Afternoon program
15 years anniversary of InfraWatt

InfraWatt

Gemeinsam für Klima und Energie
Unis pour le climat et l'énergie
Uniti per il clima e l'energia

Herzlich Willkommen
Welcome
Bienvenue
Welkom

Andres Kronenberg

Afternoon program

Agenda

13.30	Presentation InfraWatt
	Innovation Award 2025: Short presentation of the winning projects
	New members InfraWatt
14.30	10 minute break
14.40	Introduction to the ResNRJWater project
	Topic 1: Identification of potential for renewable energy use at WWTPs
	Topic 2: Battery storage and energy management on WWTPs
15.30	End of the presentations

Leisure program:

15.40	Transfer and visit of the ARA Altenrhein
17.30	Joint aperitif & get together BBQ at the ARA Altenrhein
20.00	End of the event and transfer back to Hotel Seegarten

15 years of InfraWatt

Laure Deschaintre

InfraWatt

Gemeinsam für Klima und Energie
Unis pour le climat et l'énergie
Uniti per il clima e l'energia

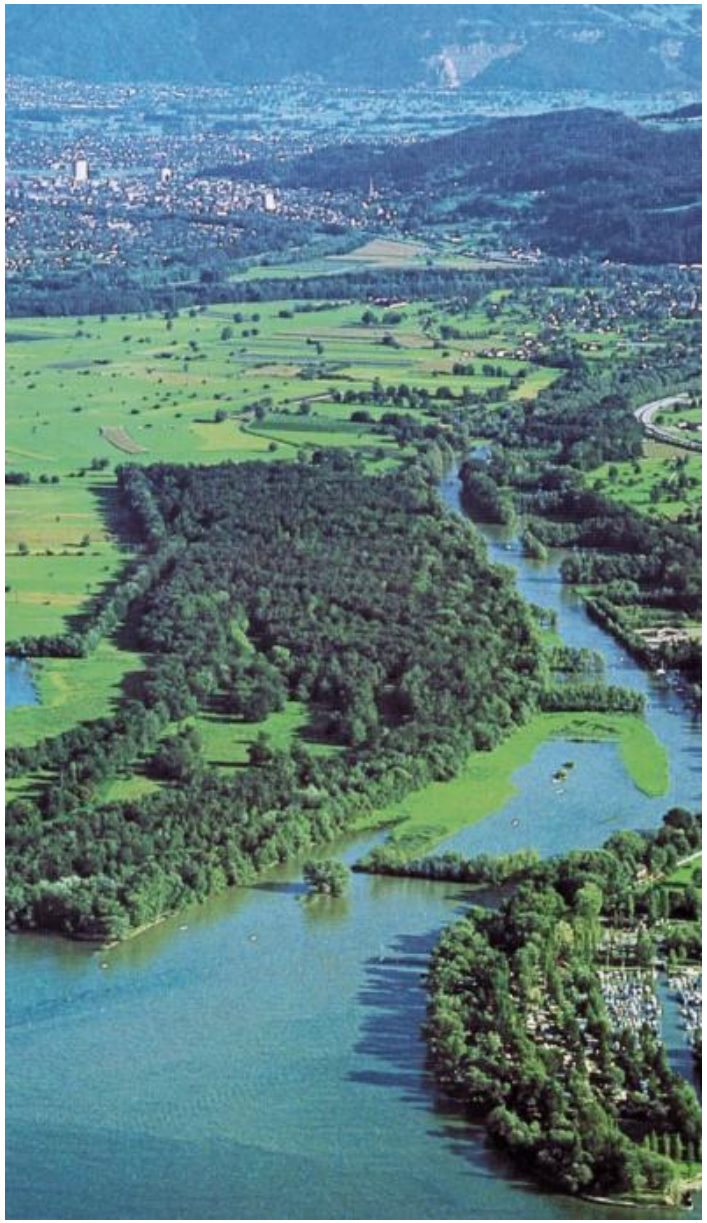
Innovation Award 2025

Laure Deschaintre

Topic: Wastewater treatment plants

Wastewater Association Lenzburg Region (2 projects) - AVA Altenrhein (3 projects)- Blue Factory Fribourg - ARA Basel - ARA Obermarch - STEP ORBE - STEP Delémont

AVA Altenrhein



ABWASSERVERBAND
ALTENRHEIN

Topic : granulated activated carbon

The project : Second-hand coal from the wwtps in Biel

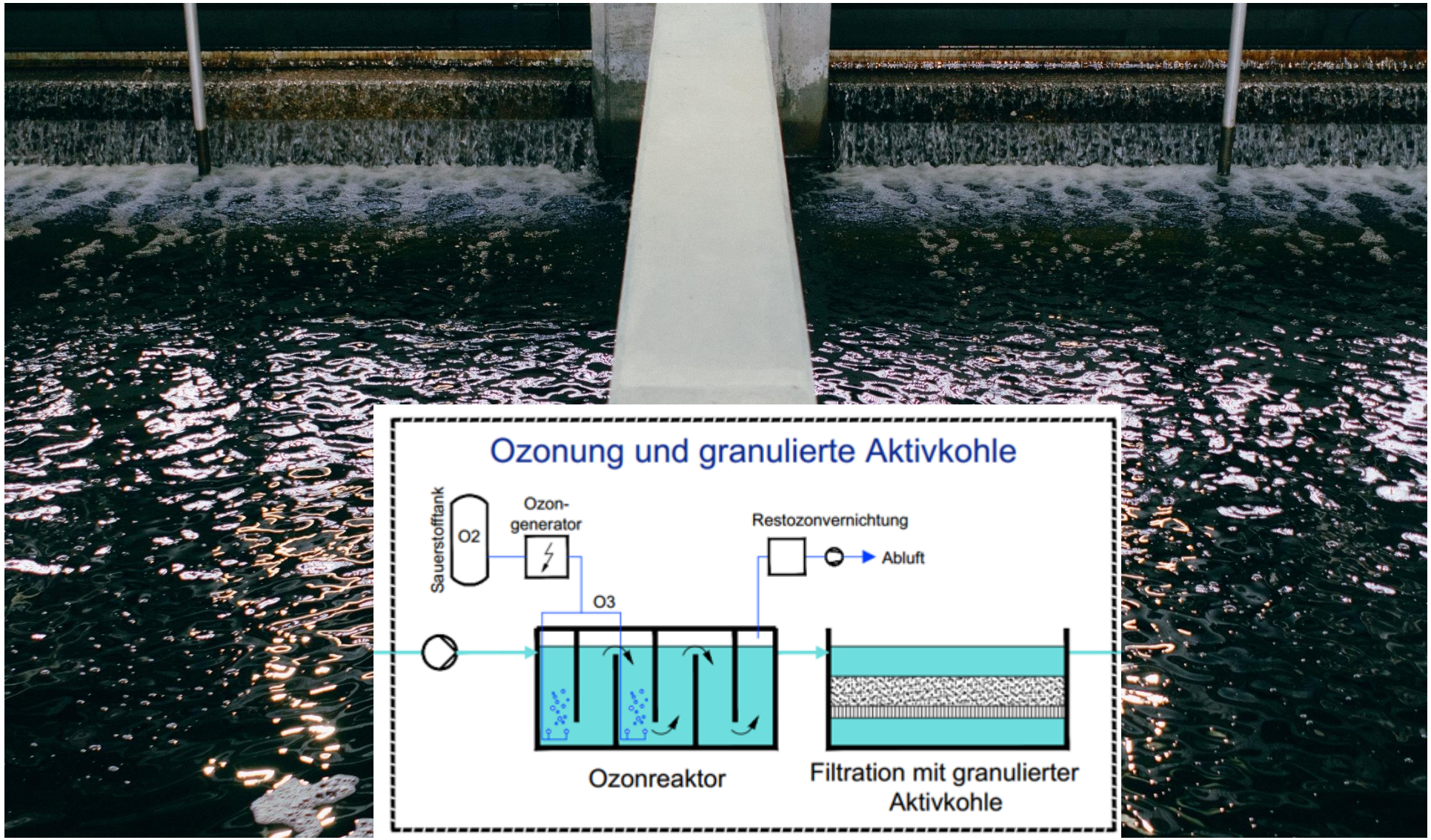
Why we think it's great: It saves resources and protects the climate, it's easy to implement and simply a great idea

‘Re-Use’ von GAK auf ARA

ABWASSERVERBAND ALTENRHEIN
WIR KLÄREN DAS

Publikation aqua&gas 2/2025

ABWASSERVERBAND ALTENRHEIN
WIR KLÄREN DAS


Ozonung und granulierte Aktivkohle
Sauerstofftank
O2
Ozon-generator
Restozonvernichtung
Abluft
O3
Ozonreaktor
Filtration mit granulierter Aktivkohle

CO_2 Einsparung durch ‘Re-Use’

ABWASSERVERBAND ALTENRHEIN
WIR KLÄREN DAS

Footprints*

- Herstellung aus Steinkohle: 13.402kg CO_2eq/kg AK
- Entsorgung: 3.333kg CO_2eq/kg AK

- Minderemission pro Nach-/Ergänzungsfüllvorgang (150m^3 GAK): 250t CO_2eq/a

→ entspricht ca. 6% der ARA-CO_2eq-Gesamtemissionen.

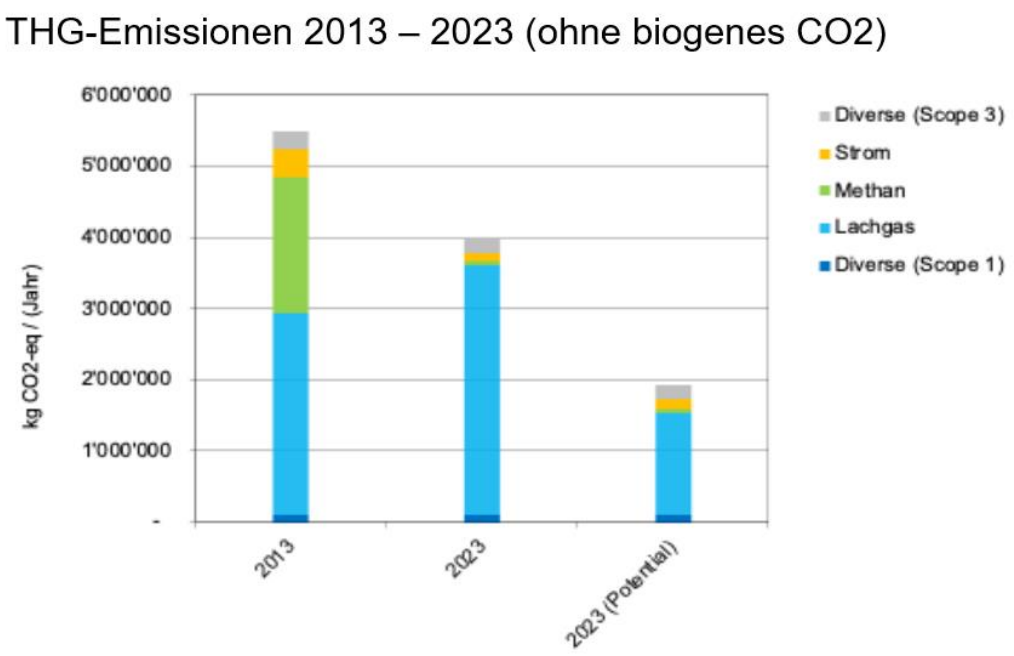
- Bei einer Erstbefüllung beträgt das GAK Volumen ca. 700m^3, d.h. 5'857CO_2eq/einmalig.

* Referenz der Angaben aus dem Projekt „CoAct–Integriertes Stadt-Land-Konzept zur Erzeugung von Aktivkohle und anderen Energieträgern aus Restbiomassen“ in Kooperation mit dem Institut für Energie-und Umweltforschung Heidelberg GmbH (ifeu)

THG Bilanz AVA

ABWASSERVERBAND ALTENRHEIN
WIR KLÄREN DAS

→ entspricht ca. 6% der ARA-CO2eq-Gesamtemissionen.



Trinkwasseraufbereitung Biel

ABWASSERVERBAND ALTENRHEIN
WIR KLÄREN DAS

Ausbau der Gebrauchtkohle

ABWASSERVERBAND ALTENRHEIN
WIR KLÄREN DAS

Transport und Ablad in Altenrhein

ABWASSERVERBAND ALTENRHEIN
WIR KLÄREN DAS

Einfüllvorgang in einer Zelle

ABWASSERVERBAND ALTENRHEIN
WIR KLÄREN DAS

Abwasserverband Altenrhein
Postfach 55
Wiesenstrasse 32
CH-9423 Altenrhein

Tel: +41 71 858 67 67
Fax: +41 71 858 67 77
www.ava-altenrhein.ch

AVRL

ABWASSERVERBAND
REGION LENZBURG

Topic : Own CO2 to lower the PH value

The project : Liquefaction of CO2 from off-gas and direct use for pH reduction in digester water treatment

Why we think it's great: It utilizes a resource that would otherwise be lost and saves chemicals and therefore operating costs. It can also be applied to other systems. A very good example!

Special price: Sponge City Bluefactory

Topic : Water management

The project: Bluefactory innovation district in Freiburg - raw water, wastewater and rainwater are stored in a 1000 m³ basin and used for toilets, irrigation and cleaning.

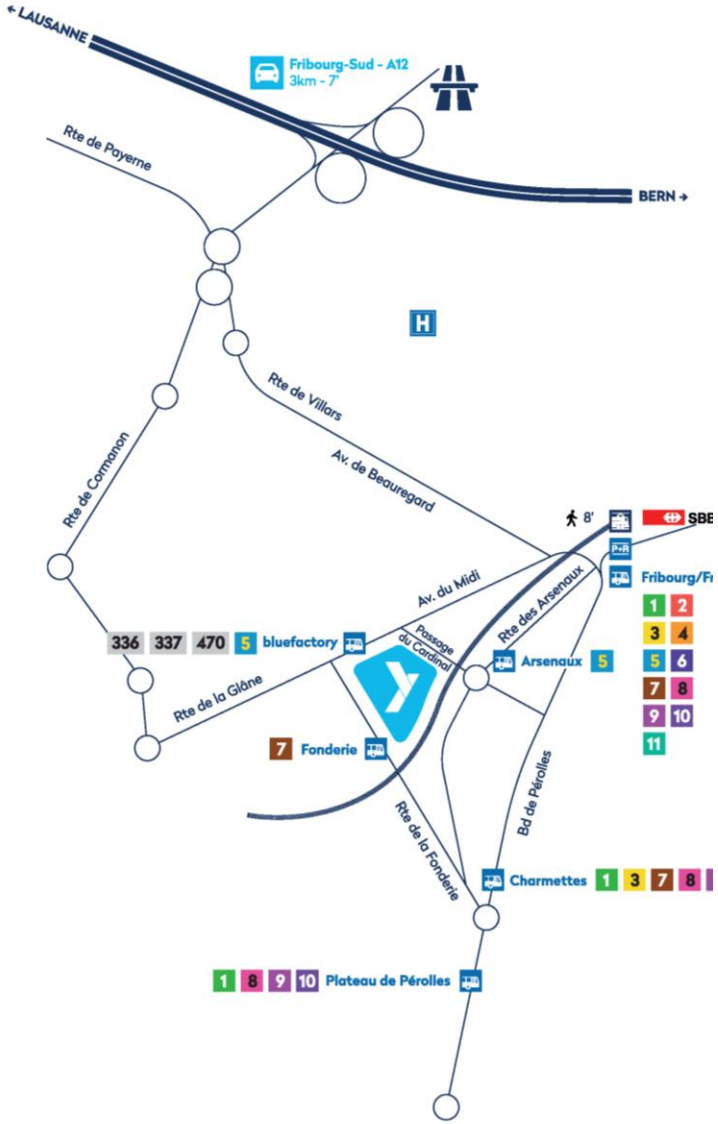
Why we think it's great: The energy you don't need is the best!

SPONGE CITY FRIBOURG

Sponge City concept – Water management at bluefactory

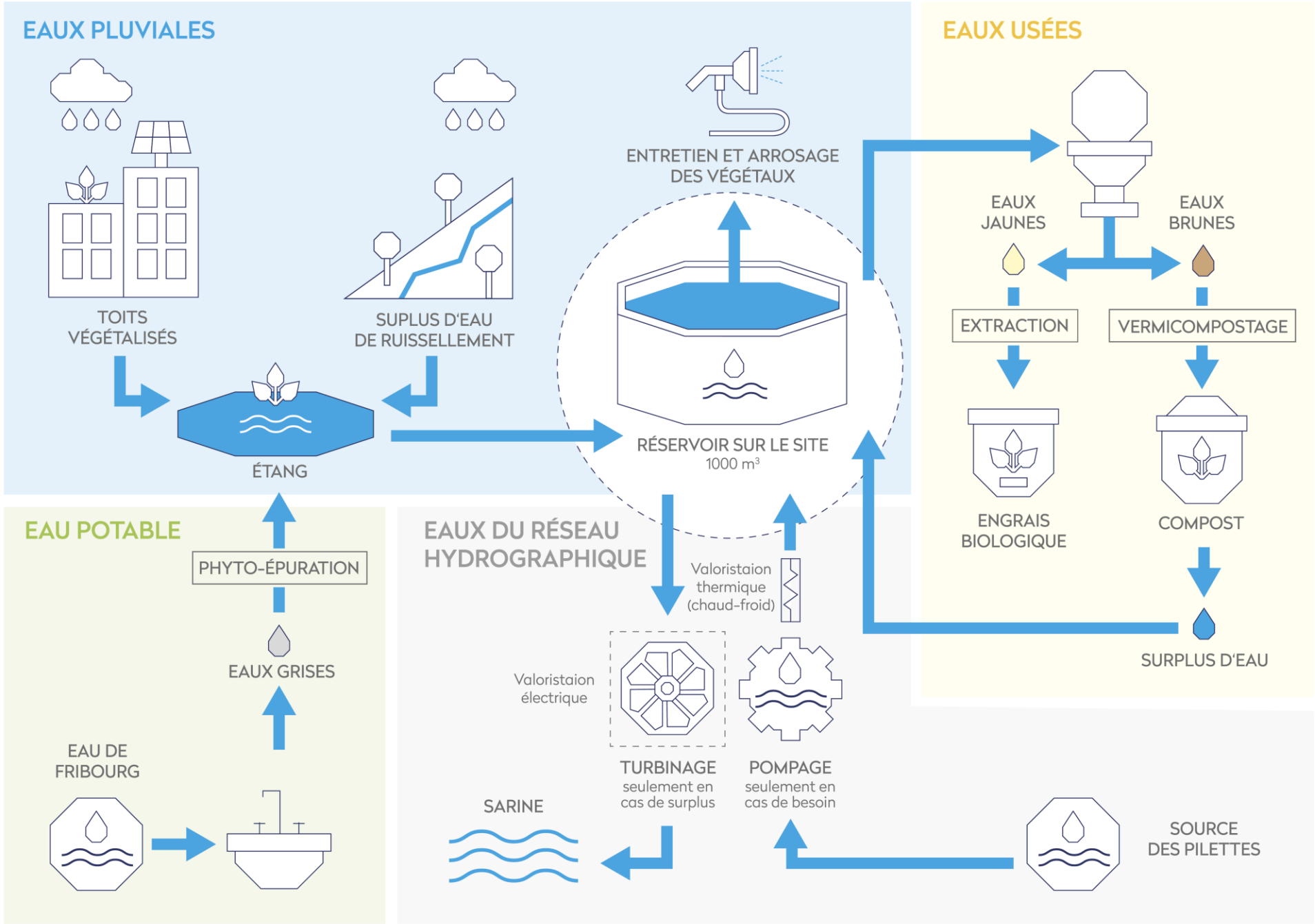
Présentation InfraWatt 03.06.2025

Quartier bluefactory



Le projet de ville éponge, boucle d'eau à l'échelle du quartier

Das Schwammstadtprojekt, ein Wasserkreislauf auf Quartierebene



bluefactory

SWITZERLAND INNOVATION PARK NETWORK WEST EP

Merci pour votre attention

Danke für eure Aufmerksamkeit

bluefactory SWITZERLAND INNOVATION PARK NETWORK WEST EPFL CARBON FRI SINEF groupe E

Presentation of new members InfraWatt

2025

Quellfrosch

ExerGo

ExerGo

Compact CO_2 anergy network
Functionality and application

ExerGo

Dr. Alberto Mian
CEO
Doctorate EPFL

Philippe von Holzen
Sales & BD Manager
MSc BA

Foundation 2018

Development of CO_2 -based anergy networks

Patented technology

Efficient heat transfer with CO_2

Pilot plant since 2022

350 kW power in practice

Market introduction in CH & EU

Current projects from SIA phase 21 to 51

ExerGo

Introduction

Why CO_2?

H_2O

our solution

CO_2

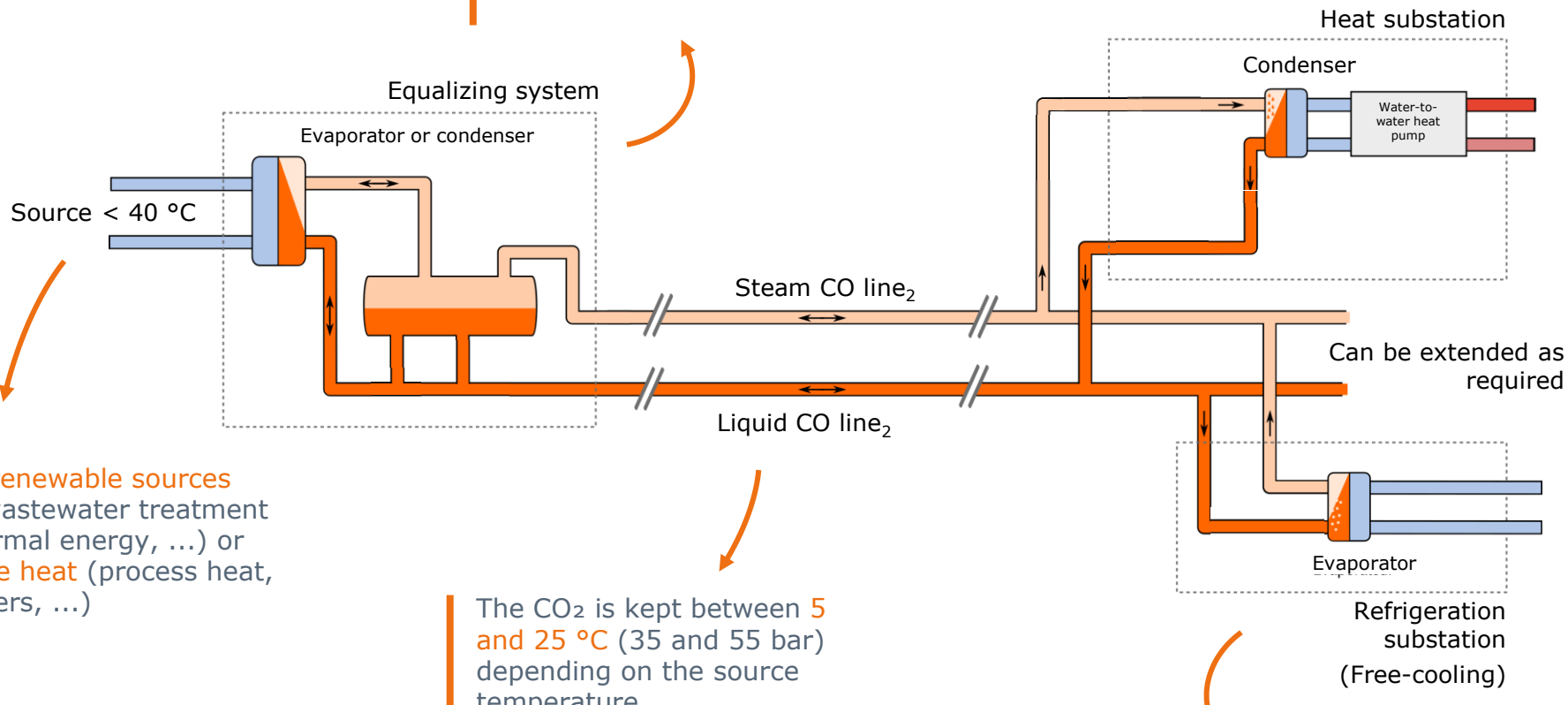
Low (22kJ/kg)	**Energy density**	**9x denser** (200kJ/kg), thanks to phase change
15°C	**Temperature**	15°C
High	**Flow rate**	**9x lower**
Large ø and rigid	**Cables**	**Small ø and flexible**
Expensive and time-consuming	**Construction costs**	Up to **60 % savings** on piping and road construction costs

ExerGo

How the CO_2 network works

The control center
evaporates or condenses according to the net demand of the grid.

Heat substation
The CO_2 condenses in the heat exchanger. A heat pump then increases the temperature



The grid uses renewable sources (lake, rivers, wastewater treatment plants, geothermal energy, ...) or industrial waste heat (process heat, computer centers, ...)

The CO_2 is kept between 5 and 25 °C (35 and 55 bar) depending on the source temperature.

Refrigeration substation
The CO_2 evaporates in the heat exchanger. If the temperature allows, it is cooled directly (free-cooling).

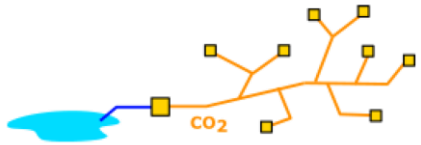
Market advantages in two use cases

Old towns

Energy service: Heating, cooling, hot water
Surroundings: Densely populated
Network size: up to 10 MW

Advantages:

- Decarbonization of old towns
- Expansion of existing heating and cooling networks
- Development of the "last kilometer"
- Flexible installation:
  - as inliner
  - over bridges, roofs or facades

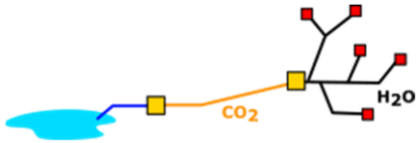


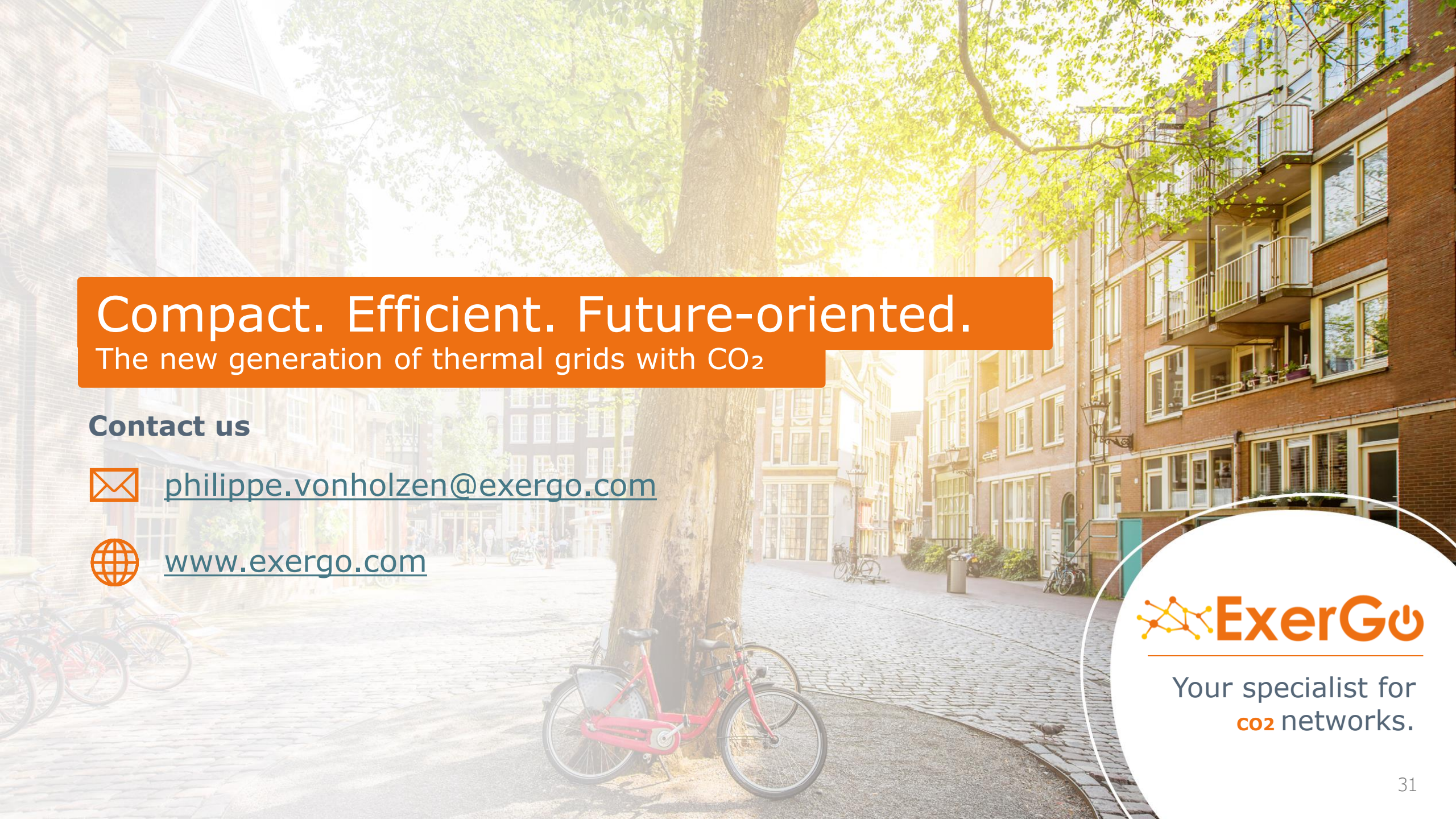
Source transport to large heat pumps

Energy service: Source transport to large heat pumps for district heating network
Surroundings: cities, industry, countryside
Network size: up to 20 MW

Advantages:

- Fast installation, even on steep terrain
- High capacity with small pipe diameters
- Built-in redundancies in the network design
- Thermosiphon effect can be used (passive return flow without pumps)





Compact. Efficient. Future-oriented.

The new generation of thermal grids with CO_2

Contact us

philippe.vonholzen@exergo.com

www.exergo.com

ExerGo

Your specialist for CO_2 networks.

10 minutes break

Start at 2.40 pm

Interreg
North-West Europe

Co-funded by the European Union

ResNRJwater

ResNRJwater – Northwest European w&w infrastructure as an energy hub

Lisa Schiferle, Lippeverband

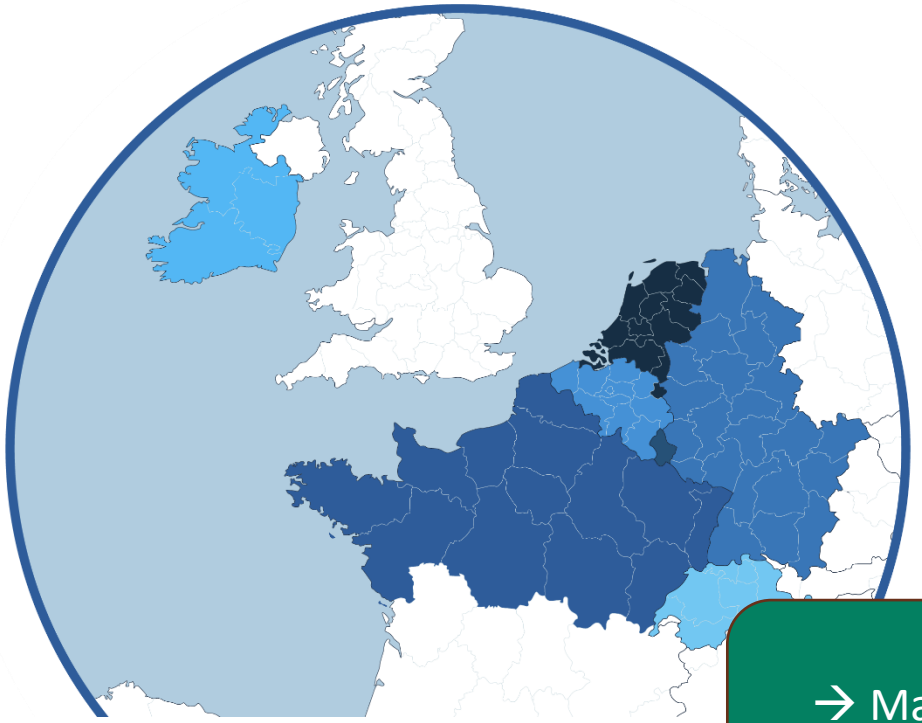
EGLV
Lippeverband

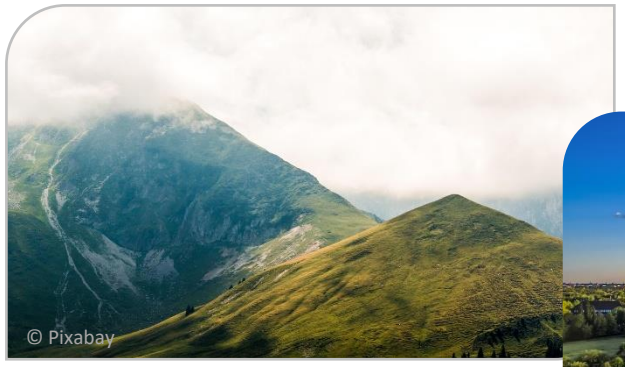
Agenda

- The water/wastewater (w&w) sector in Northwest Europe
  - Challenges
  - Potential
- Project design
  - Approach and objective
  - Facts and figures
  - Partners and investments
- Q&A

THE W&W SECTOR IN NORTHWEST EUROPE

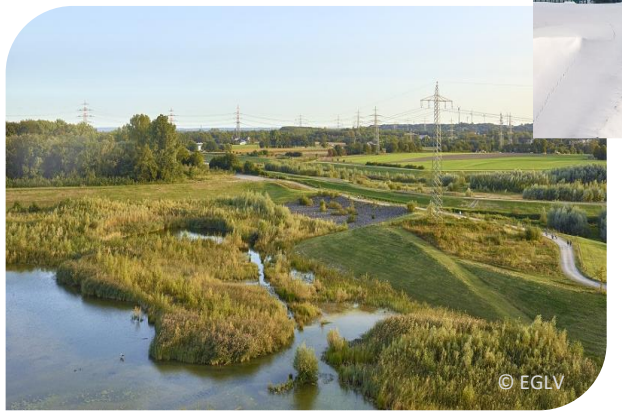
Varied landscapes – varied requirements





→ Manifold requirements for the w&w sector

Intensive w&w management is in place



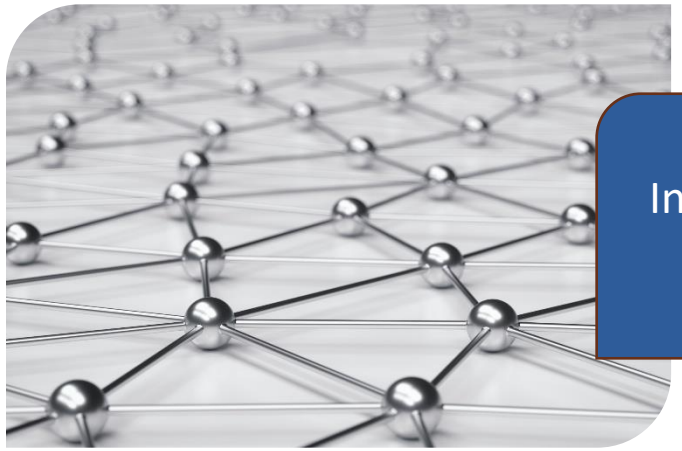
Major energy challenges: Crisis and transition

Plants require sufficient energy

Plants require stable energy supply

Share of renewable energy needs to grow

The potential of w&w infrastructure



Infrastructure is available and evenly distributed.

Infrastructure has potential for generating renewable energy:

- Ample space for windpower and solar energy
- Biogas
- Wastewater heat

Energy is available and/or can be produced relatively easily!

PROJECT DESIGN

Approach

Systematic approach

- Analyse existing w&w spaces and use them to generate renewable energy.
- Make this energy available in intelligent systems, store it and optimise its use.

Focus on **key technologies** in the areas of

- Solar energy
- Wind power
- Bio methane
- Wastewater heat

Objective

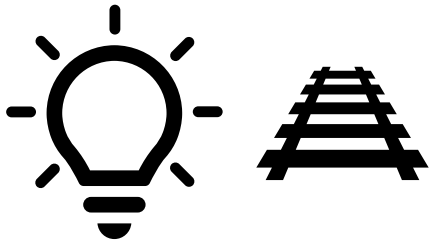
Demonstrate how to…

… explore the renewable energy potential of w&w infrastructure

… set up smart energy hubs

… stabilise grids, increasing the share of renewable energy

… make knowledge available to trainees and experts in the field



Facts and figures

- Duration: 2024-2027
- Budget: € 11m
- Funded by INTERREG NWE (60%)
- Nine partners
- Seven pilots

Partners from science and technology

Interreg North-West Europe
Co-funded by the European Union
ResNRJwater

hoogheemraadschap Hollands Noorderkwartier

EGLV Lippeverband

Aquafin

EGLV Emschergenossenschaft

territoire d'énergie LOIRE-ATLANTIQUE

InfraWatt

Sem EnR44

Ollscoil na Gaillimhe University of Galway

BETREM ABFALL • BRENNSTOFF • ENERGIE

Seven pilots in four regions

Interreg North-West Europe
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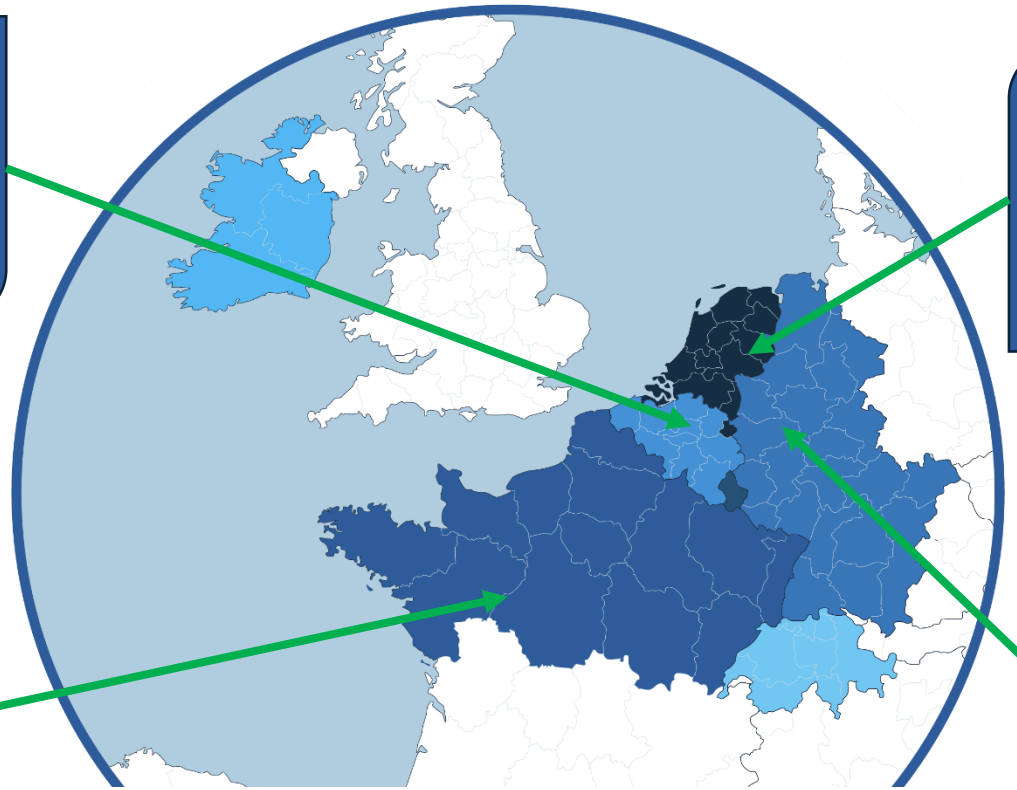
ResNRJwater

Flanders(BE) –
Energy management and grid stabilisation



Nordholland (NL) –
Biomethane, energy management and storage

Loire-Atlantique (FR) –
Solar technology (4x)

- Emscher-Lippe (DE) –
Wind power,
energy management


© EGLV/Macher, Detlef
© EGLV/Fritsche, Andreas
© EGLV/Fritsche, Andreas
© EGLV/Baumers, Klaus

Q&A

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North-West Europe

ResNRJwater

EGLV Lippeverband

territoire d'énergie LOIRE-ATLANTIQUE

Aquafin

EGLV Emschergenossenschaft

SemEnR44

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North-West Europe
ResNRJwater

Projet ResNRJwater

Interreg program

Report Exploratory phase TE44
INFRAWATT ARBON
03/06/2025

Valoen

Le SYDELA devient territoire d'énergie LOIRE-ATLANTIQUE

BECQUEREL INSTITUTE
Strategy Consulting in Solar PV

FIDAL AVOCATS

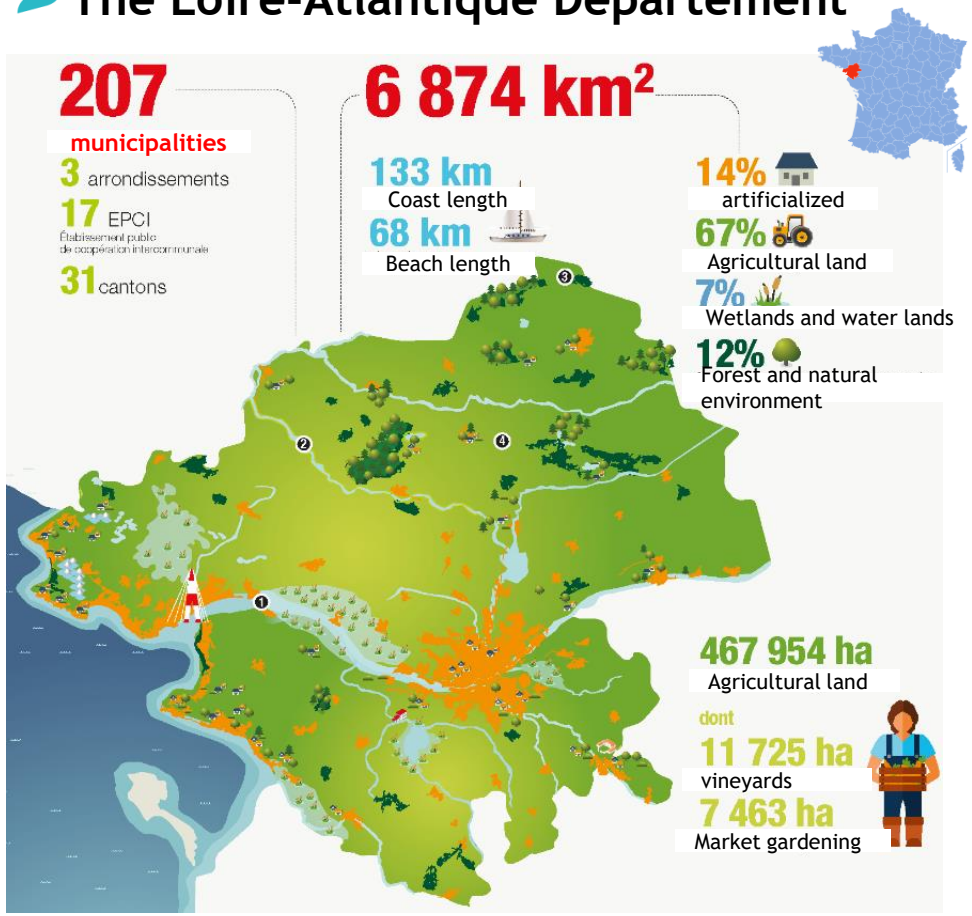
AGENDA :

- RNW project context
- Characterisation methodology : filtering
- Characterisation methodology : analyzing
- Results sheets given to collectivities

What is Territoire d'énergie Loire-Atlantique ?

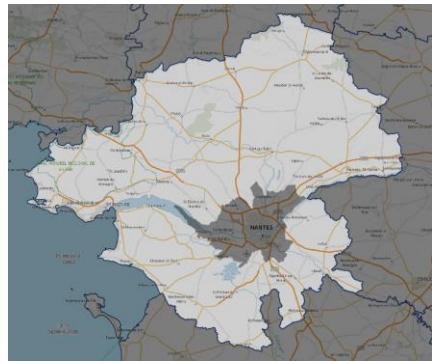
Interreg North-West Europe
Co-funded by the European Union
ResNRJwater

The Loire-Atlantique Departement



Territoire d'énergie Loire-Atlantique (TE44)

- Territoire d'énergie Loire-Atlantique is **a joint association** of 180 communes and 14 intercommunal bodies in the Loire-Atlantique department.
- Missions and skills:
  - Network infrastructures
  - Energy efficiency
  - **Renewable Energy production**
  - Sustainable mobility
  - Data and geographic information for the region



- 6,350 km2
- 780,000 inhabitants

territoire d'énergie LOIRE-ATLANTIQUE

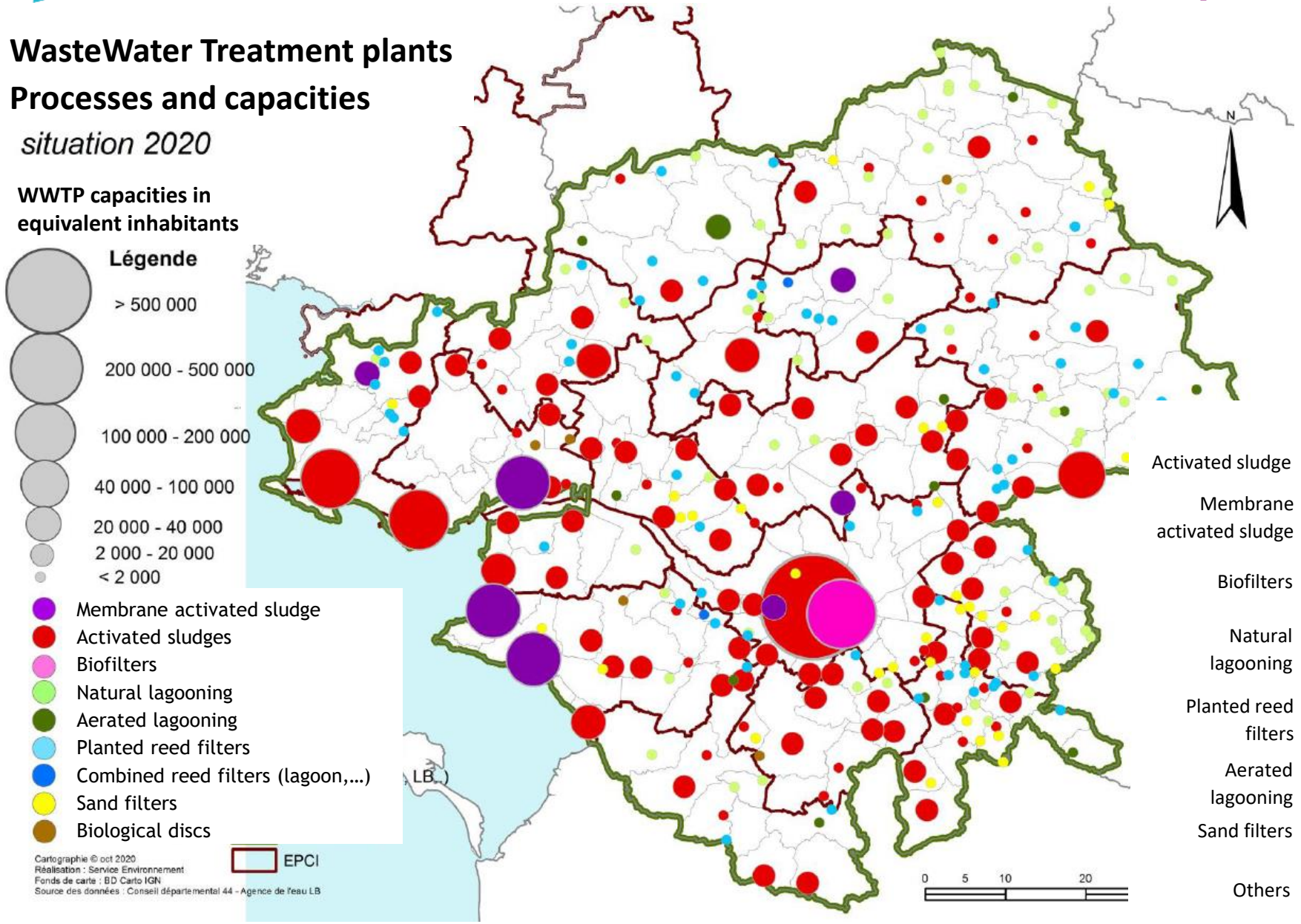
What are the WWTPs in Loire-Atlantique ?

Interreg North-West Europe
Co-funded by the European Union
ResNRJwater

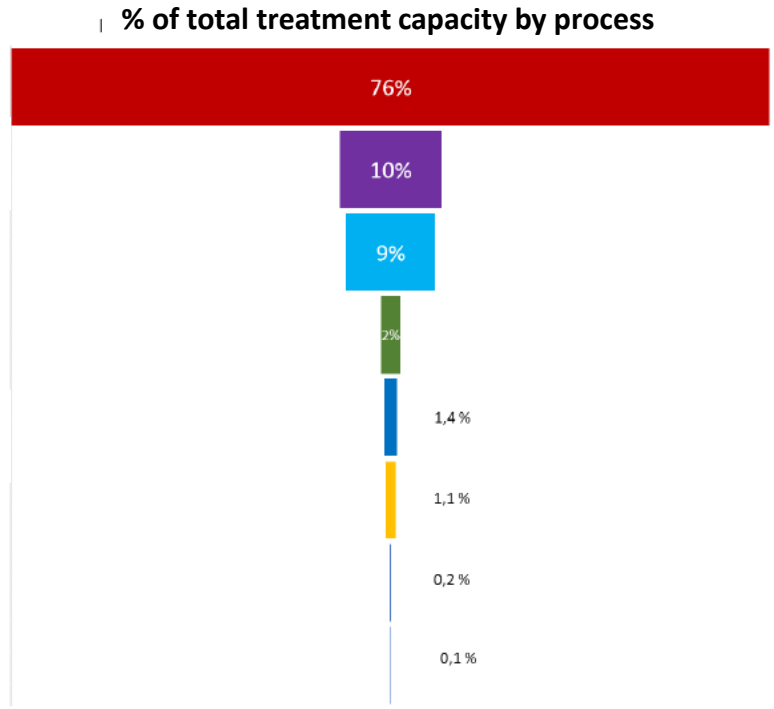
WasteWater Treatment plants

Processes and capacities

situation 2020



- 307 wwtp under public authority
- 2 004 626 equivalent inhabitants treatment capacity



What are the WWTPs in Loire-Atlantique ?

Interreg North-West Europe
Co-funded by the European Union
ResNRJwater

- La Baule / Guerande wwtp (2006)
  - Activated sludge
  - 178 000 equivalent inhabitants

- Pornic – La Rinais wwtp (2017)
  - Sand filters
  - 50 equivalent inhabitants

What are the WWTPs in Loire-Atlantique ?

Interreg North-West Europe
Co-funded by the European Union
ResNRJwater

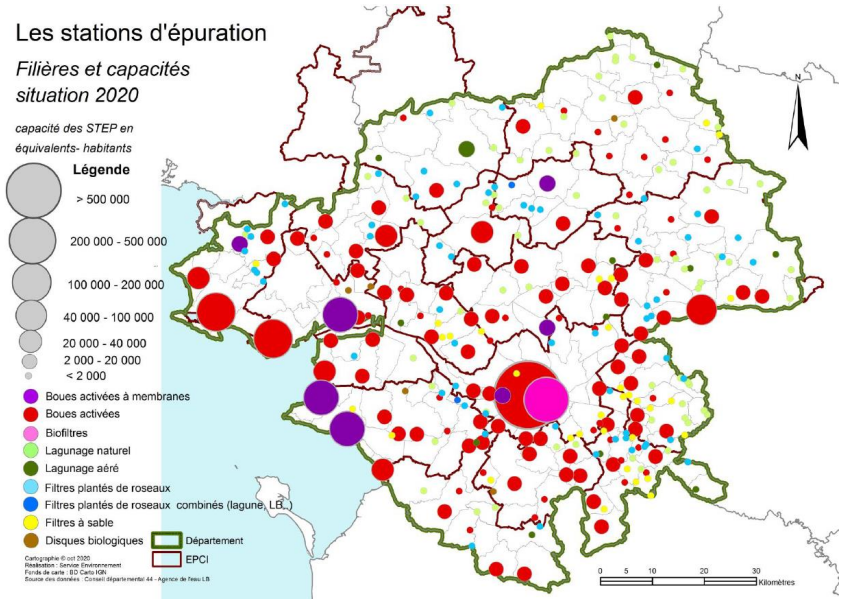
- Joué sur Erdre (1978)
  - Activated sludge
  - 720 equivalent inhabitants

- Marsac-Sur-Don –Guénouvry (2006)
  - Natural lagooning
  - 1 000 equivalent inhabitants

- Bouvron – Lande de la Noé (1966)
  - Planted filter
  - 1 900 equivalent inhabitants

- Guéméné-Penfao– Callac (1991)
  - Aerated lagooning
  - 2 250 equivalent inhabitants

The challenge with RNW project :




Ground mounted PV


PV tracker


PV carpark shelter


Floating PV


Semi Clear PV


Vertical PV

How to easily find the most relevant WWTP to install PV plants ?

Which PV technology is the most suitable ?

=> Develop and test a method for characterizing WWTP in terms of their capacity to host PV power plants

2024-2025 timetable for PV-WWTPs study

Interreg North-West Europe
Co-funded by the European Union
ResNRJwater

May 2024
Study contract award

Valoen
BECQUEREL Strategy Consulting in Solar PV
INSTITUTE
FIDAL AVOCATS

June 2024
- Defining Method
- Meeting Essen (GE)

July 2024
- Regulatory study
- Method description
- Surveying local authorities

September 2024
- Benchmark Becquerel PV / WWTPs
- Survey results interpretation

October 2024
- First filtering results
- Defining scoring

November 2024
- Implementing scoring
- PV cost study
- Meeting Den Helder (NL)

December 2024
- DefiErgebnErgning the « Pairs » [Surface type – PV system]
- Finalising scoring method

January 2025
- Final filtering
- Deliverables

March 2025
- **Feedback to local authorities**

territoire d'énergie LOIRE-ATLANTIQUE

AGENDA :

- RNW project context
- Characterisation methodology : filtering
- Characterisation methodology : analyzing
- Results sheets given to collectivities

Global methodology

WWTP location, perimeter and useful area(s)

Critical criteria

➔ *Criteria for Filter **Level 1***
➔ *Criteria for Filter **Level 2***

First selection of WWTP

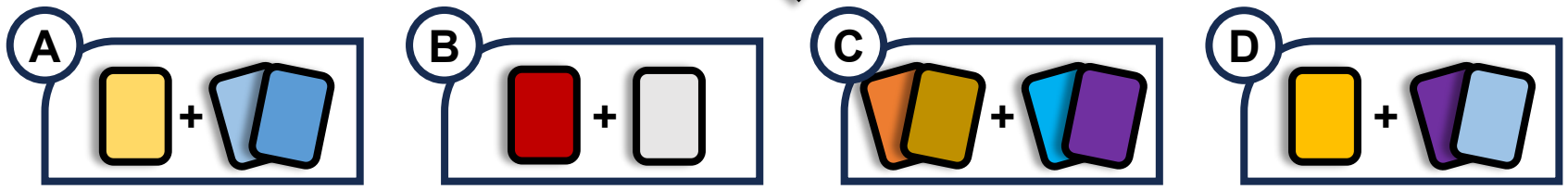
Secondary criteria

➔ ***Filtering** on Technical, Administrative and Environmental **Grades***

& PV systems

➔ ***Analysing** on Economical and Innovation **Grades***

Pairing: the same criterion has not the same impact on different PV systems



GIS data specifications

WWTP type

Main influencing factor: **type of treatment**

- Purification treatment
- Capacity
- Administrative and legal pattern

Activated sludge	109	38%
Reed-bed filters	70	24%
Natural lagoon	60	21%
Infiltration-percolation	16	6%
Aerated lagoon	12	4%
No data	10	3%
Mixed	6	2%
Rotated biological contactors	5	2%
Others	2	1%

3 levels filtering

Surface type

Common denominator: **useful area**

- Type of equipment
- Usable area for PV

- ✓ Building
- ✓ Car park
- ✓ Round pond
- ✓ Other pond
- ✓ Ground

Economical and Innovation analysis

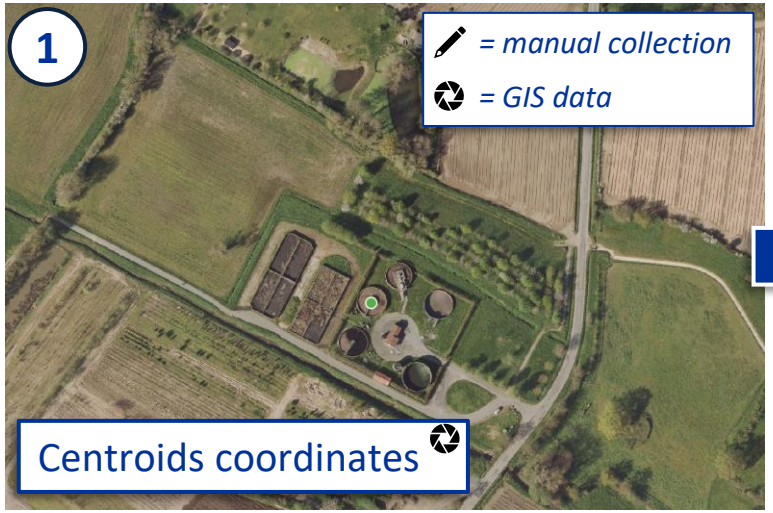
PV Plant type

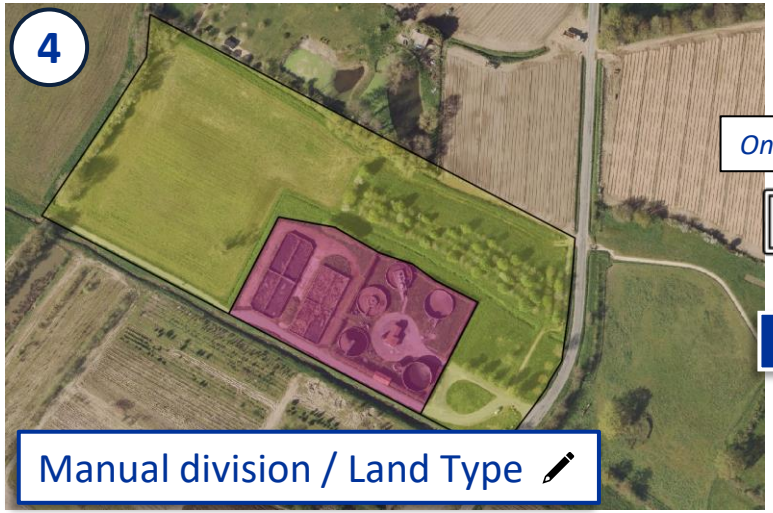
Main influencing factor: **installation technique**

- PV technology
- PV power density (Wc/m^2)

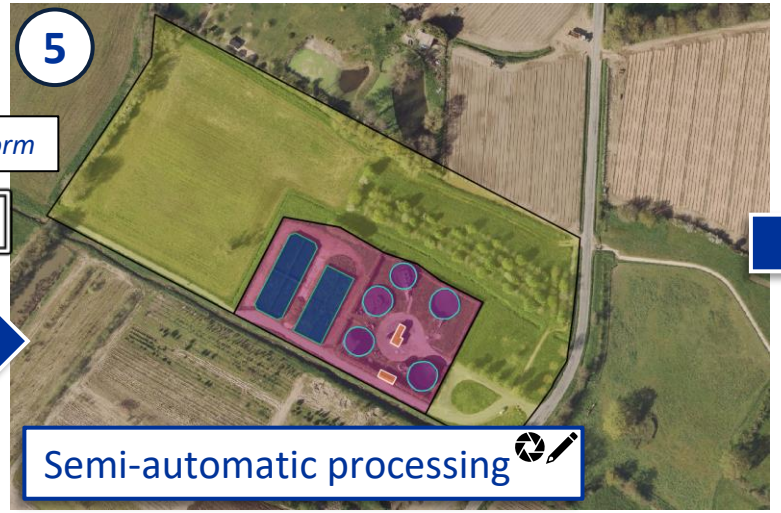
- ✓ Roof PV
- ✓ Carpark PV canopies
- ✓ Floating PV
- ✓ Ground mounted PV :
  - Fixed ground PV
  - Bifacial Vertical PV
  - PV tracker on mast

GIS data separation





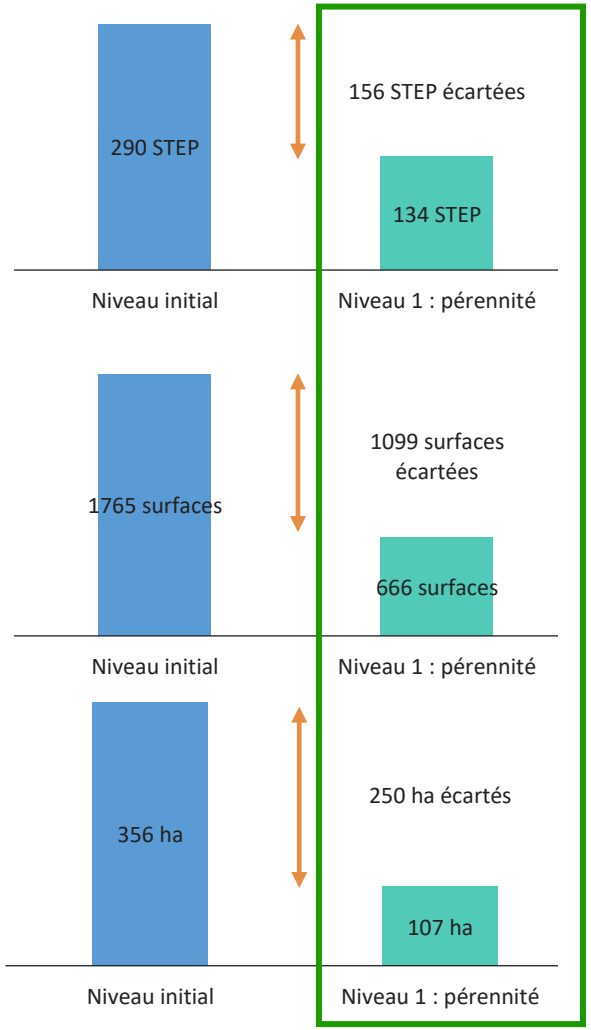
Online form



- ✓ Useful area in Type 1 *(equipment and circulation)* land
- ✓ Useful area in Type 2 *(auxiliary)* land
- ✓ Specified surface types (buildings, carparks, round basins, lagoons, ground -> 1 765 areas

Critical criteria / filter 1 : sustainable use of WWTPs

0	No long-term viability or major works
1	Medium-term work (< 10 years)
2	Long-term work (10 - 20 years)
3	***No works for 20 years***

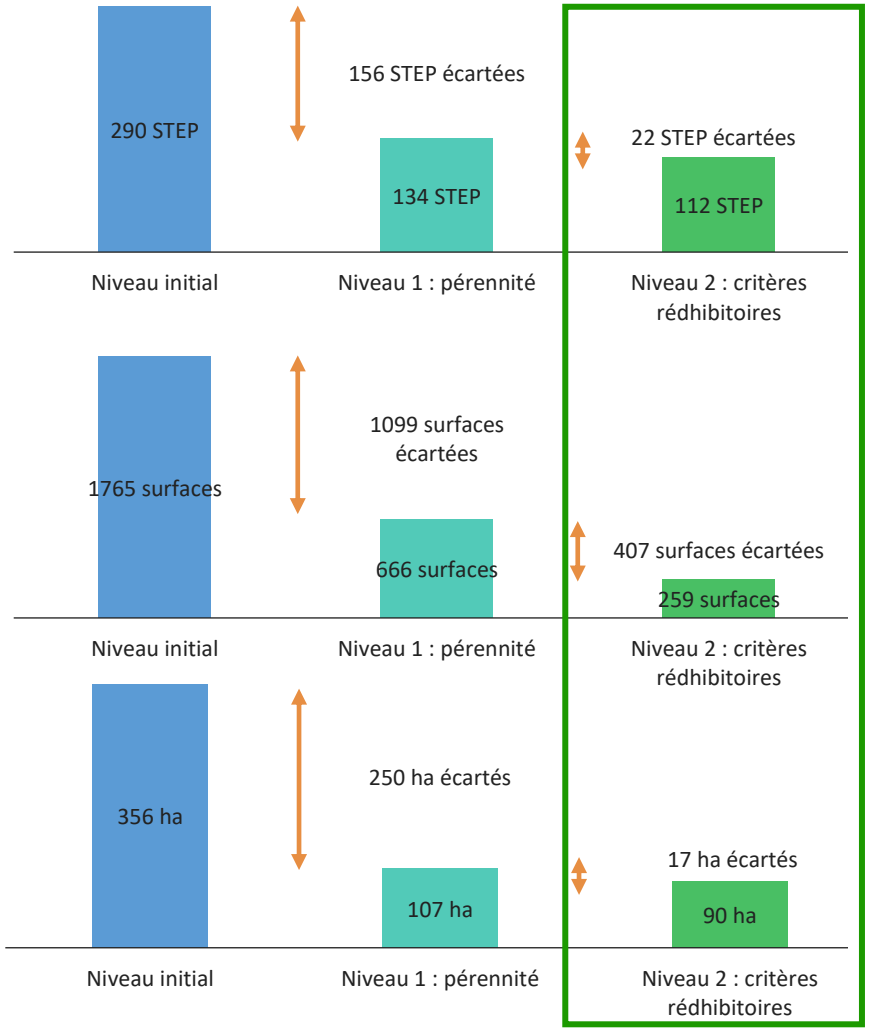


Critical criteria / filter 2 : at surface type level

- **Selection of areas that do not already have PV.**
- **Useful area threshold to be reached: :**
  - *Buildings : 180 m² / 36 kWc.*
  - *Car parts and round ponds : 250 m² / 50 kWc.*
  - *Lagoons: 750 m² / 150 kWc.*
  - *Ground : 75 m² / 15 kWc.*
- **Solar potential threshold to be reached: 1,100 kWh/m2.year on the median potential.**
- **Need to be in continuity with urban development if in a commune covered by the Loi Littoral (except for buildings).**
- **On a WWTP with a capacity < 10,000 p.e. (except car parks).**

= manual collection

= GIS data



Level 3 filter: technical, administrative and environmental rating of Surface Types

Technical criterions:

- Adjacent public land.
- Asbestos risk.
- WWT process and operational constraints.
- Annual electricity consumption.
- Proximity to the ocean coast.
- Distance to the public electric grid.
- Site of geological interest; geological heritage inventory
- Airfields and heliports

Environmental criterions:

- Humid zone and Ramsar sites.
- Geological sites of special interest .
- Habitats protection decree.
- Biosphere, biological and naturel reserves.
- National and natural parcs.
- Coastal conservatory reserves.
- Sensitive natural landscape and geoparks.
- Wildlife and flora natural areas.

Regulatory / administrative criterions:

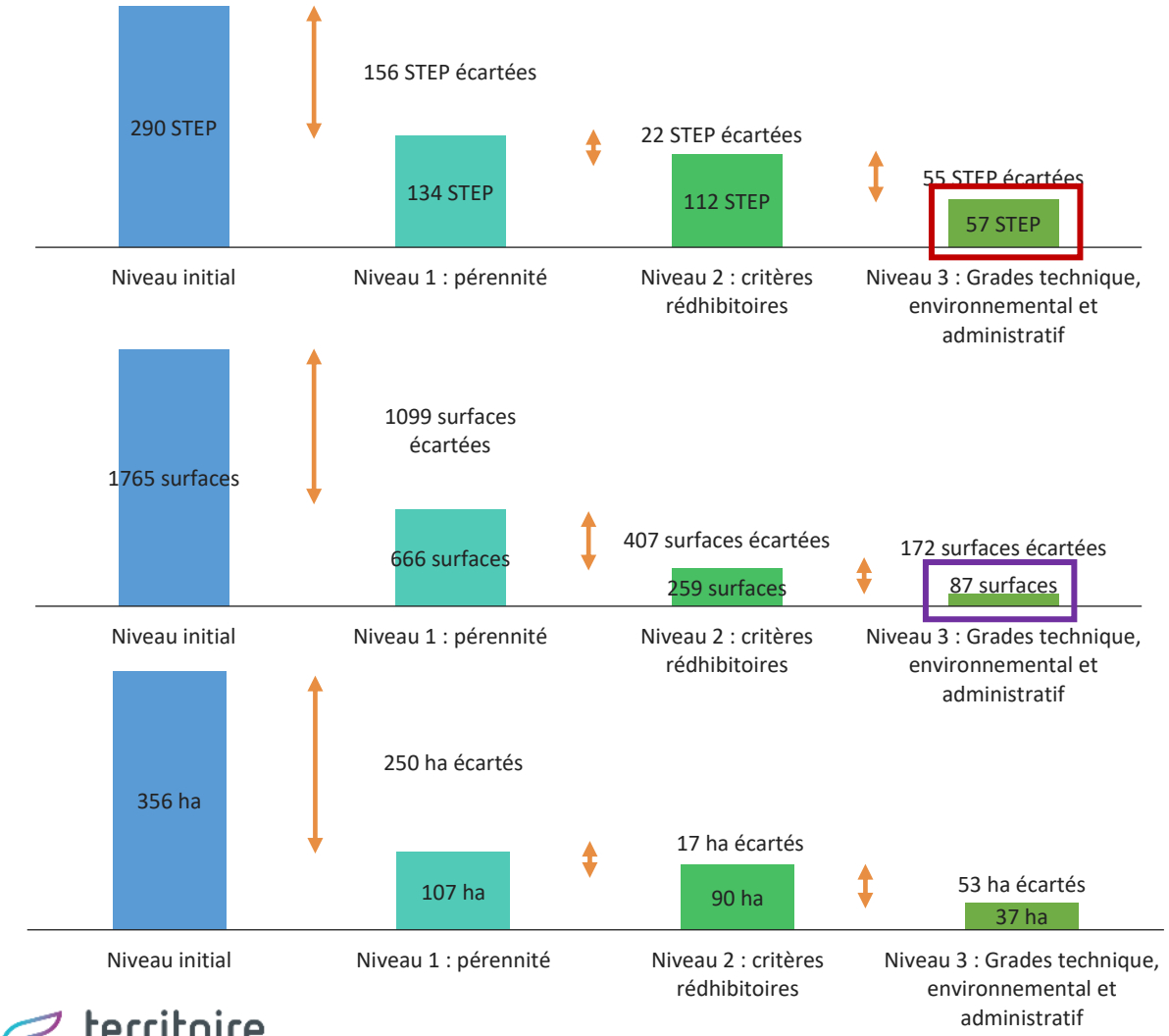
- Public or private domanial status.
- City population density.
- Public servitudes and urban planning.
- Archaeological entities or sensitivity.
- Patrimonial label.
- Farming for more than 10 years ?
- In RES acceleration zones?

= manual collection

= GIS data

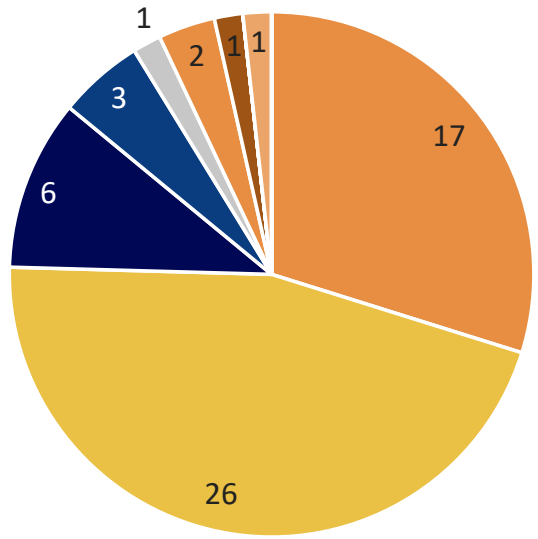
3 Grades from A(++) to E(--)
Filter keeps grande A and B surfaces

Filtering methodogology results over 290 WWTPs



At the end of the first 3 levels of filters, there are **57 WWTPs**, including **87 usable surfaces** (buildings, round basins, other basins, ground surface).

WWTP level 3 filter output, sorted by type of treatment



AGENDA :

- RNW project context
- Characterisation methodology : filtering
- Characterisation methodology : analyzing
- Results sheets given to collectivities

Benchmark on PV solutions for WWTPs

BECQUEREL INSTITUTE
Strategy Consulting in Solar PV

Interreg
North-West Europe
Co-funded by the European Union
ResNRJwater

Conventionnal PV

Fixed Ground-mounted

Rooftop (flat or titled roof)

Innovative PV for WWTPs

Pole mounted trackers

Ponds Canopies

Small scale floating PV

Innovative PV outside WWTPs

Vertical bifacial PV

Above water ground power plants

Greenhouse systems over basins

territoire d'énergie
LOIRE-ATLANTIQUE

Defining the best pairs « Type of surface » - « PV systems »

Type of surface  & PV systems 

Up to 8 ‘type of surface’ / ‘PV system’ pairs are possible, depending on the thresholds defined.:

A	Building	Roof mounted PV	E	Other Ponds (lagoons)	PV superstructure shading
B	Car park	Carpark PV shading	F	Ground useful area	Standard Ground-mounted PV
C	Round ponds	PV superstructure shading	G	Ground useful area	Dual-axis mast-mounted PV tracker
D	Other ponds (lagoons)	Floating PV	H	Ground useful area	Vertical PV

What is the best pair depending on your goal ?

Minimise the cost of produced energy €/MWh

A — Building + Roof mounted PV

F — Ground useful area + Standard Ground-mounted PV

Optimise individual or collective self-consumption

A — Building + Roof mounted PV

F — Ground useful area + Standard Ground-mounted PV

G — Ground useful area + Dual-axis mast-mounted PV tracker

Be innovative

C — Round ponds + PV superstructure shading

D — Other ponds (lagoons) + Floating PV

E — Other Ponds (lagoons) + PV superstructure shading

G — Ground useful area + Dual-axis mast-mounted PV tracker

H — Ground useful area + Vertical PV

Pair illustration: PV superstructure shading over ponds

C

Interesting solution for clusters of basins

Main criteria

- Usable area > 250 m²
- Sustainability of the land
- Technical grade (annual consumption, distance from HTA, area potentially subject to groundwater overflow)

No individual round basin is eligible at the outlet of a level 3 filter, but some sites may be suitable for a superstructure shade structure over several of these basins.

Example :

Pair illustration: Floating PV

D

For large tertiary basins, without treatment or cleaning

Main criteria

- Usable area > 750 m²
- Solar potential > 1 100 kWh/m².an
- Type of eligible basin:
  - No treatment
  - Lagooning & tertiary treatment
- Technical grade A or B

11 non-round basins at 5 different WWTPs are eligible at the outlet of a level 3 filter

Example :

Pair illustration : PV superstructure shading over large basins

E

Other Ponds (lagoons)

PV superstructure shading

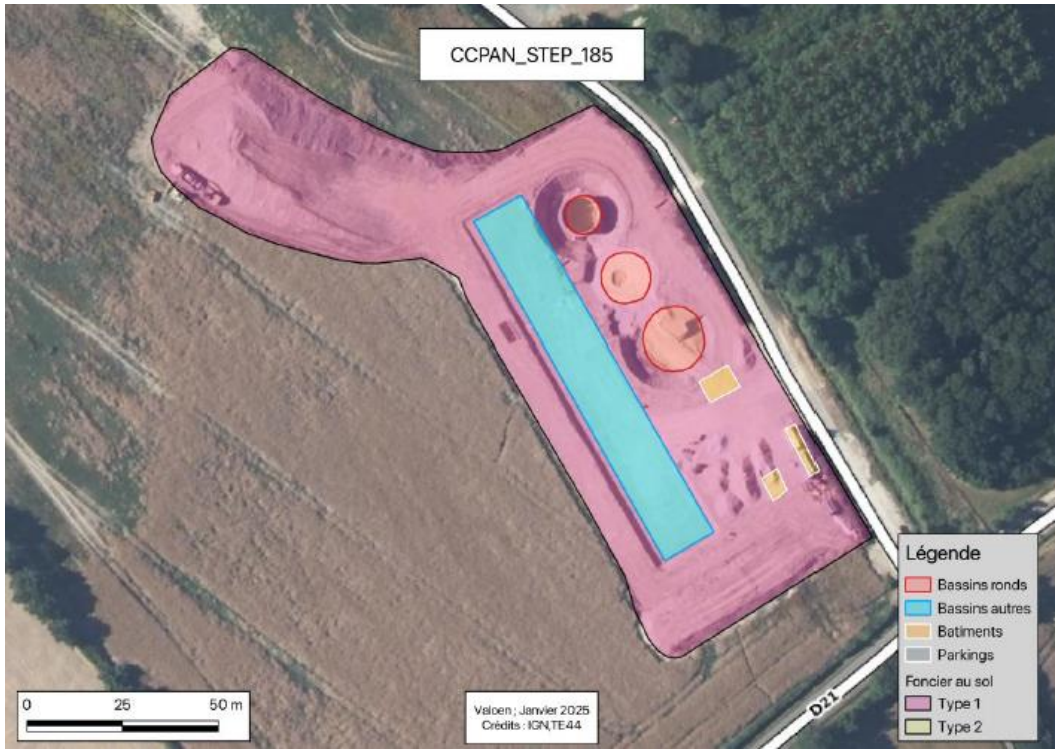
Main criteria

- Usable area of non-round tank > 750 m²
- Solar gain > 1,100 kWh/m².an
- P.E. capacity < 10,000
- Type of eligible tank:
  - No treatment
  - Tertiary treatment in lagoon system

11 non-round tanks at 5 different WWTPs are eligible at the outlet of a level 3 filter

Complex but complementary to floating PV

Exemple :



Pair illustration : ground mounted PV

F

The simplest and less expensive solution

Main criteria

- Useful area > 1,000 m² (for at least 100 kWp)
- Solar potential > 1,100 kWh/m².an

52 floor areas excluding basins at 38 different WWTPs are eligible for level 3 filter output.

Example :

Pair illustration : PV pole mounted trackers

G

Ground useful area

Dual-axis mast-mounted PV tracker

When the usable floor area is limited

Main criteria

- Useful area > 75 m² (for at least 100 kWp)
- Solar potential > 1,100 kWh/m².year

75 floor areas excluding basins at 55 different WWTPs are eligible for level 3 filter output.

Example :

Pair illustration : vertical PV

For linear properties

Main criteria

- Usable area > 75 m²
- Solar potential > 1,100 kWh/m².an

75 floor areas excluding basins at 55 different WWTPs are eligible for level 3 filter output.

Example :

How to analyse the relevance of these pairs for each WWTP ?

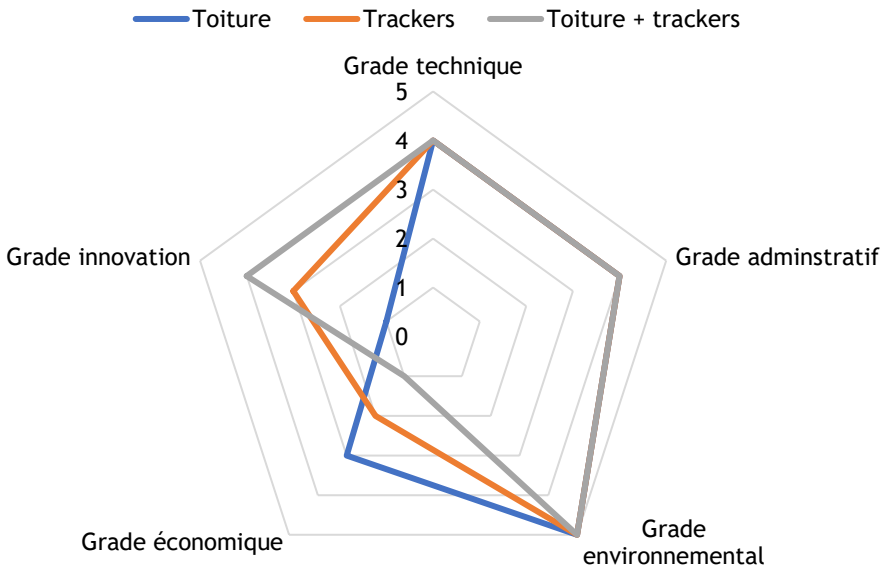
Economical analysis

- Installation costs
- Grid connection costs
- Volume of energy produced
- Possibility of self-consumption
- Feed-in tariff
- Project size

Innovation analysis

- Innovative PV system
- Combination of different PV systems
- Consumption flexibility and control
- Collective self-consumption capabilities

Example of comparative analysis between roof PV and PV trackers and a combination of both of them



AGENDA :

- RNW project context
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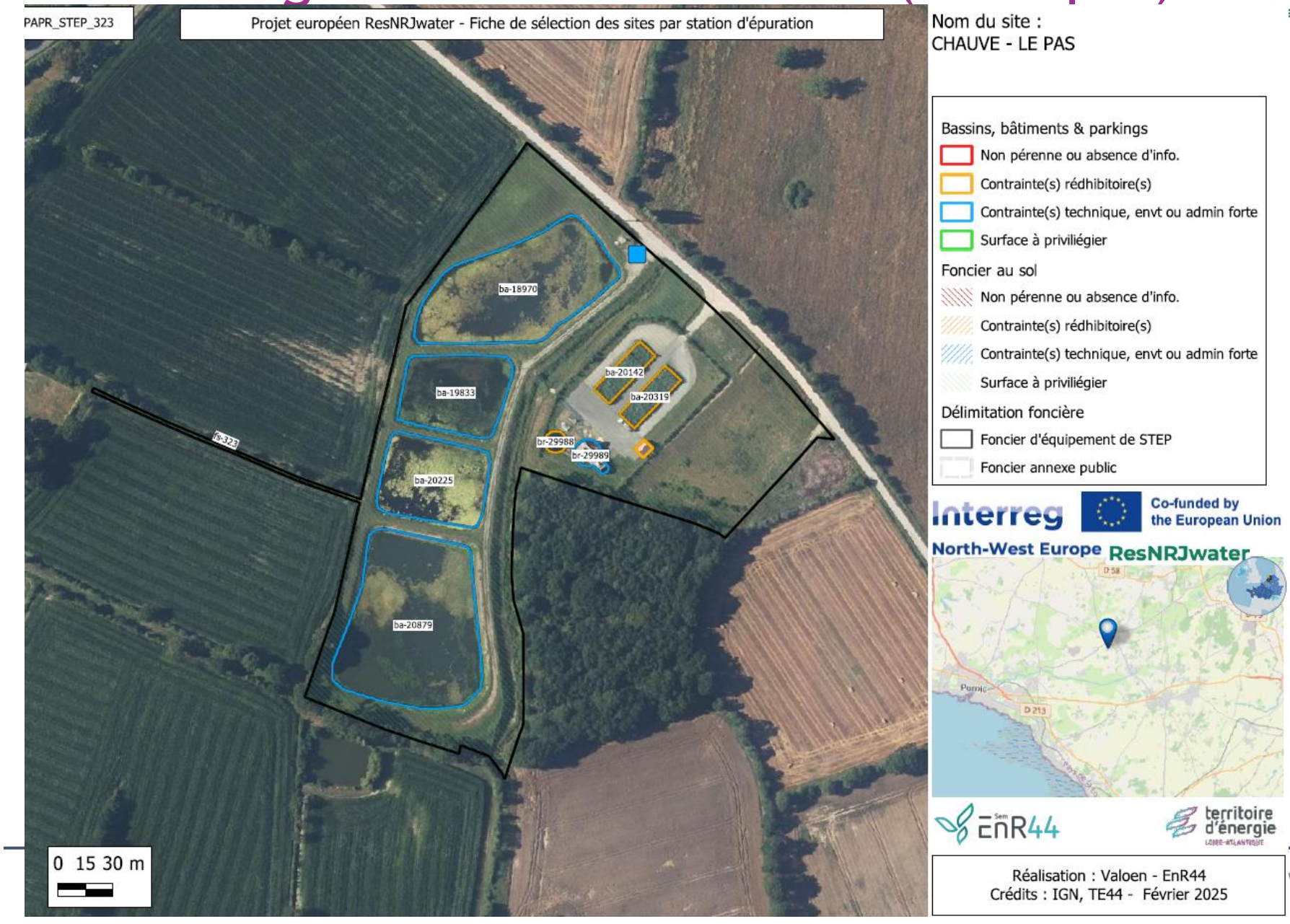
Result sheets given to collectivities (example)



Result sheets given to collectivities (example)

Interreg North-West Europe — Co-funded by the European Union

Site de : CHAUVE - LE PAS
Réponse au questionnaire : oui
Maître d'ouvrage : CA PORNIC AGGLO PAYS DE RETZ
Propriétaire foncier : COMMUNE DE CHAUVE
Exploitant : SAUR 44 - Agence de St-Philbert-de-Grandlieu
(fin DSP : 2027)
Filière : Boue activée
Capacité : 2200 EH
Consommation : 90 MWh/an
Evolution possible foncier équipement : Pas avant 20 ans
Evolution possible foncier annexe :

Détails sur le filtrage & la méthodologie appliqués :

- Pérennité ou absence d'information : Ne passe pas le filtre si il a été prévu des évolutions sur le foncier dans les 20 prochaines années ou si l'information n'a pas été communiquée
- Contraintes rédhibitoires : Ne passe pas le filtre si la surface considérée présente une caractéristique rédhibitoire parmi : Seuil d'aire utile, Absence de PV déjà installé, Seuil de gisement solaire, Capacité en EH (<10 000), Loi littoral et continuité d'urbanisation
- Contraintes techniques, environnementales ou administrative forte : Chaque surface d'équipement reçc un grade technique, environnementale et administrative de 1 (très bon) à 5 (mauvais), basées sur environ 25 critères. Si le grade est différent de 1 ou 2, la surface considérée ne passe pas ce filtre.

Emprises & technologies

Emprises ou équipements sans contrainte	Technologie(s) possible(s)
Emprise(s) au sol sans contrainte rédhibitoire	Tracker, vertical linéaire bi-faciale, au sol (sous réserves études)
1 bassin(s) rond(s) sans contrainte rédhibitoire	ombrière de bassin (sous réserves études)
4 bassin(s) autre(s) sans contrainte rédhibitoire	ombrière de bassin ou flottant (sous réserves études)

--- Détails des crtières et grade par type d'emprise ---

Fonciers au sol	Seuil aire utile	Présence de solaire	Seuil de gisement solaire	Capacité en EH (/ 10 000)	Loi littoral et continuité d'urbanisation	Grade/contrainte Technique (/5)	Grade/contrainte Administratif (/5)	Grade/contrainte Environnemental (/5)
fs-323	Ok	pas de solaire	suffisant	<10 000	hors loi litt.	4	4	5

Bassins ronds	Seuil aire utile	Présence de solaire	Seuil de gisement solaire	Capacité en EH (/ 10 000)	Loi littoral et continuité d'urbanisation	Grade/contrainte Technique (/5)	Grade/contrainte Administratif (/5)	Grade/contrainte Environnemental (/5)
br-29988	insuffisant	pas de solaire	suffisant	<10 000	hors loi litt.	3	4	5
br-29989	Ok	pas de solaire	suffisant	<10 000	hors loi litt.	3	4	5

Bassins "autres"	Seuil aire utile	Présence de solaire	Seuil de gisement solaire	Capacité en EH (/ 10 000)	Loi littoral et continuité d'urbanisation	Grade/contrainte Technique (/5)	Grade/contrainte Administratif (/5)	Grade/contrainte Environnemental (/5)
ba-18970	Ok	pas de solaire	suffisant	<10 000	hors loi litt.	3	4	5
ba-19833	Ok	pas de solaire	suffisant	<10 000	hors loi litt.	3	4	5
ba-20142	insuffisant	pas de solaire	suffisant	<10 000	hors loi litt.	3	4	5
ba-20225	Ok	pas de solaire	suffisant	<10 000	hors loi litt.	3	4	5
ba-20319	insuffisant	pas de solaire	suffisant	<10 000	hors loi litt.	3	4	5
ba-20879	Ok	pas de solaire	suffisant	<10 000	hors loi litt.	3	4	5

territoire d'énergie LOIRE-ATLANTIQUE

Questions and comments

Le SYDELA devient

territoire d'énergie

LOIRE-ATLANTIQUE

Battery Storage and Energy Management at WWTPs

InfraWatt Anniversary Event

Brecht Donckels

Arbon, Switzerland – 3 June 2025

Aquafin

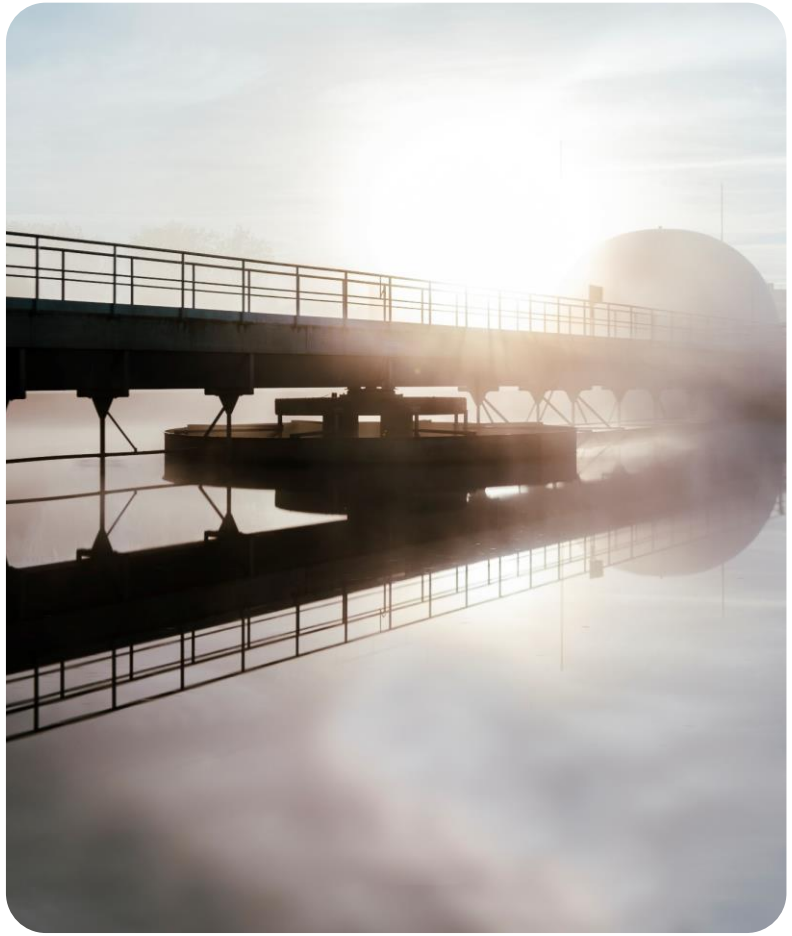
A few words about Aquafin...

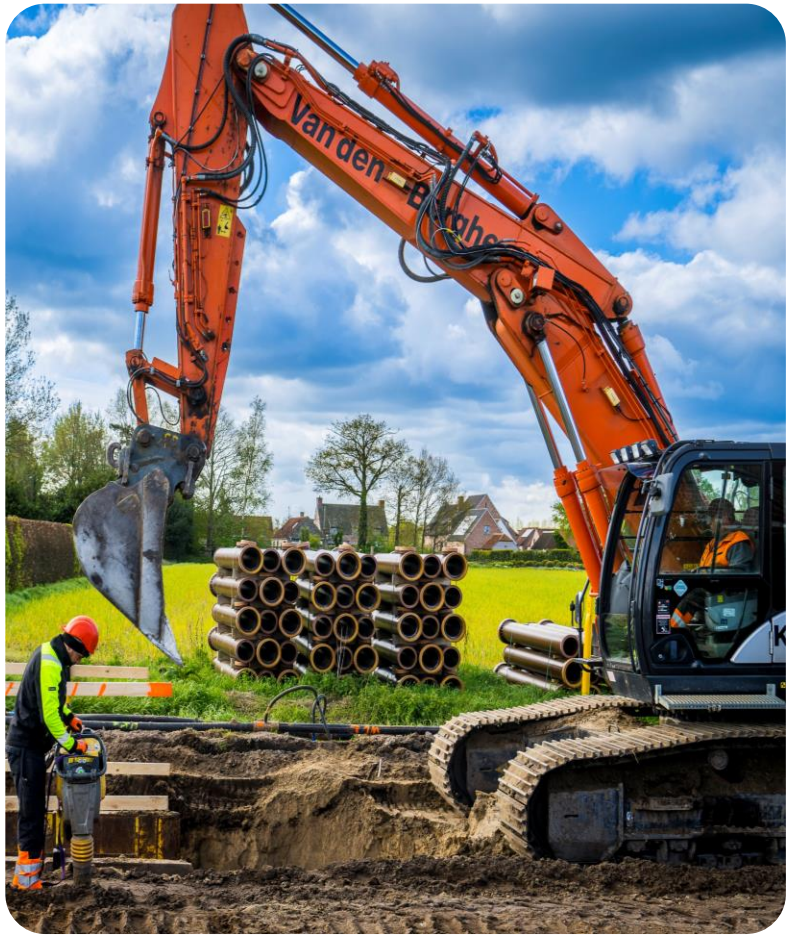
330
wastewater treatment plants

2090
pumping stations

7429
kilometres of sewer pipes

1232
projects under construction





ROAD TO ZERO CARBON

Aquafin

40% eigen hernieuwbare productie tegen 2030

We verhogen onze energie-efficiëntie met minimaal 1% per jaar

Fossielvrij tegen 2030

In dialoog gaan rond de processen, services en producten met de grootste impact

Incentives inbouwen in onze aankoopprocedures richting reducerende maatregelen

Aquafin is een drijvende motor voor duurzame energie-ontwikkelingen

We minimaliseren de broeikasuitstoot bij elk nieuw project

ROAD TO ZERO CARBON

Aquafin

40%
own renewable energy production by 2030

ROAD TO ZERO CARBON

Aquafin

1%

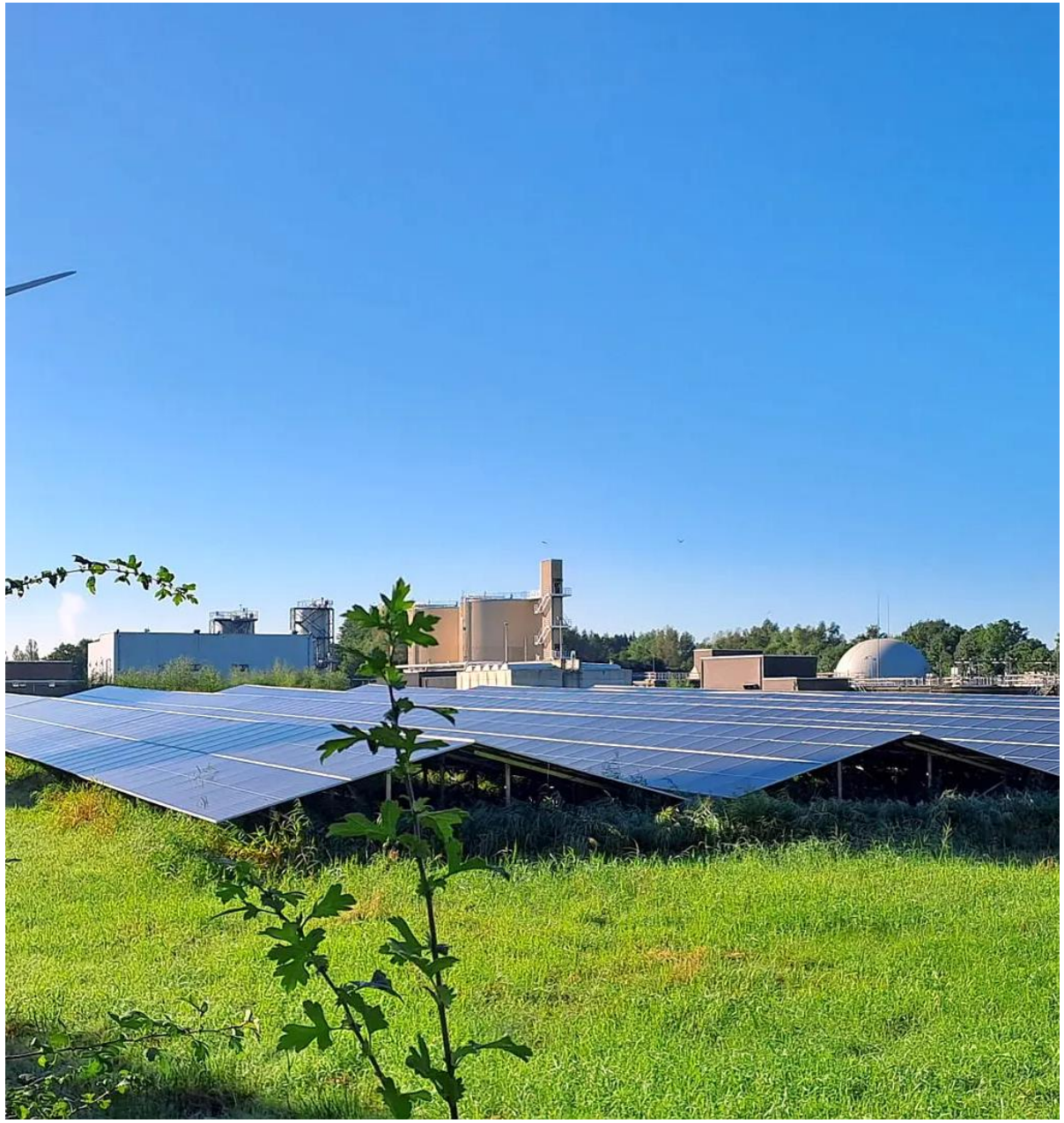
annual improvement in energy efficiency

ROAD TO ZERO CARBON

Aquafin

Energy management at our wastewater treatment plants

- Today, more than **45 wastewater treatment plants** are equipped with **solar panels**.
- Installed capacity of approximately **18 megawatts peak**.



Energy management at our wastewater treatment plants

- **20-year Corporate Power Purchase Agreement** (CPPA) signed with Luminus for the annual supply of **21,300 MWh** of green electricity.
- Electricity produced from two new **wind turbines** in Oud-Turnhout, located near one of our wastewater treatment plants.
- This agreement will avoid **6,000 tons of CO_2** emissions each year.

Energy management at our wastewater treatment plants

- Today, we produce biogas at **12 wwtps**
- Primary goal is to **improve dewaterability** of sludge to reduce transport costs
- Biogas is mainly used in CHP units (combined heat and power) for local energy production
- Remains part of our new sludge strategy, though on a **reduced scale**

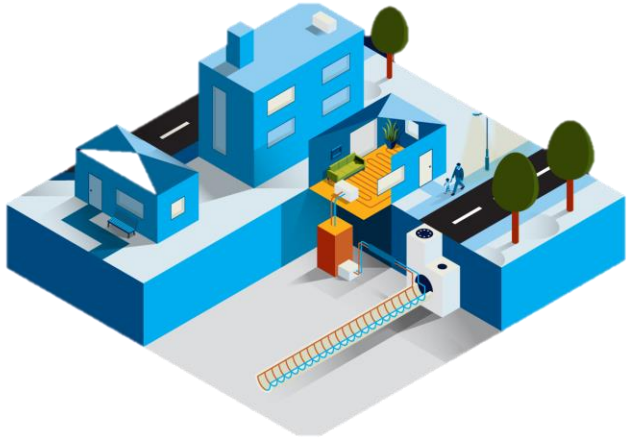
Energy management at our wastewater treatment plants

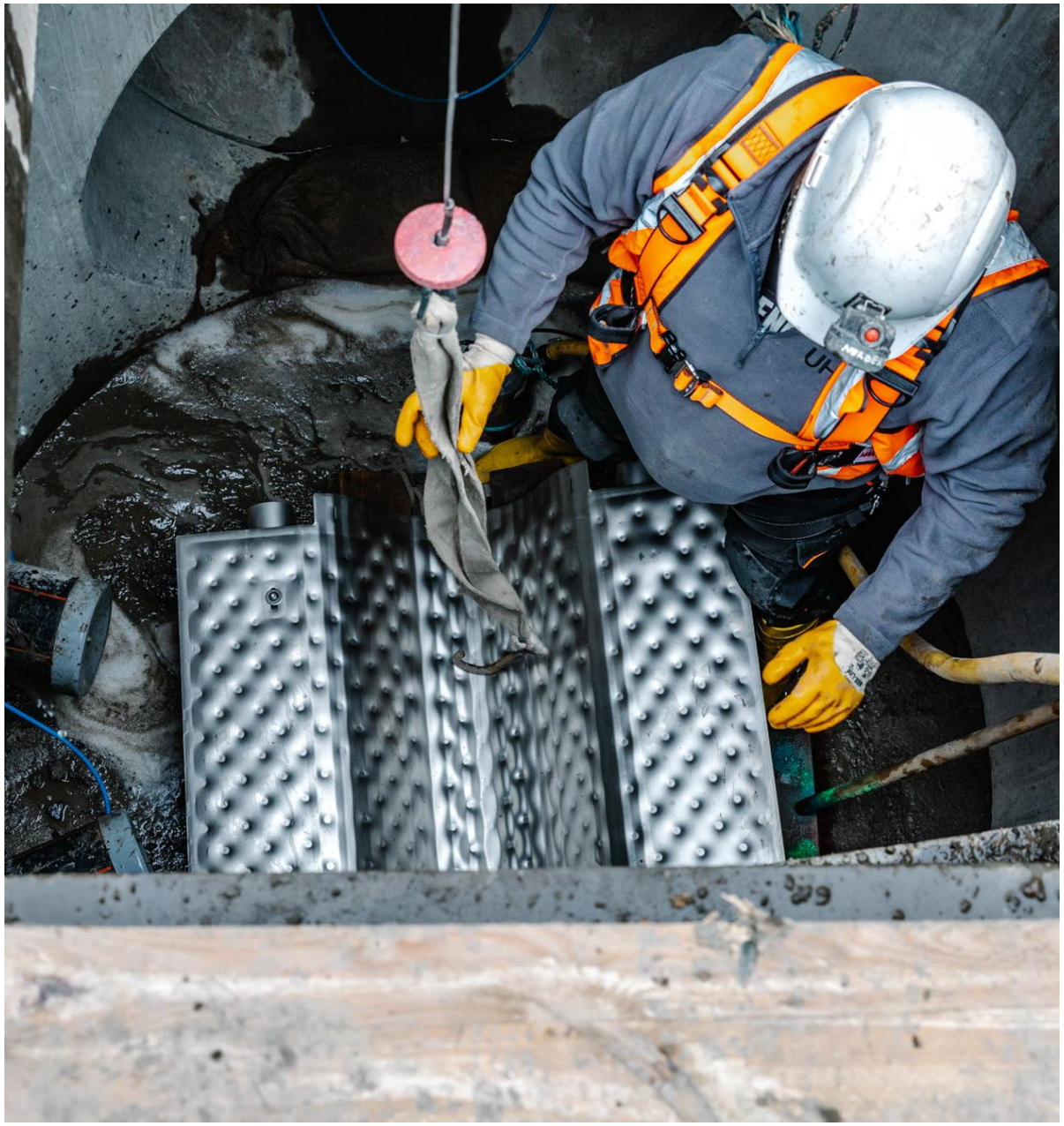
- In 2021, we replaced a CHP unit in Antwerp-South with its first **biomethane installation**.
- Once all installations are operational, we will produce biomethane at **5 sites** — totaling **40 GWh/year**, equivalent to the gas consumption of 2,650 Flemish households.
- Waste heat is recovered using heat pumps to bring the digestion process to the optimal temperature.
    - In **Antwerp-South**, heat is extracted from **digested sludge**, a technically more complex approach.
    - At **other sites**, heat is recovered from **treated wastewater**, offering a more straightforward solution.

Energy management at our wastewater treatment plants

Heat recovery from wastewater

- Heat is extracted directly from untreated wastewater **via the sewer pipe**
- Typical capacity ranges **from 50 to 600 kW**
- Designed for a single user with collective heat consumption

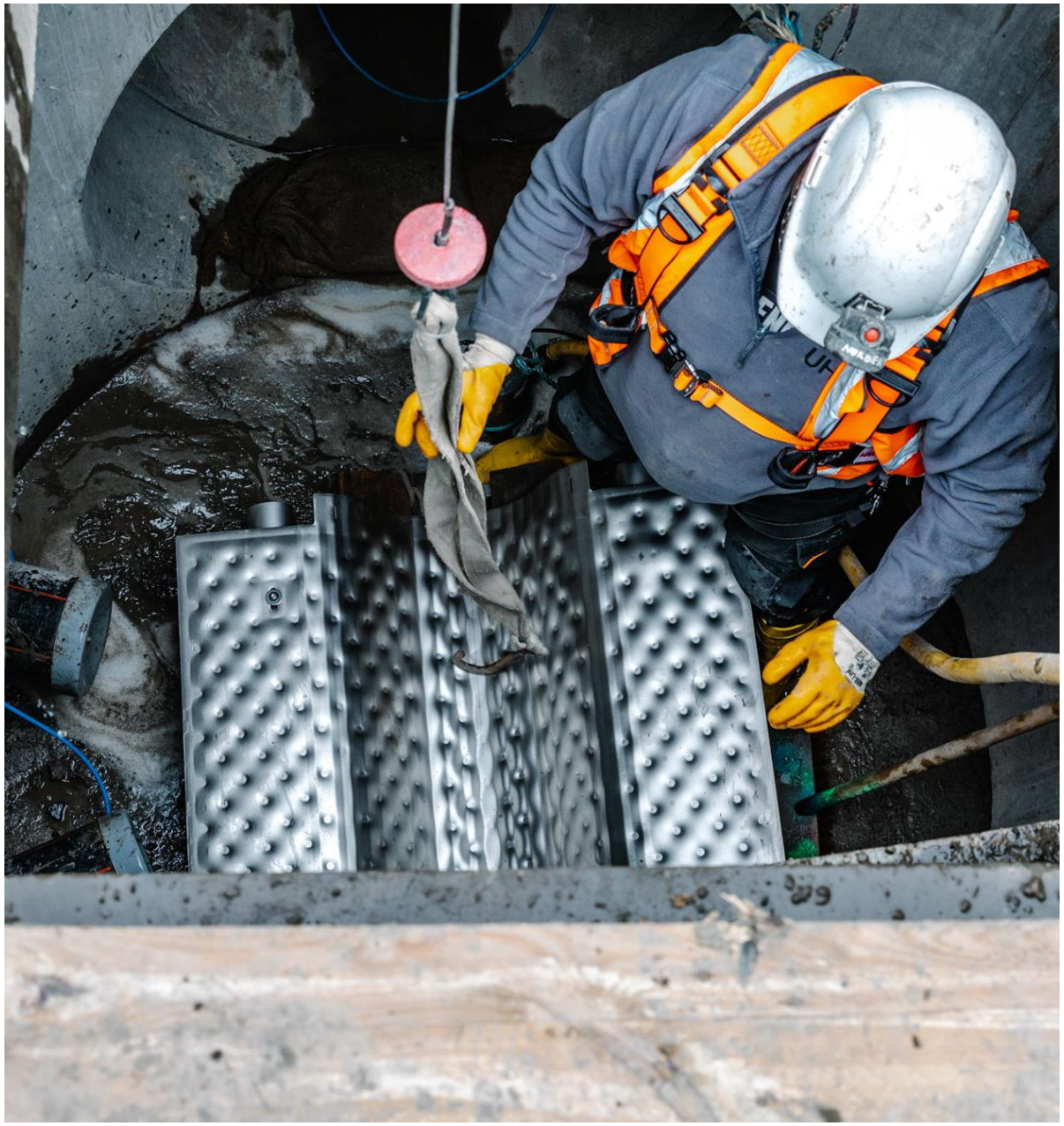




Energy management at our wastewater treatment plants

Heat recovery from treated wastewater

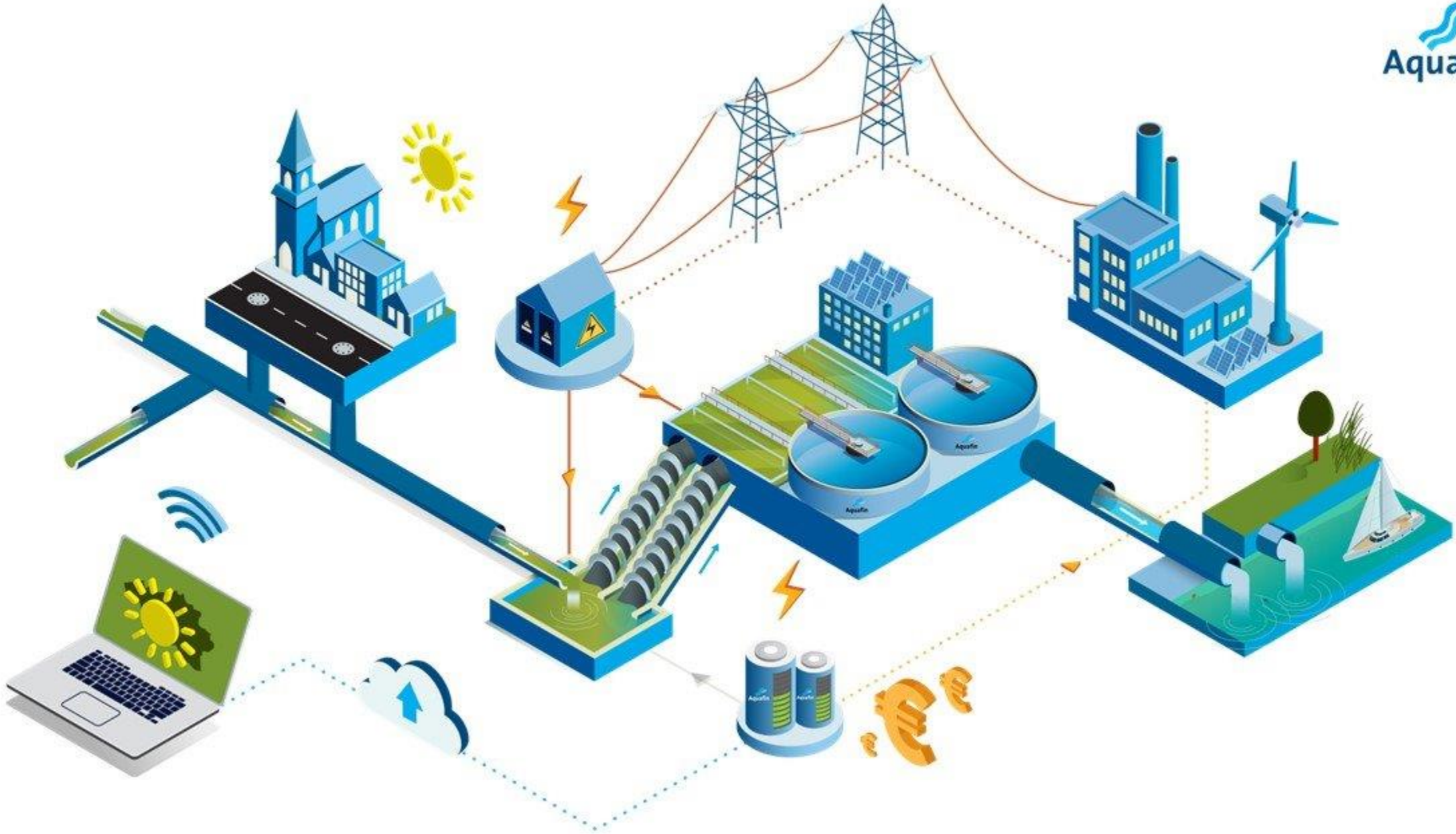
- Heat is extracted **effluent** before it is discharged into watercourses
- Typical capacity exceeds 600 kW on average
- Ideal for connection to **district heating networks**

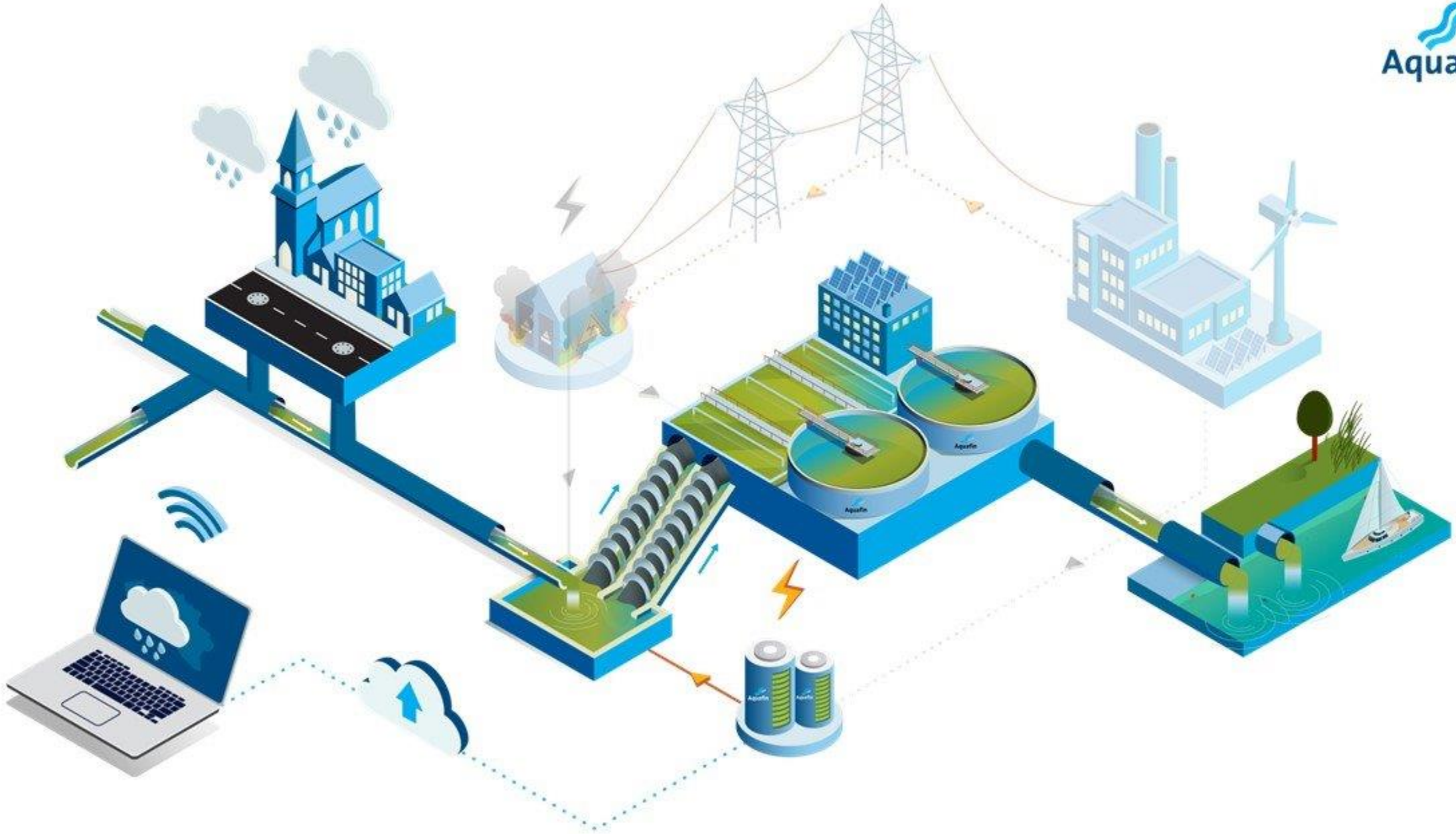


Energy management at our wastewater treatment plants

- A **battery energy storage system** (BESS) will be installed at WWTP Merksem to enhance energy resilience
- BESS acts as a **backup power supply** during heavy rainfall events to prevent **flooding** in case of grid outages
- Can also be used to provide **grid flexibility services**, which strengthens the business case for the investment
- Co-funded by the **ResNRJwater** project (Interreg North-West Europe)

Interreg
Co-funded by the European Union
North-West Europe
ResNRJwater


Aquafin


Aquafin

Energy management at our wastewater treatment plants

Battery, you said?!

Two innovative energy flexibility projects:

- **Biogas as a battery**:
  The gas balloons of two biogas units act as energy buffers — gas is stored and only converted to electricity when power is cheap and available.
- **Smart sewer buffering**:
  By smartly operating our **2,000+ pumping stations** based on electricity availability and rain forecasts, we can use the **sewer system's intrinsic buffering capacity** to shift energy demand.

Thanks for listening!

Curious to hear your thoughts or questions.

Aquafin

InfraWatt

Gemeinsam für Klima und Energie
Unis pour le climat et l'énergie
Uniti per il clima e l'energia