source Inverter (CSI) to Voltage Source Inverter (VSI) mode

Hardware-in-the-Loop use and deployment

ETAP from Schneider & Speedgoat third-party compatibility

EcoStruxure™ Power Automation System (EPAS V6.4) used for the graphical design of the project

- Basic redundancy to ensure the continuity of the operations
- DER management capability increase (120 setpoints/s)
- Cybersecurity certification

Benefits

Favoring renewable DERs
during islanding (enabling more than 30% of renewable production)

Reduces CAPEX

Easy operation and maintenance

EcoStruxure™ Microgrid Operation

Continuity and stability

Constantly monitors the case of abnormal electric Synchronizes load voltage continuity and stability

Features

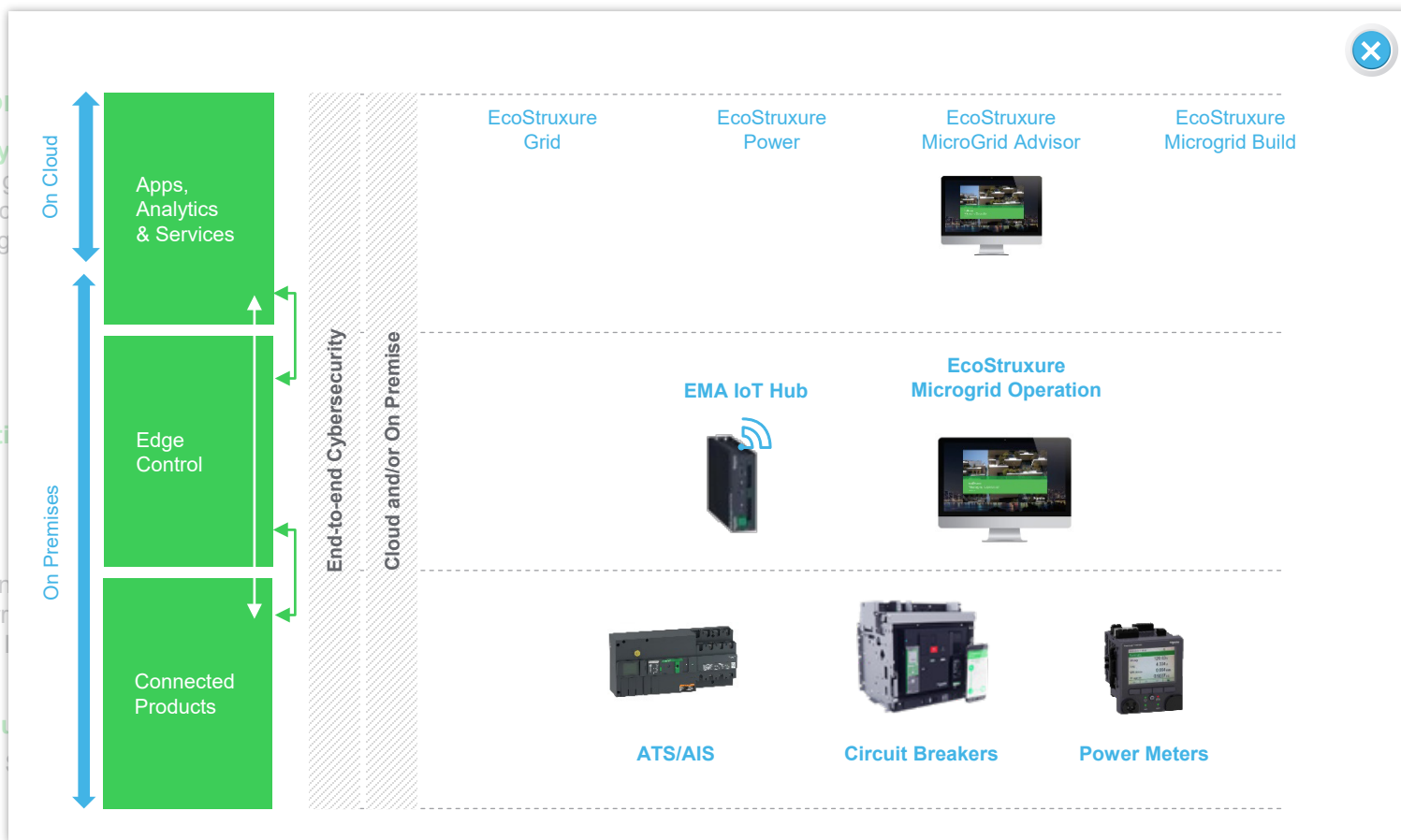
Seamless communication using MQTT protocol

Advanced algorithms

- Curtail PVs in grid-connected
- Switch BESS from Current Source Inverter (CSI) to Voltage Source Inverter

Hardware-in-the-Loop

ETAP from Schneider & compatibility



*D/R Demand/response - FFR/FCR : Fast Frequency Reserve, Frequency Containment Reserve - DER : Distributed Energy Resource



Let's **continue** with

**POWER and CURRENT
SIZING OPTIMIZATION**

or

Go back

to 'Go Further'
main menu



Levers for current rating optimization

What's the problematic?

Tender specifications follow design criteria which may be too restrictive. Those design rules may lead to oversized equipment out of the economic range of product.

How to optimize this?

Calculations of short circulation and load flow could guarantee a design “Fit to purpose” and avoid the extra margin generally used when the design is only based on estimations.

Short Circuit rating reduction

Rated Current reduction





Levers for current rating optimization



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Tender specifications follow design criteria which may be too restrictive. Those design rules may lead to oversized equipment out of the economic range of product.

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Calculations of short circulation and load flow could guarantee a design "Fit to purpose" and avoid the extra margin generally used when the design is only based on estimations.

Short Circuit rating reduction



- Using VSD, the motor contribution to short circuit could be neglected
- By setting the maximum fault clearing time to less than 1s, we can reduce the thermal withstand time of the equipment to 1s. Compared to a withstand of 3s, less expensive equipment can be selected.

(Note: Except for utility point of coupling busbars where utility approval is mandatory)



Levers for current rating optimization

What's the problematic?

Tender specifications follow design criteria which may be too restrictive. Those design rules may lead to oversized equipment out of the economic range of product.

How to optimize this?

Calculations of short circulation and load flow could guarantee a design "Fit to purpose" and avoid the extra margin generally used when the design is only based on estimations.

Rated Current reduction



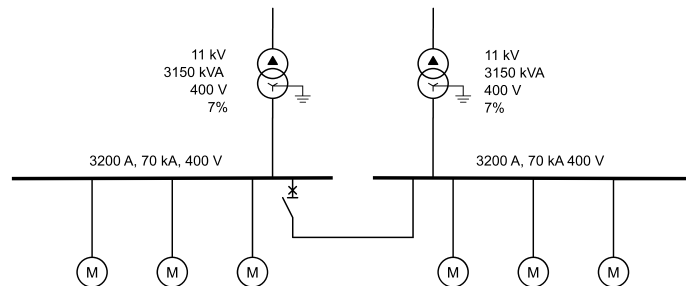
Transformer (TFO) rated power

> Sizing as per the load with reasonable margin

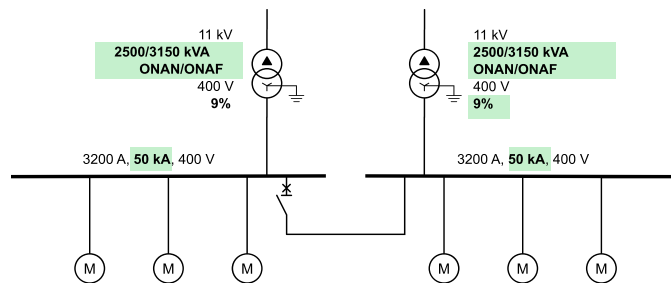
Busbar current

> Determined as per load list rather than TFO rated power, whenever possible

Power and Current sizing optimization architecture



- Analysis of load profile
- Usage of forced cooling
- Transformer impedance modification



All values highlighted in green
have been optimized compared to
typical architecture

[READ ME](#)

Up to
10%

TFO cost saving

Up to
5%

MV switchgear
cost saving

Up to
5%

LV panels
cost saving

Power transformer

Should be **sized according to the peak power demand** rather than the maximum possible total power.

Rated current of busbar and feeder

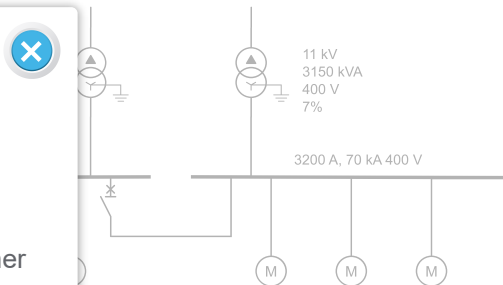
Should be **determined as per load list output** rather than the maximum potential power from the upstream transformer.

Motors

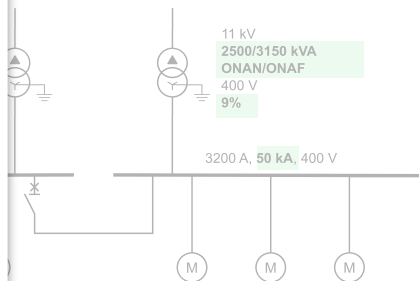
When **managed through VSD**, the **contribution of motors to the short-circuit current should not be taken into account**.

As a result, the **peak current and the short-circuit withstand** can be reduced. The **thermal withstand** could also be reduced to 1s instead of 3s according to the maximum clearing time given by the protection plan.

As example, **the limitation of the rated and short-circuit current leads to downsized busbars**.



- Analysis of load profile
- Usage of forced cooling
- Transformer impedance modification



Up to
10%

TFO cost saving

Up to
5%

MV switchgear
cost saving

Up to
5%

LV panels
cost saving

ETAP Portfolio

Exceptional user experience with highest quality standards

Electrical design and operations

Electrical System Design	Analysis / Simulation	Machine/Panel Engineering	Build	Operate	Maintenance/ Operator training	Automate / Optimise
Low voltage - CANECO BT/Electrical - CANECO BIM - CANECO One - AutoCAD OEM - AED for Revit Electro-Intensive - ETAP Power Simulator	- ETAP Arc flash suite - ETAP Network Analysis - Load Low - Short circuit - Load Analyzer - Voltage Stability - Reliability ... 140 modules - ETAP DC Systems - ETAP Protection & coordination - ETAP Dynamics & Transients - ETAP Cable systems - ETAP Renewables design	- SEE Electrical - SEE Electrical Expert - SEE Electrical 3D Panel - SEE Electrical PLM suite - SEE Electrical Building - SEE Building SE Edition - SEE System Design	- SEE Electrical 3D Shop Floor - SEE One Panel Manufacturing - SEE Harness Manufacturing suite - SEE Electrical Jigboard - SEE Cabling	- ETAP SCADA - ETAP Power simulation - ETAP Generation management system - ETAP Advanced Distribution management System	- ETAP Operator Training Simulator - ETAP Situational Awareness - ETAP Protection asset management - SEE Gen eDOC	- ETAP Intelligent Load Shedding - ETAP Micro Grid - ETAP Power Plant Control system - ETAP Grid code - ETAP Sustainability Analysis

Complete traction system design and analysis

- ETAP Traction Simulation - eTrax

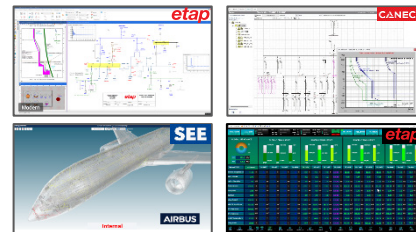
Data management & Project collaboration

- SEE Web Catalogue
- SEE Electrical Equipment Definition
- SEE Project Manager
- SEE Compodata
- ETAP Mobile APP
- ETAP NetPM
- NEM-based interoperability across applications

Services

- Electrical consulting
- Data Exchange services
- Trainings/ Advanced support
- Project design and execution
- Product integration
- Sustainability consulting

Top products





Let's **continue** with

VOLTAGE LEVEL
CHOICE

or

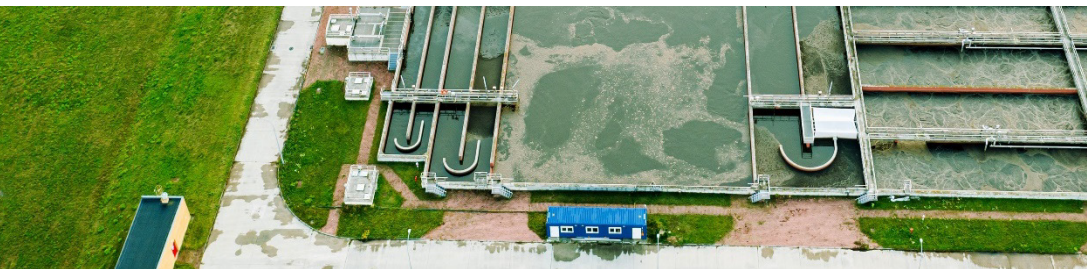
Go back

to 'Go Further'
main menu

Voltage level selection



The **appropriate Medium Voltage (MV) voltage level to be used stands between 6.6 kV to 33 kV**, depending on power and voltage combination.



The optimization targets to:

- Limit the rated current below 2500A
- Limit the short circuit current below 25kA

Up to
2%

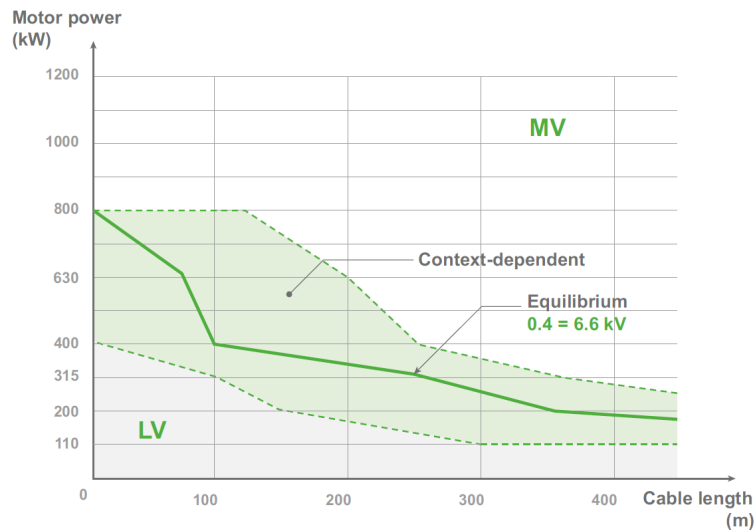
MV switchgear
cost saving



Voltage level selection

An important lever for optimization is the **selection of Low Voltage (LV) or Medium Voltage (MV) for the motors**.

The choice of MV (**6.6 kV**) or LV (**400 V**) is recommended in this graph depending on the cable length.

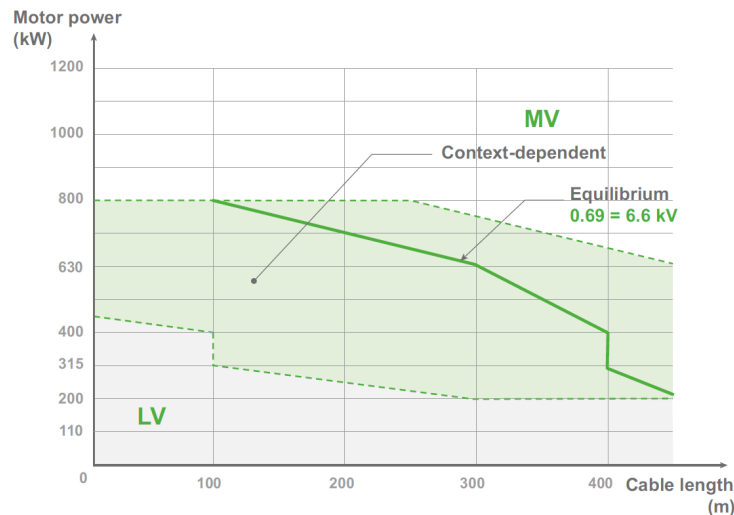


- ☐ 'LV' 400 V
Where LV connection is recommended
- ☐ 'MV' 6.6 kV
Where MV connection is recommended
- ☐ 'Context-dependent'
Where the connection is subject to the above mentioned cost variation factors

Voltage level selection

An important lever for optimization is the **selection of Low Voltage (LV) or Medium Voltage (MV) for the motors**.

The choice of MV (**6.6 kV**) or LV (**690 V**) is recommended in this graph depending on the cable length.



- ☐ 'LV' 690 V
Where LV connection is recommended
- ☐ 'MV' 6.6 kV
Where MV connection is recommended
- ☐ 'Context-dependent'
Where the connection is subject to the above mentioned cost variation factors

[Go back](#)

to 'Go Further'
main menu

Life Is On



Schneider
Electric