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Industrial Urban Symbiosis in Practice: Lessons from four EcoSites

SYMSITES replication webinar
29/01/2026

This project has received funding from the European Union's Horizon Europe program under GA Project 101058426.

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Welcome!

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Housekeeping

- Please **change your name** to include your full name & your organisation and turn on your camera if you can
- Please keep your **microphone muted** while others are speaking
- Any questions? **Write them in the chat** and we try to address them there or during our panel

- We will **record the webinar and share all relevant slides and materials** afterwards!

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Webinar Agenda

Time (CET)	Agenda item	Speaker
9:00-9:05	Welcome	ICLEI – Felix Schumacher
9:05-9:15	Replicating I-US solutions – setting the scene	ICLEI – Nikolai Jacobi
9:15-9:22	The SYMSITES EcoSites and their pilot systems	AITEX – Emma Pérez
9:22-9:29	Water reuse – challenges and opportunities	FOVASA - Jose Antonio Magdalena Cadelo
9:29-9:36	Scaling of a pilot biogas plant for wastewater reuse	BOKU – Wolfgang Gabauer
9:36-9:41	Mentimeter poll	ICLEI + Audience
9:41-9:48	Material sourcing – the importance of properly separating waste	BOFA – Mathias Kjærgaard Knudsen
9:48-9:55	Material sourcing – valorisation opportunities of different wastes	NTUA – Dr. Gerasimos Lyberatos
9:55-10:25	Panel discussion	ICLEI – Chiara Collucia +EcoSite leaders
10:25-10:30	Wrap up and outlook	ICLEI – Felix Schumacher

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ICLEI Local Governments for Sustainability EUROPE

Your hosts

Today's replication webinar is hosted by ICLEI Europe – Local Governments for Sustainability. ICLEI is commited to advancing local sustainability across Europe and beyond.

Felix Schumacher

Nikolai Jacobi

Chiara Collucia

Jon Jonoski

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Webinar Agenda – Introductory presentations

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…I-S is not a new concept. the Kalundborg site has developed the world's first industrial symbiosis with a circular approach to production since 1972.

Sotenäs / Sweden, industry **collaboration** between marine food industry consists of, in addition to the food industry, a privately owned biogas and water treatment plant, agricultural activities, land-based fish farming and algae farming, and a beer brewery to **avoid waste and save virgin production inputs.**

Wastewater treatment: The treated wastewater from the **Kalundborg Utility** is then passed through a heat exchanger at the heat pump utility, which can produce approx. 80,000 MWh per year, covering more than 30% of Kalundborg Utility's annual purchase of **district heating.**

Helsingborg / Sweden. This initiative estimates preventing around 120,000 tons of **CO2 emissions** annually, with the nearby city having avoided emitting 1.6 million tons of CO2 since 2007.

Ulsan City/Korea have benefited from 14 energy symbiosis networks of the **high-grade heat** to reduce the energy consumption and carbon emission.

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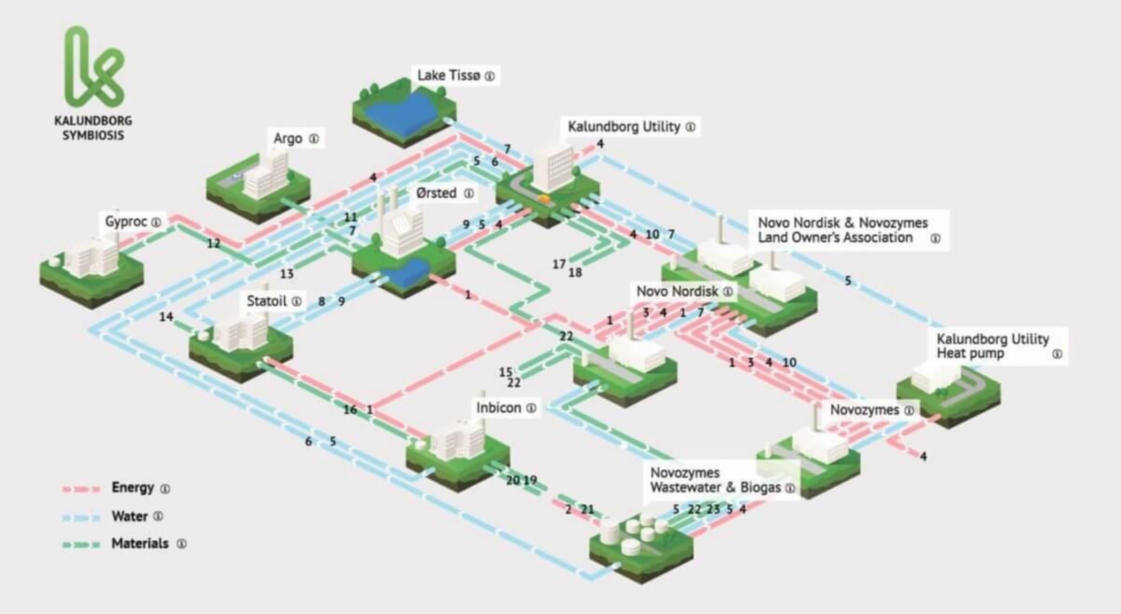
Industrial Symbiosis

- Underutilised resource exchange - waste, by-products, residues, energy, water, and materials
- Cross-company cooperation
- Reduction of waste & costs



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What is I-US and why does it matter for cities?

What is Industrial & Industrial-Urban Symbiosis?

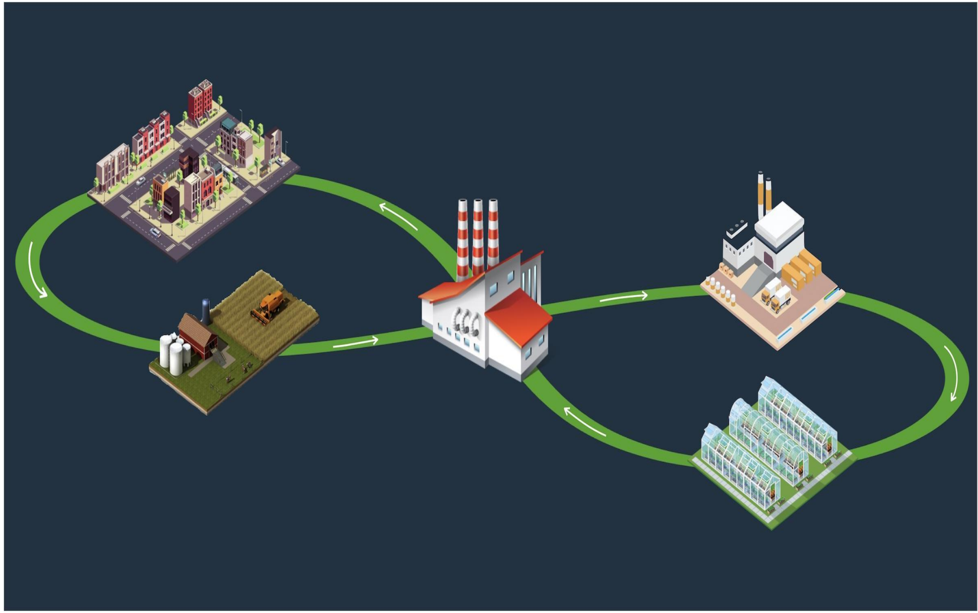
- Resource sharing between industries (IS)
- Extends to cities & urban flows (I-US)
- Reuse of waste, energy, water, materials
- Requires collaboration hubs & facilitators

Why I(-U)S Matters for Cities & Regions?

- Boosts circular economy & resource efficiency
- Reduces emissions, waste and costs
- Creates local economic opportunities
- Strengthens energy security & resilience

Key roles for local authorities?

- Mobilizing: embed I(-U)S in strategies & planning
- Facilitating: connect stakeholders & map flows
- Educating: raise awareness & build skills
- Incentivizing &
- Managing through funding & utilities



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How does I(-U)S enable sustainable cities and communities?

- A lever towards **strengthening local Industry and Resource security** – Reduce dependence on global supply chains, strengthening local resilience to price and supply shocks.
- **Toward achieving city climate neutrality and circular economy goals** – Reducing consumption and GHG emissions, extending resource life-time, reducing waste generation and resource extraction, minimising biodiversity loss.
- **Regional and economic development** – Maintaining key industry, attracting new businesses, , alternative sources of revenue, new green job opportunities in innovation to address real time technology needs.
- **Energy security and decarbonisation** – Process heat reuse, district heating and replacement of fossil fuels.

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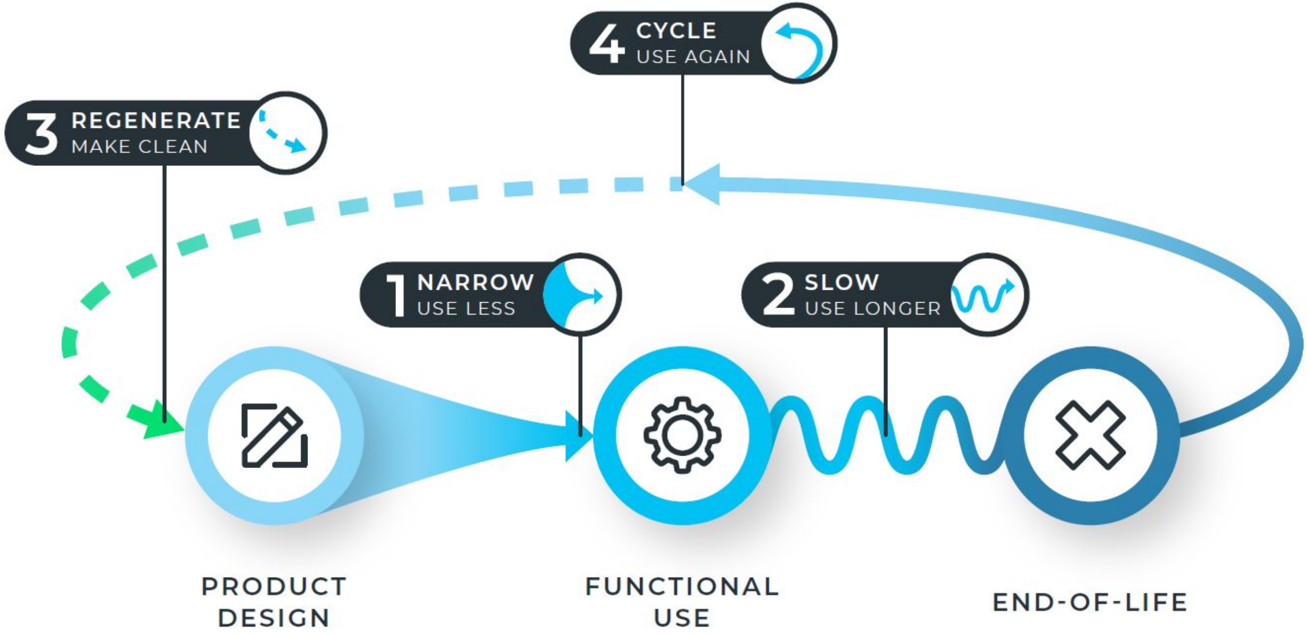
The Circular Transition



Circle Economy – Circularity Gap Report 2023

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EU policy on I-US

- **Embedded in the Circular Economy Action Plan (CEAP)**
- **I-US features across and is funded through EU Innovation Programmes**
- **Supporting governance and standardization** – e.g. CCRI working groups
- **Upcoming Circular Economy Act (CEA)** –e.g. Harmonising end-of-waste criteria; (3) regulatory and certification systems for secondary and by-product streams

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Standardization of I-US

- **The issue: I-US is strongly supported by EU policy ambitions**, but implementation lags…
- **A major barrier is the lack of harmonized standards**: actors do not share common definitions, data formats…
- **Standardization is the missing link between policy and practice**, translating high-level circular economy goals into action…
- **CWA 17354:2018 provides an initial foundation**
- **RISERS I-US Standardization Roadmap**

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Non-technological barriers to I-US

- **Fragmented governance and regulation -** Unclear roles, overlapping mandates, inconsistent permitting…
- **Lack of harmonised standards and legal certainty** - Absence of shared definitions, quality criteria, liability rules, and contractual frameworks creates risk for cities….
- **Financial and business-model uncertainty** - High upfront costs, limited access to funding, unclear pricing of secondary resources,…
- **Weak information flows and data interoperability**
- **Skills gaps and limited social acceptance and complex stakeholder landscape**

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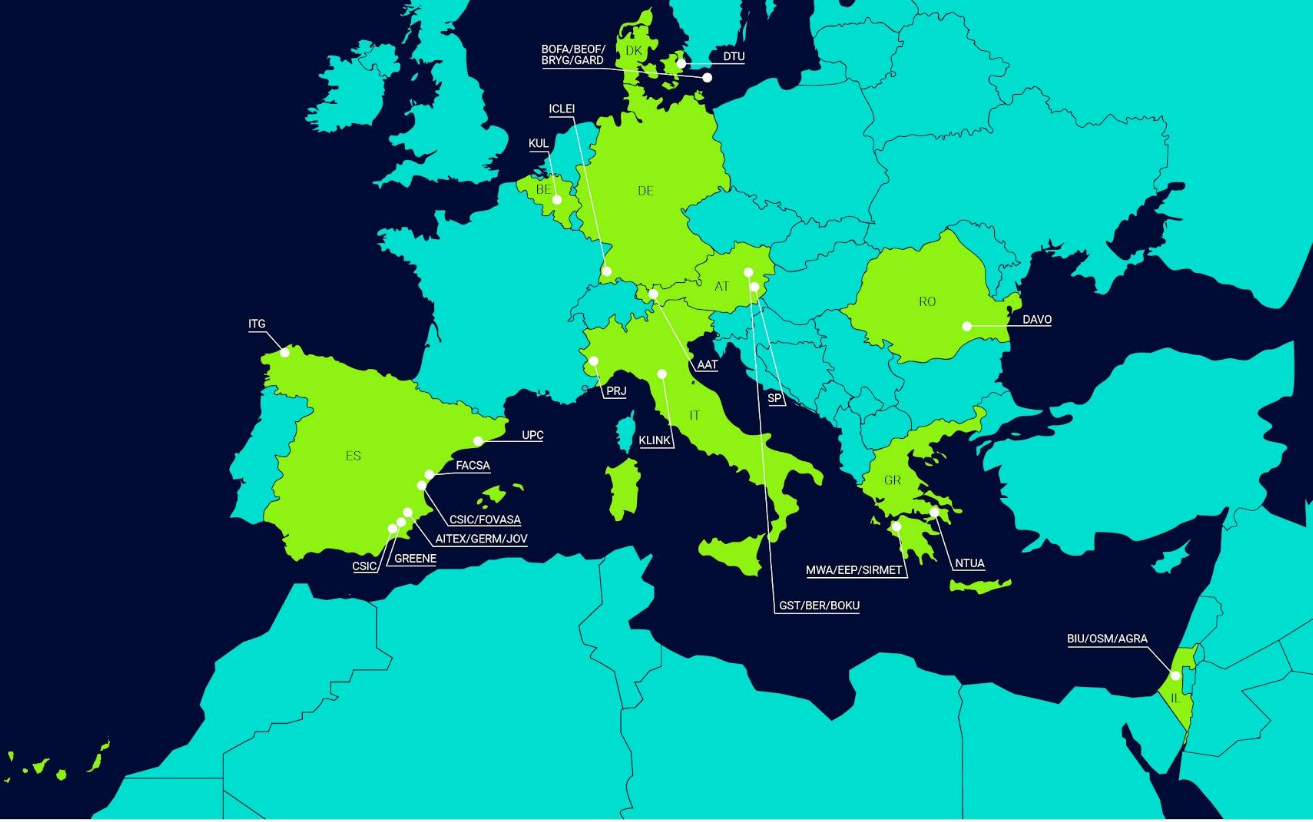
CONSORTIUM MAP

info@symsites.eu



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Introduction to SYMSITES

Emma Pérez Hernández
Project Manager, R&D Department, AITEX

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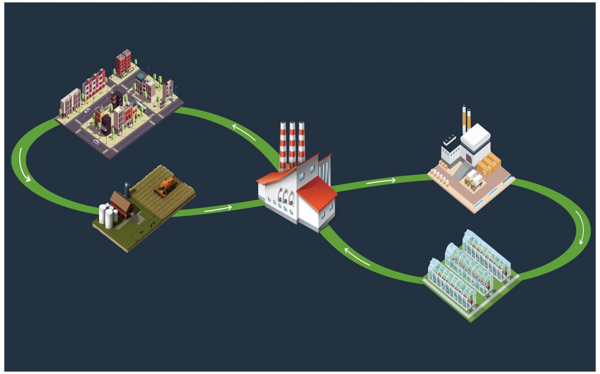
INDUSTRIAL-URBAN SYMBIOSIS

THE PROBLEM

THE SOLUTION



THE OPPORTUNITY

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HORIZON-CL4-2021-TWIN-TRANSITION-01-14: Deploying I-U symbiosis solutions for the utilization of energy, water, industrial waste and by-products at regional scale (Processes4Planet Partnership) (RIA)

12.404.455 €

Industrial-Urban Symbiosis

New technologies

Stakeholders’ engagement methodologies

Four European regions

EcoSite concept

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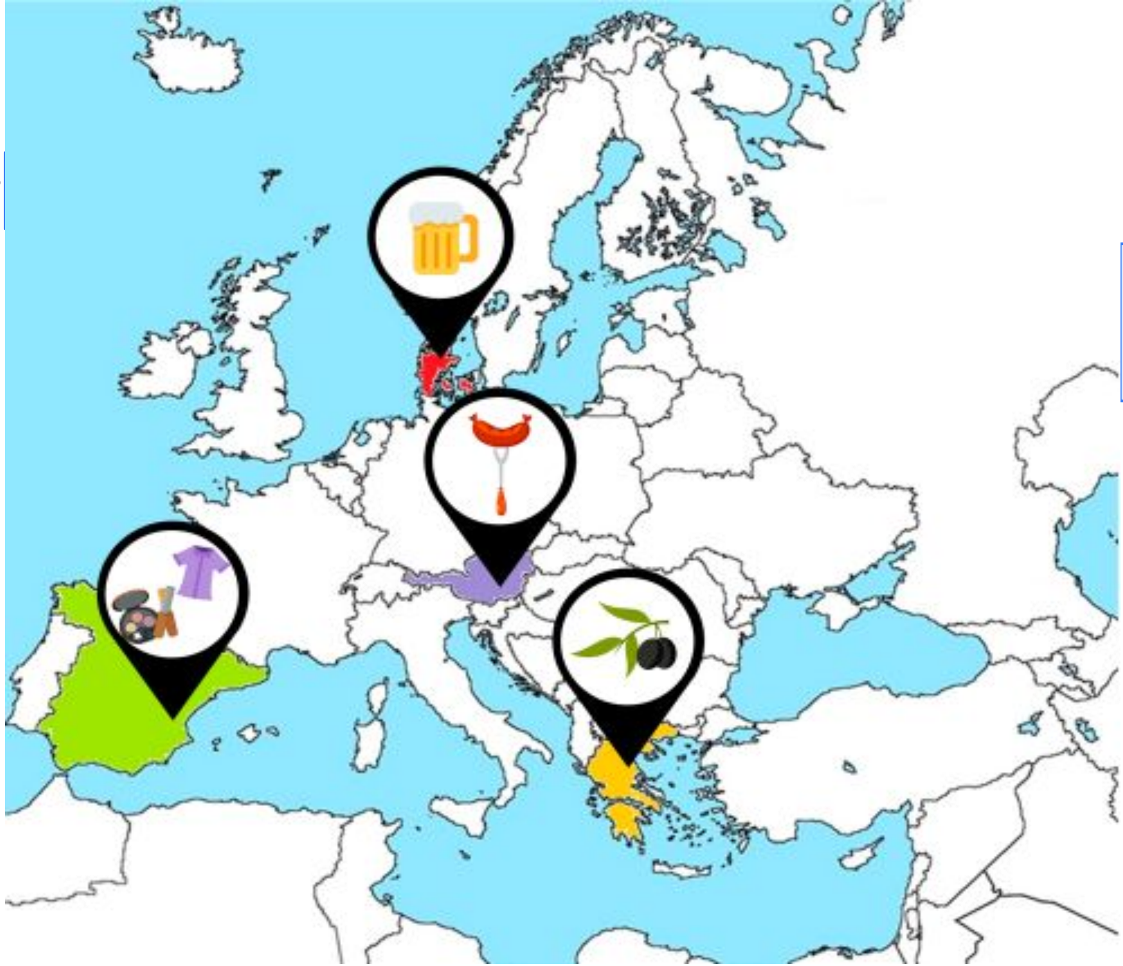

WHERE TO FIND THE ECOSITES?

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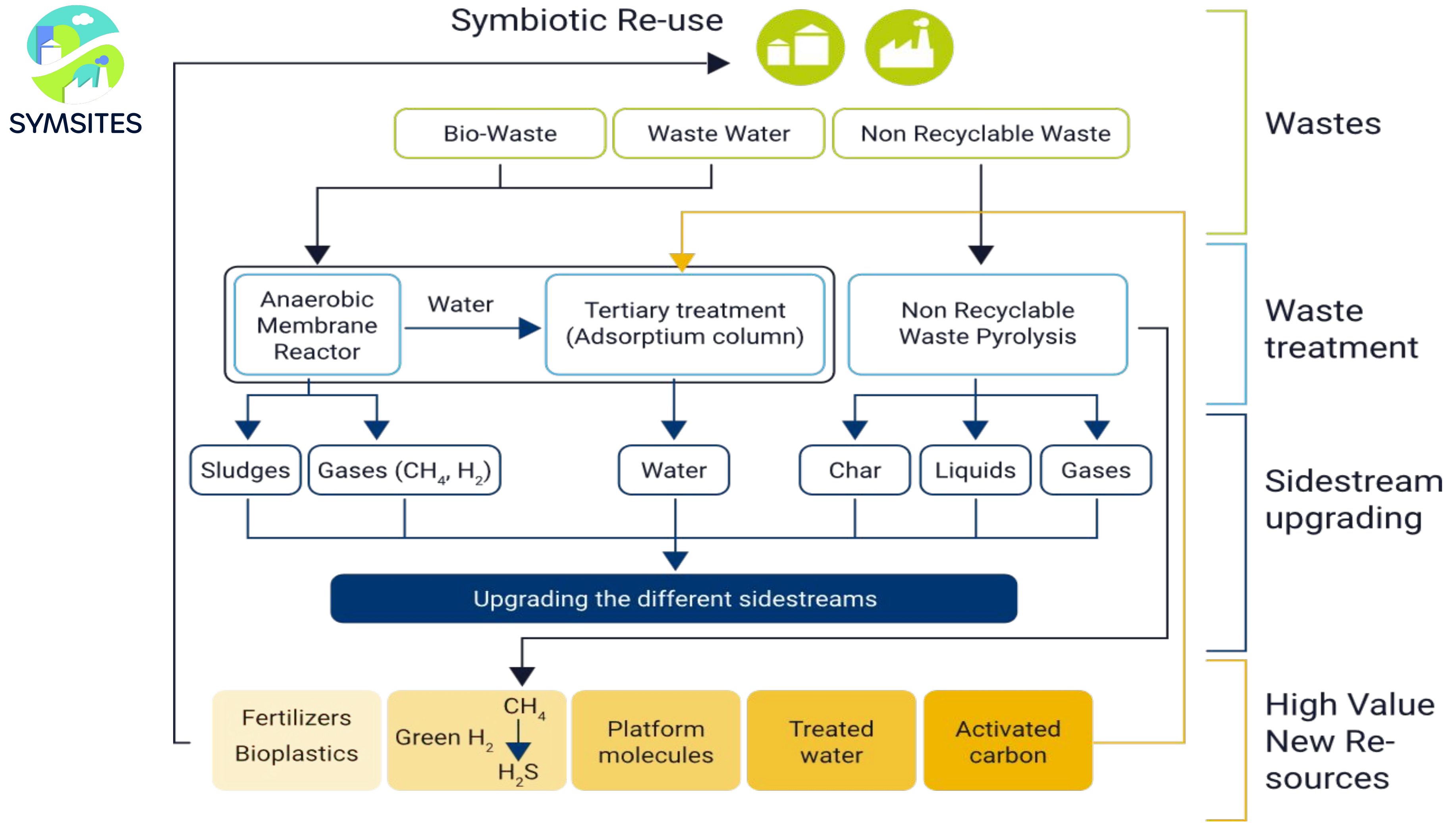
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Symbiotic Re-use
Bio-Waste
Waste Water
Non Recyclable Waste
Anaerobic Membrane Reactor
Water
Tertiary treatment (Adsorptium column)
Non Recyclable Waste Pyrolysis
Sludges
Gases (CH_4, H_2)
Water
Char
Liquids
Gases
Upgrading the different sidestreams
Fertilizers
Bioplastics
Green H_2
CH_4
H_2S
Platform molecules
Treated water
Activated carbon
Wastes
Waste treatment
Sidestream upgrading
High Value New Re-sources

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Wastes

- Bio-Waste
- Waste Water
- Non Recyclable Waste

Waste treatment

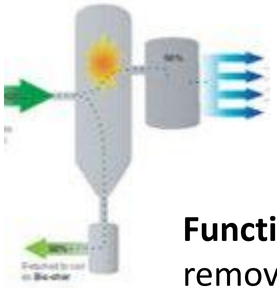
- Anaerobic Membrane Reactor → Water → Tertiary treatment (Adsorptium column)
- Non Recyclable Waste Pyrolysis

Energy from CH_4 and H_2 via metabolic route

Antifouling treatment

- Nano structured coatings
- Carbon dots coatings
- Magnetically induced membrane vibration

Pyrolysis optimization of NRW using CH_4 as an energy source.



Functionalized AC with LigNPs and/or CDs to remove emerging pollutants.

4 EcoSites WITH THE SAME GOAL

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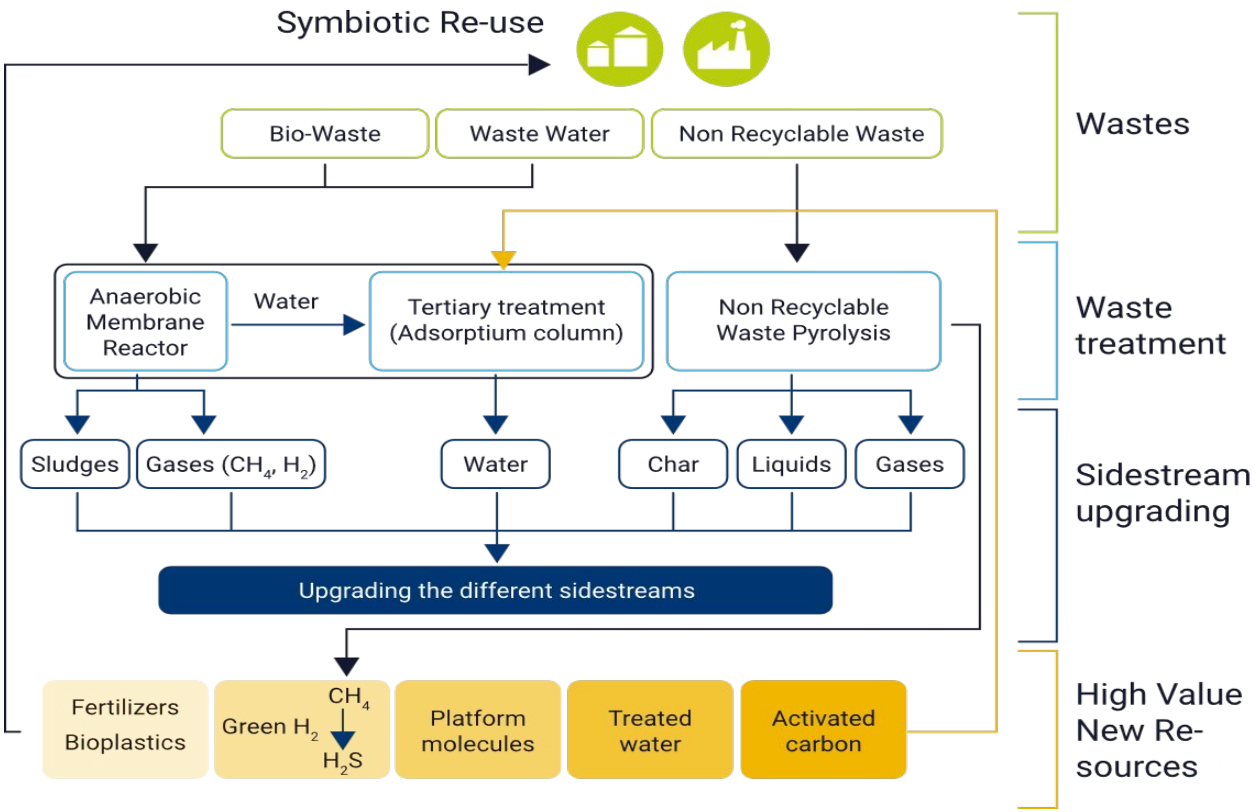
Enhance recovery of resources, energy and reclaimed water from wastes

Technologies for water reuse with an I-U Symbiosis perspective



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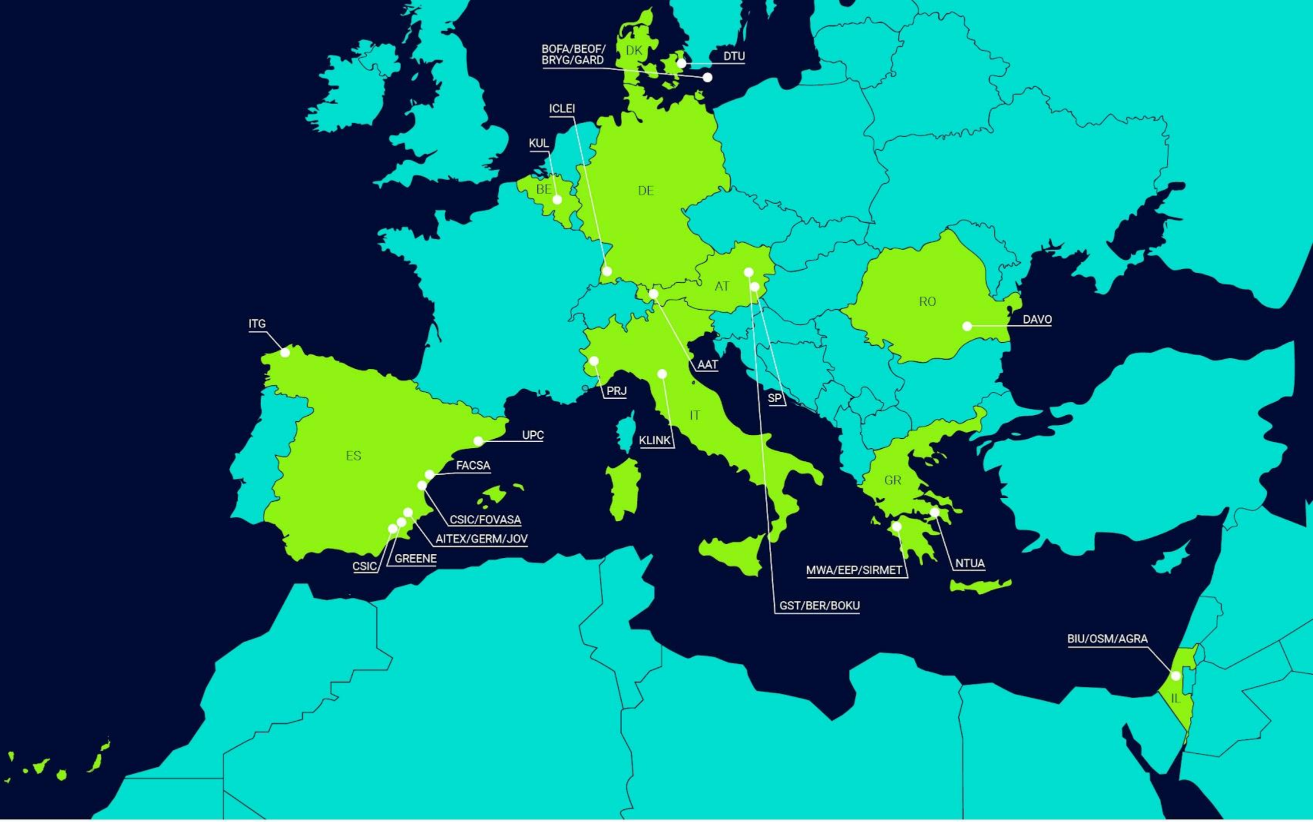
CONSORTIUM MAP



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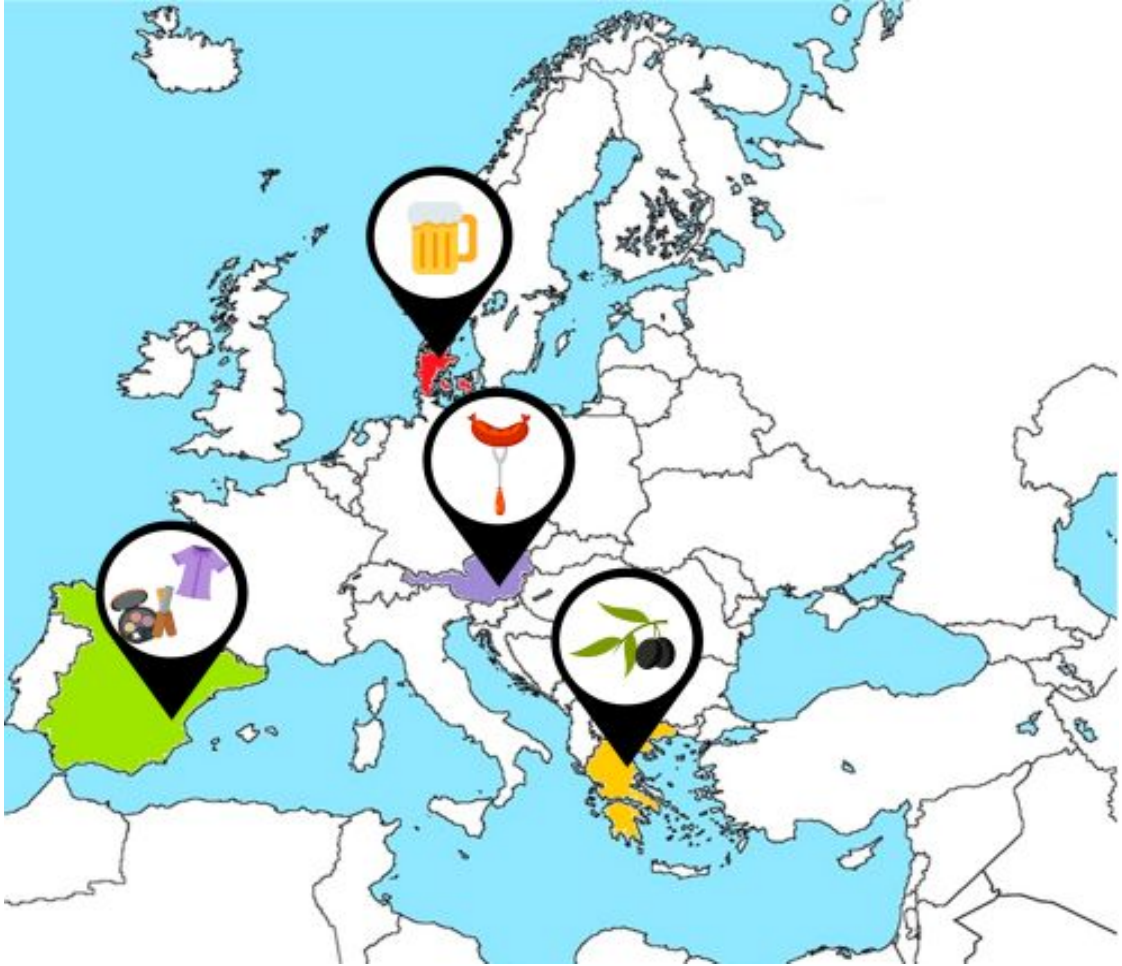

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Webinar Agenda – Water and wastewater reuse

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Water reuse – challenges and opportunities

Industrial Urban Symbiosis in Practice: Lessons from four EcoSites

Jose Antonio Magdalena

R&D (FOVASA)

29/01/2026

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Facsa ciclo integral del agua

Fovasa medioambiente

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Facsa ciclo integral del agua

FOVASA medioambiente

1. INTRODUCTION

Not enough water

Europe is the fastest warming continent in the world. Many countries are at risk of water scarcity and more frequent droughts. What can we all do?

38 %
of the EU population was affected by water scarcity in 2019

29 %
of EU territory was affected by water scarcity in 2019

€2 to 9 billion
cost of droughts each year

1 billion m3
of treated urban wastewater is reused annually

6 times more
treated water could be reused than current levels

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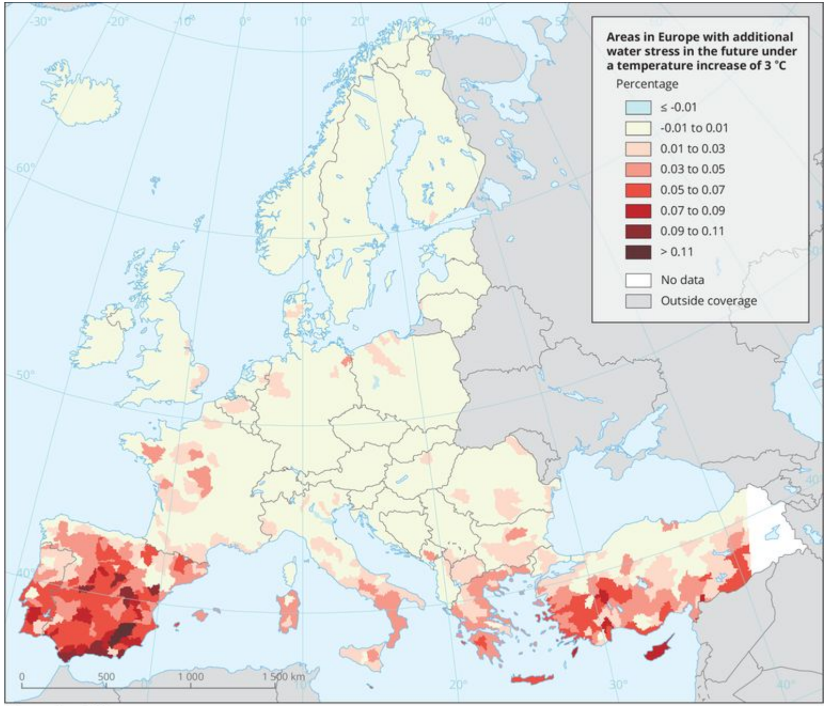
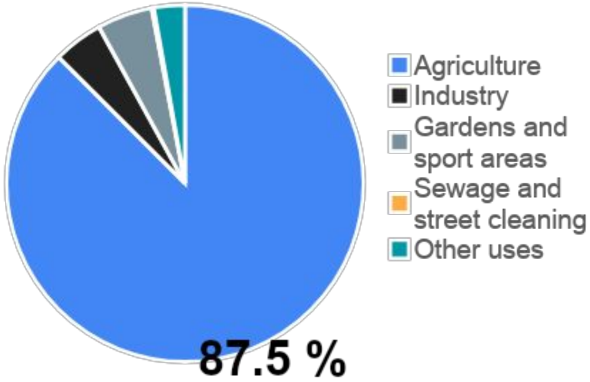
1. INTRODUCTION



Reference data: ©ESRI

Water reuse in the Valencian Community



One of the highest rates of wastewater reuse

0.051 m^3 per inhabitant reused daily

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2. OBJECTIVE

European

Commission Delegated Regulation (EU) 2024/1765 of 11 March 2024

Regulation (EU) 2020/741 of the European Parliament and of the Council of 25 May 2020

State

Royal Decree 1085/2024, approving the Water Reuse Regulations

Royal Decree-Law 11/1995, urban wastewater treatment.

Royal Decree 509/1996, urban waste water treatment.

Royal Decree 3/2023, technical-sanitary criteria for the quality of drinking water, its control and supply.

RD255/2013, establishes the composition, structure and operation of the Water Council of the Júcar Hydrographic Demarcation

Law 10/2001, of 5 July, on the National Hydrological Plan.

Regional

Discharge authorisation issued by the Júcar Hydrographic Confederation

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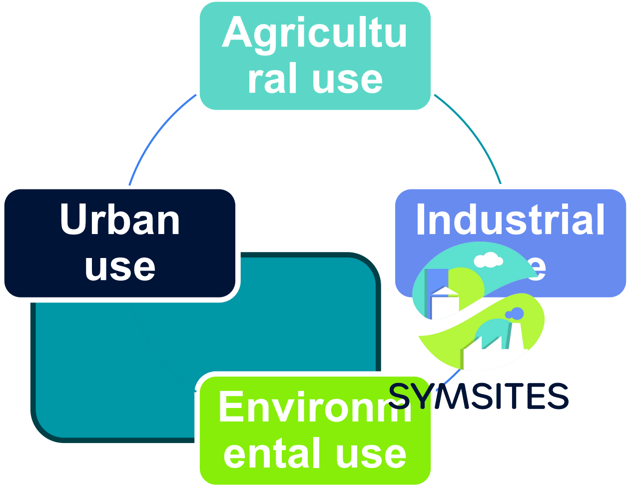
FOVASA medioambiente

3. RESULTS AND DISCUSSION



How could be the treated water reused in an IU-S environment?

RD 1085/2024

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3. RESULTS AND DISCUSSION

Urban use

Quality	*E.Coli* (UFC/100 mL)	Turbidity (NTU)	SS (mg/L)	Bacteriophages (UFP/100 mL)	Intestinal nematodes (eggs/10L)	*Legionella* spp (UFC/L)
A	10	5	10	100	1	Not detected
B	100	-	35	-	-	Not detected
C	1000	-	35	-	-	Not detected

Quality B

- Street cleaning.
- Irrigation of green urban areas (parks and similar).
- Firefighting systems.
- Industrial vehicle washing.

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4. TAKE HOME MESSAGE

In water-scarce regions, the question is no longer *if* we reuse water, but *how fast* we scale the technologies to do it.

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THANK YOU VERY MUCH

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Scaling Austrian Pilot plant for wastewater reuse and biogas production

BOKU University

SYMSITES replication webinar

29th January 2026

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Location of EcoSite

Fleischwaren Berger Schinken GmbH (18 BER)

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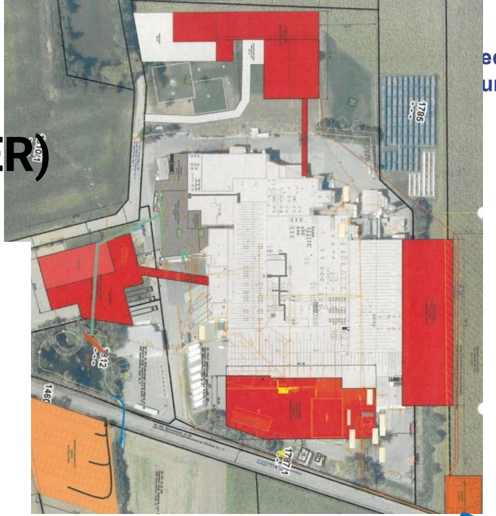
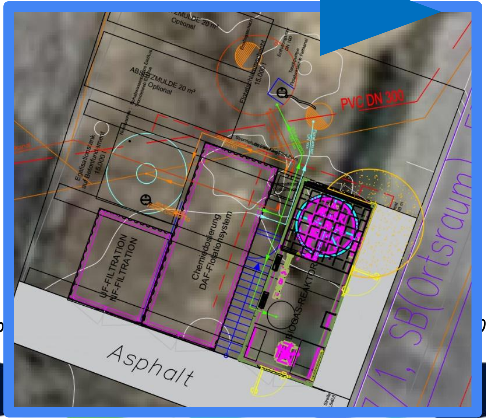


- Ham and meat product producer in the village of Sieghartskirchen
- Family business in the 5th generation
- Over 750 employees in total
- 28,000 tons/year of meat and sausage products
- 10% of the raw material/meat from our own slaughterhouse
- turnover around 150 Mio. €/year
- Wastewater volume up to 650 m^3/day

- Reuse treated wastewater (cooling purposes)
- Biogas production
- Fertilizer production from digestate

op



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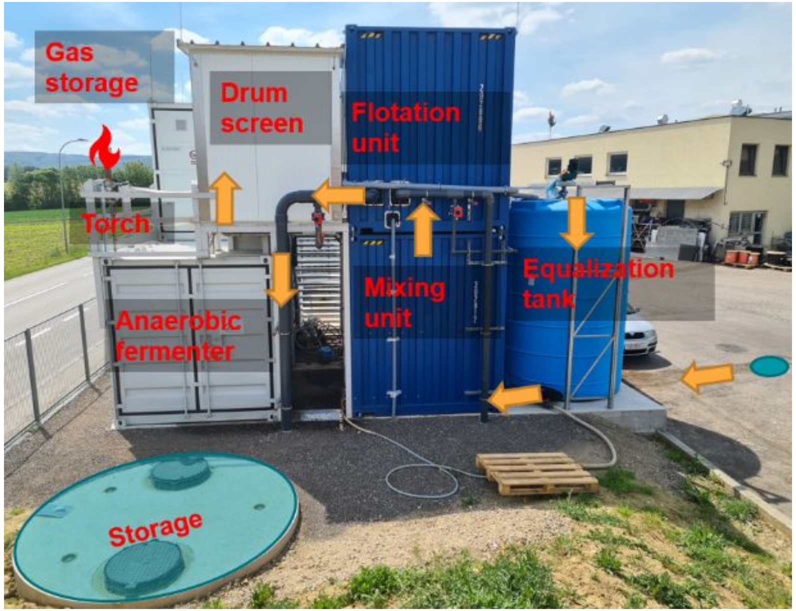
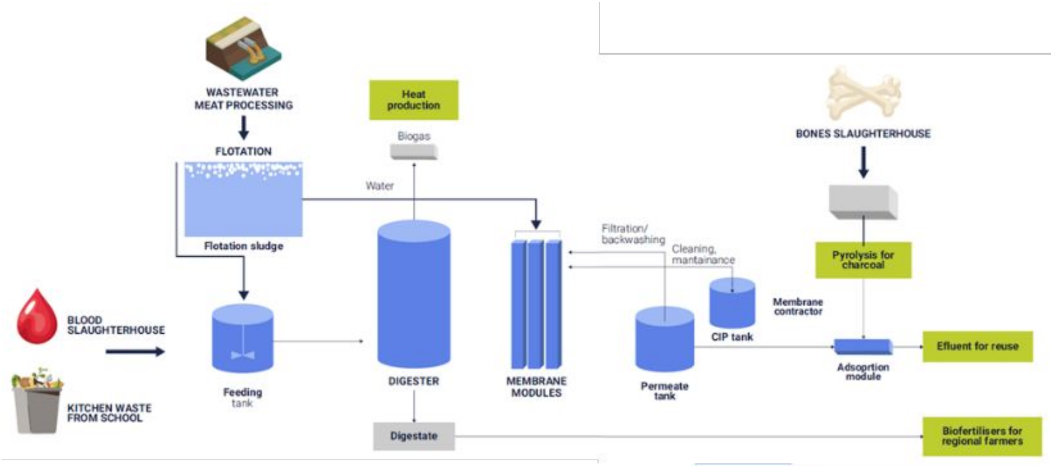
Task 4.1 Design, building and operation of Austrian EcoSite

General scheme of the pilot at the Austrian EcoSite





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Task 4.2 Monitoring and validation

Industrias and urban uses: I-US

Parameter	Requirement cooling water	After Reverse Osmose
pH	6.5 – 9.2	5.8 ± 1.5
Water hardness (CaCO3)	50 – 750 mg/L	2.4 mg/L Ca ≡ 5.99 mg/L CaCO3
Alkalinity (CaCO3)	Max 600 mg/L	22.3 mg/L Ca ≡ 5.99 mg/L CaCO3
Dissolved total solids TS	Max 2050 mg/L	0,01 mg/L
Chloride	Max 300 mg/L	1137,8 mg/L
Sulfate	Max 350 mg/L	<1,32 mg S/L
Conductivity	3300 µS/cm	42,5 µS/cm
Suspended solids	Max 25 mg/L	n.a.

Parameter	EU REGULATION 2020/741 category A	After Nanofiltration	After Reverse Osmose
E.Coli	<1 log cfu/100 mL	<1 cfu/100mL	<1 cfu/100mL
BOD5	<20 mg/L	48.0 mg/L	4.3 mg/L
TSS	<20 mg/L	1.8 mg/L	0.0 mg/L
Turbidity (NTU)	≤ 5	0.4	0.6

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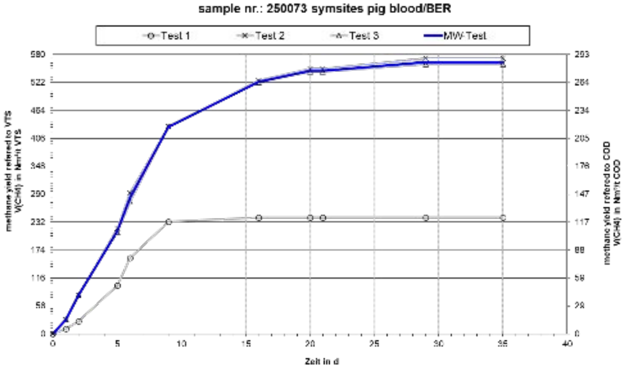
Task 4.2 Monitoring and validation

Pilot operational conditions – reactor inlet streams/substrates

Streams / Parameter	Wastewater untreated	Flotation sludge	Pig blood
pH [-]	7.42	5.9	8.20
VFA (mg/l)	129	1 185.4	14
COD (g/kg)	4.52	27.0	312
TS (%)	0.87	2.6	16.98
VTS (%)	0.27	1.8	15.72
TKN (g/kg)	0.26	2.2	32.21
NH4 (g/kg)	0.02	0.5	1.63



pig blood - methane yield	result
$Y(CH_4)$ in Nm³/t (FM)	89,0
$Y(CH_4)$ in Nm³/t (COD)	285,2
$Y(CH_4)$ in Nm³/t (VTS)	566,1

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Full scale plant
Fleischwaren Berger Schinken GmbH (18 BER)

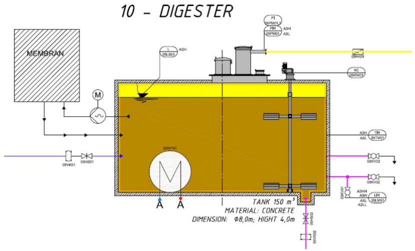
1. Substrate mixture: biomethane potential (BMP-tests)
2. Organic loading rate digester (kg oDS/(m^3*day))
3. Hydraulic retention time in digesters (days)
4. Nitrogen concentration in substrate mixture (NH_3 inhibition)
5. Digestate/fertilizer concept

Picture: AAT-biogas

main digester		
volume	1199	m^3
diameter	12	m
height	11.6	m
retention time	25	d
organic loading rate	2.01	kg oDS/(m^3*d)
post digester		
volume	792	m^3
diameter	12	m
height	8	m
retention time	17	d
organic loading rate	1.29	kg oDS/(m^3*d)

Picture: AAT-biogas

	input fresh mass [t/a]	input oDS [kg/d]	gas production [Nm^3/t oDS]	gas production [Nm^3/d]
substrates				
blood	266	126	685	86
intestinal package	585	175	823	144
fat from fat separation	522	77	900	70
flotation sludge	16200	1997	718	1434
food waste	80	36	760	28
	17653			**1762**



susbtrate	biogas-yield	CH_4-Anteil	CH_4-Ertrag	substrate-mixture	biogas-yield	CH_4-yield		
	Baserga	Baserga	Baserga	estimation				
	l/kg OS	Vol %	l/kg OS	%	l/kg OS	l/kg OS		
carbohydrates	790	50	**395**	13	103	51		
protein	700	71	**497**	62	434	308		
fat	1 250	68	**850**	25	313	213		
				100	**849**	**572**	**67,36**	**% methane**

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Monitoring and validation

Industrias and urban uses: I-US

Identification of potential applications of treated water/other products (symbiosis at the Austrian EcoSite Tullnerfeld)	Estimated yearly need	Quality required / applicable regulation
Agricultural Uses - **Treated water**: Irrigation of crops (sugar beet, grapevine, fruit crops, grassland) - **Biogas Digestate**: fertilizer for farmers/fields - **Pig manure:** additional future substrate for full scale biogas plant	- **Treated water:** 1000-3000 m^3/ha/year - **Biogas digestate**: 170-210 kg nitrogen/ha/year - **Pig manure:** 50 farmers, 64800 pigs/year = 52000 m^3/manure/year = around 6000 MWh/year	- **Treated water:** Austrian Water Rights Act;1959 (Wasserrechtsgesetz, WRG); EU Regulation 2020/741 on minimum requirements for water reuse - **Biogas digestate:** national fertilizer regulation (2004 BGBL); EU-regulation 2092/91

Municipal Uses
- **Treated water:**
  o Irrigation of young trees
  o Irrigation of lawn of soccer field and outdoor pool
- **Surplus heat of biogas CHP**:
  o Heating and hot water supply for nearby apartment blocks
	- **Young trees**: around 150 young trees;
	- **Soccer field:** around 20-40 L/m^2/week; 3000 m^3/year
	- **Heating apartments**: around 90 apartments; 4000m^2, 200 MWh
		- **Treated water**: Austria has chosen opt out: EU Regulation 2020/741 on minimum requirements for water reuse

Industrial Uses - **Treated water:** o Cooling water for Berger Schinken (BER)	- **Cooling water**: 40 m^3 to 60 m^3 cooling water/day; 20000 m^3 per year	- **Cooling water:** EU REGULATION 2020/741 category A

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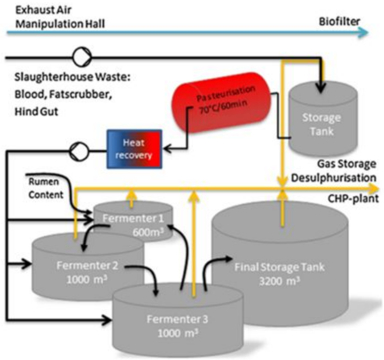
Biogas plant at slaughterhouse company „Grossfurtner“

- Slaughterings: around 550 000 pigs/year, 50 000 cattle/year
- Year of realization: 2003
- CapEx: approx. 1.8 Mio. € (first stage)
- Biogas production: 5 000 m^3/Tag (67%-69% CH^4)
- Electrical power: 525 kWel
- CSTR-digesters: 1 x 600 m^3, 2 x 1 000 m^3
- Substrates/year: 2 000 m3 blod, 1 000 t rumen content
  3 000 gut content, 4 000 t fat from fat separation
- Pre-treatment: continuous hygienization/sanitation
- CO_2 Reduction: 2 464 t/year
- Other heat sources: natural gas, geothermal energy

Foto: Rudolf Großfurtner GmbH



Ortner et. al. 2015

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Webinar Agenda – Audience poll

Time (CET)	Agenda item	Speaker
9:00-9:05	Welcome	ICLEI – Felix Schumacher
9:05-9:15	Replicating I-US solutions – setting the scene	ICLEI – Nikolai Jacobi
9:15-9:22	The SYMSITES EcoSites and their pilot systems	AITEX – Emma Pérez
9:22-9:29	Water reuse – challenges and opportunities	FOVASA - Jose Antonio Magdalena Cadelo
9:29-9:36	Scaling of a pilot biogas plant for wastewater reuse	BOKU – Wolfgang Gabauer
9:36-9:41	**Mentimeter poll**	**ICLEI + Audience**
9:41-9:48	Material sourcing – the importance of properly separating waste	BOFA – Mathias Kjærgaard Knudsen
9:48-9:55	Material sourcing – valorisation opportunities of different wastes	NTUA – Dr. Gerasimos Lyberatos
9:55-10:25	Panel discussion	ICLEI – Chiara Collucia +EcoSite leaders
10:25-10:30	Wrap up and outlook	ICLEI – Felix Schumacher

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Webinar Agenda – Material sourcing for the EcoSites

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BOFA

SYMSITES

Danish EcoSite and waste separation

Mathias Kjærgaard, Project Manager, BOFA, Regional Municipality of Bornholm

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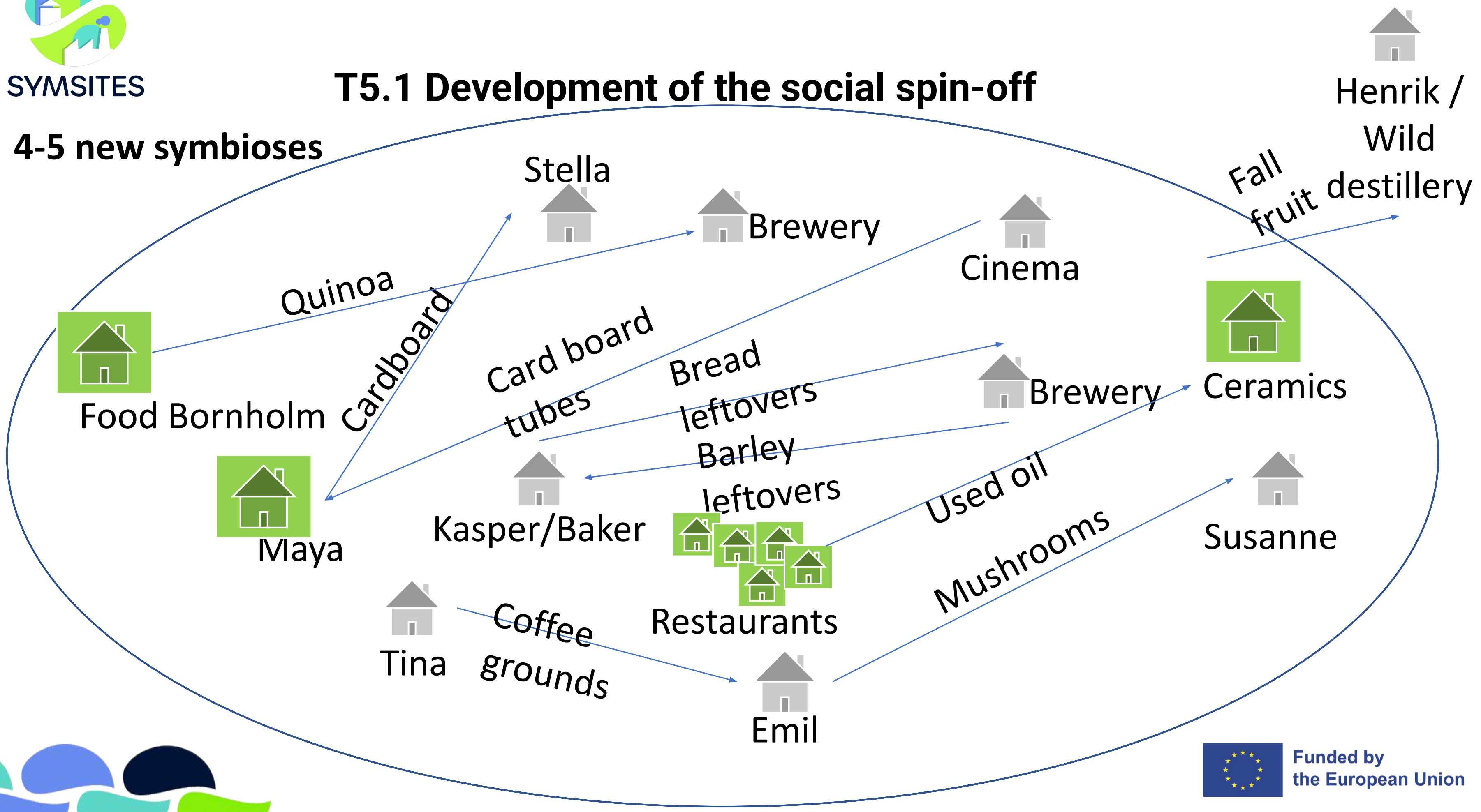
T5.1 Development of the social spin-off

- **4-5 new symbioses**



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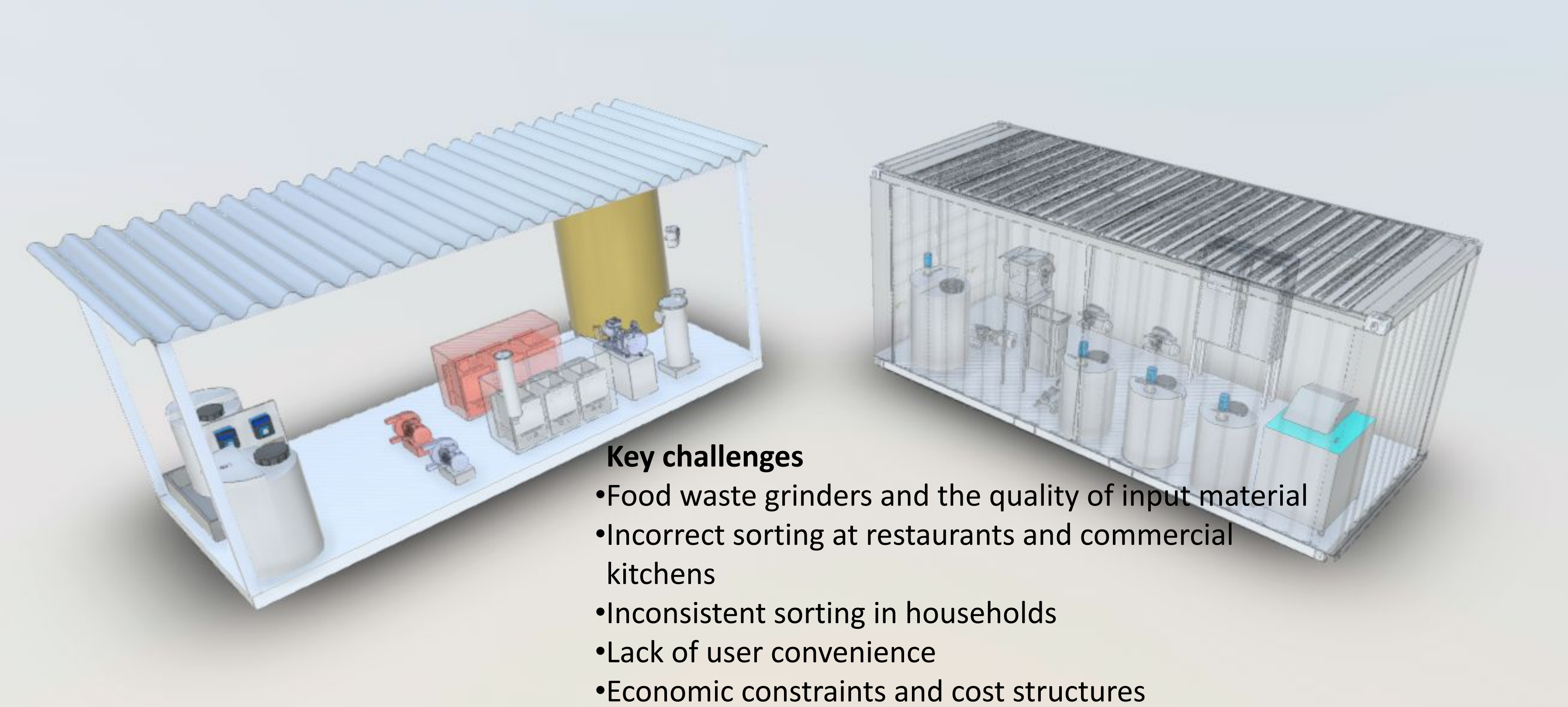

Key challenges

- Food waste grinders and the quality of input material
- Incorrect sorting at restaurants and commercial kitchens
- Inconsistent sorting in households
- Lack of user convenience
- Economic constraints and cost structures

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Partnership schools

BOFA has cooperation agreements with all the schools on Bornholm. The schools commit to sending all their students through a green education course at least three times. There are different levels that are adapted to the age group. In this way, all Bornholm students get a green education about resources such as waste.

SYMSITES spin off – granted 60000 euro from the Ministry of Children an Education to develop material for high schools.

(Circular economy and resource symbiosis. Practical learning about sustainability)

Started Q1 2025 – Done Q4 2025.

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Cardboard game

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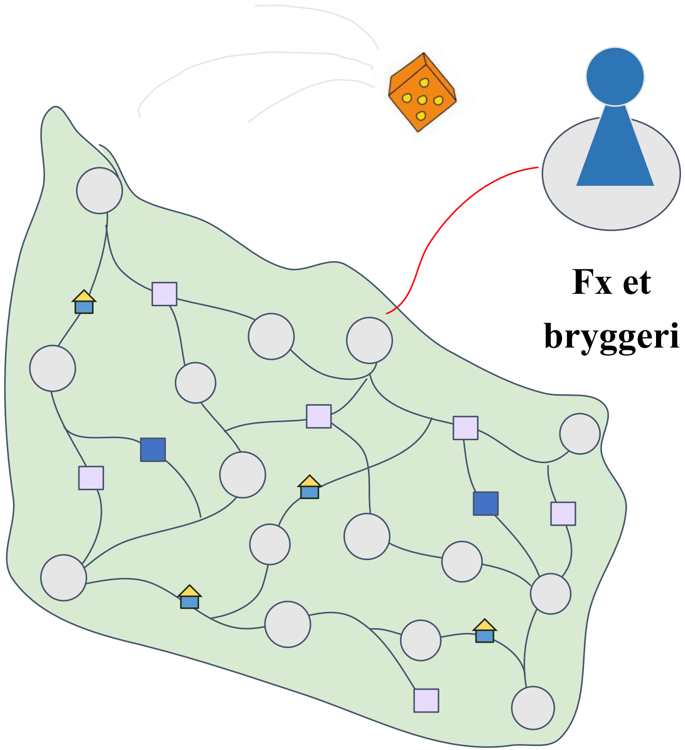
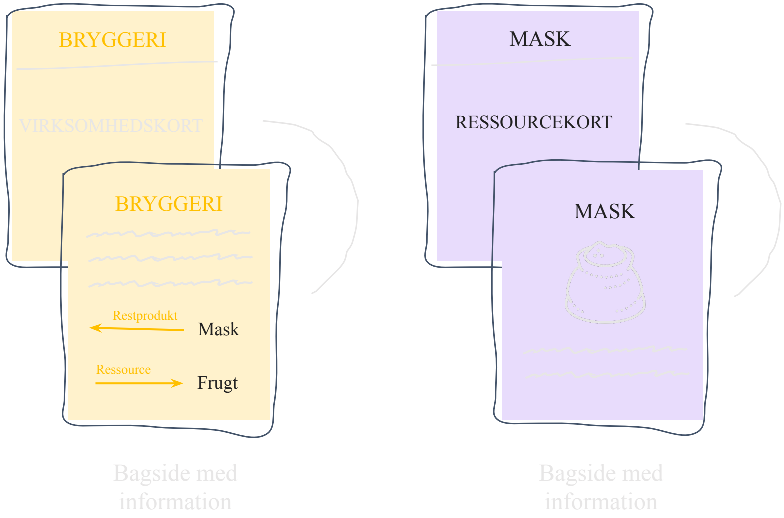


Virksomhedskort

Ressourcekort



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BOFA

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Thank you for your attention!

Mathias Kjærgaard, Project Manager, BOFA, Regional Municipality of Bornholm

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Greek Ecosite

- The **Greek EcoSite** is located at the wastewater treatment plant (WWTP) in the municipality of Western Achaia.
- This urban-industrial symbiosis extends over a larger area of approximately 13.5 km^2, encompassing municipality of West Achaia, the industrial zone, and the WWTP.

NATIONAL TECHNICAL UNIVERSITY OF ATHENS (NTUA)
Manager of the EcoSite

SIRMET S.A. (SIRMET)
Developer of the Ecosite

MUNICIPALITY OF WESTERN ACHAIA (MWA)
Operator of the WWTP

ELAIOURGIKES EPIHEIRISEIS PATRON S.A. (EEP)
Partner from the olive oil industry

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Greek Ecosite

The **main objective** of the Greek EcoSite is to treat industrial and municipal wastewater (MWW) from the municipality of Western Achaia, along with food waste.

This treatment process aims to produce hydrogen, methane in AnMBR, compost, and water for irrigation.

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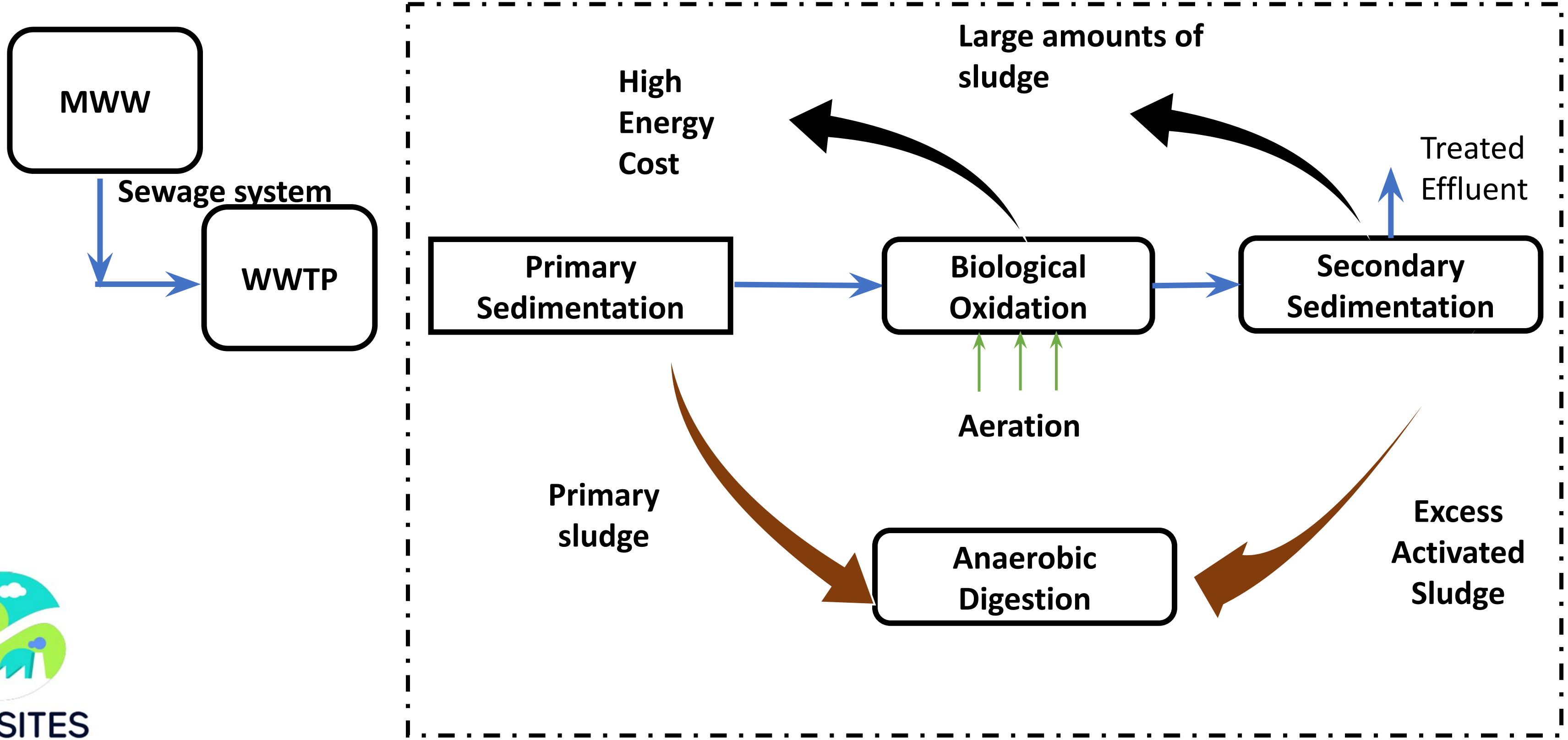
Conventional Wastewater Treatment Process



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HIGH-RATE DIGESTION OF MUNICIPAL WASTEWATER

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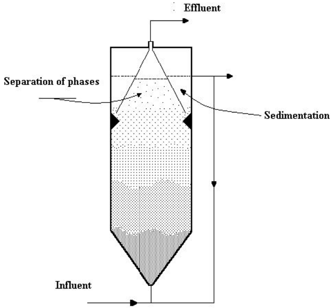
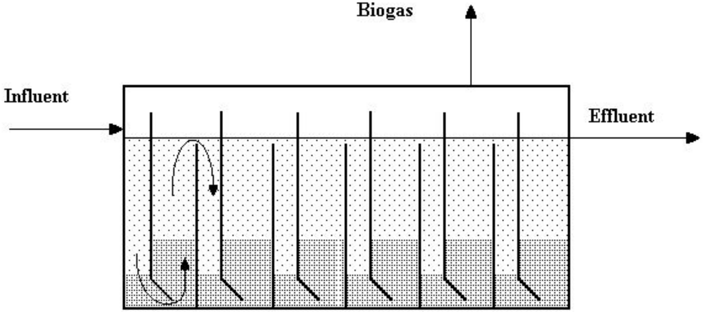
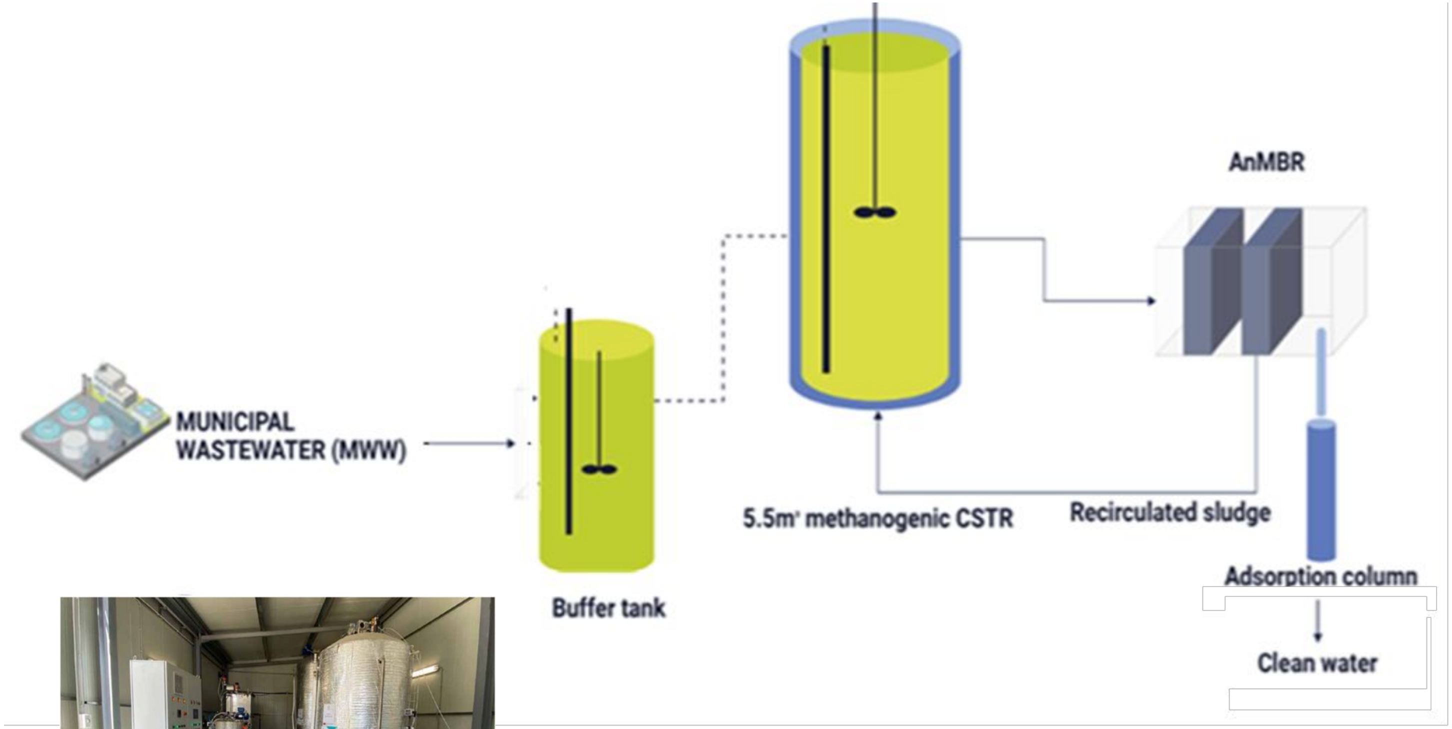
- ✔ Instead of the costly activated sludge process, high-rate anaerobic digestion systems (anaerobic filters, UASB, ABR, etc) could be used for municipal wastewater treatment
- ✔ Significant energy savings (no aeration needed and biogas produced) and less sludge generated
- ✔ Limitation: low-strength (COD) wastewater





An alternative is the use of an anaerobic membrane bioreactor



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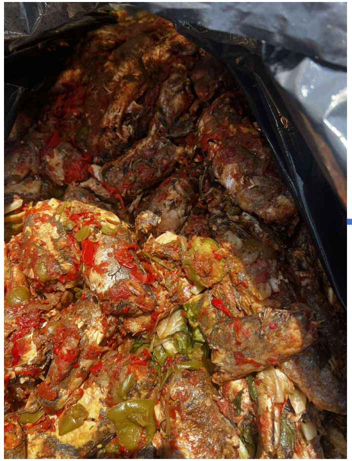
FOOD WASTE DRYING

FOOD WASTE



59 kg

FORBI

19 kg

CONDENSATE

40 kg

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GREECE
olive oil
industry

Olive Industry Wastewater (OIWW)

High season (November to March)
Low season (April to October)

Drying/shredding Food Waste

Liquid Fraction of Food Waste ~~(Condensate)~~

West Achaia wastewater treatment plant

Municipal Wastewater (MWW)

ΕΛΑΙΟΥΡΓΙΚΕΣ ΕΠΙΧΕΙΡΗΣΕΙΣ ΠΑΤΡΩΝ

SIRMET ENGINEERING & MANAGEMENT

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Wastewater streams characteristics

	MWW	OIWW	Condensate
pH	7.3	4.5	3.7
TSS g/ L	0.7	0.8	0.1
VSS g/ L	0.46	0.65	0.03
tCOD g/L	0.9	133	4.5
sCOD g/L	0.4	116	4.5

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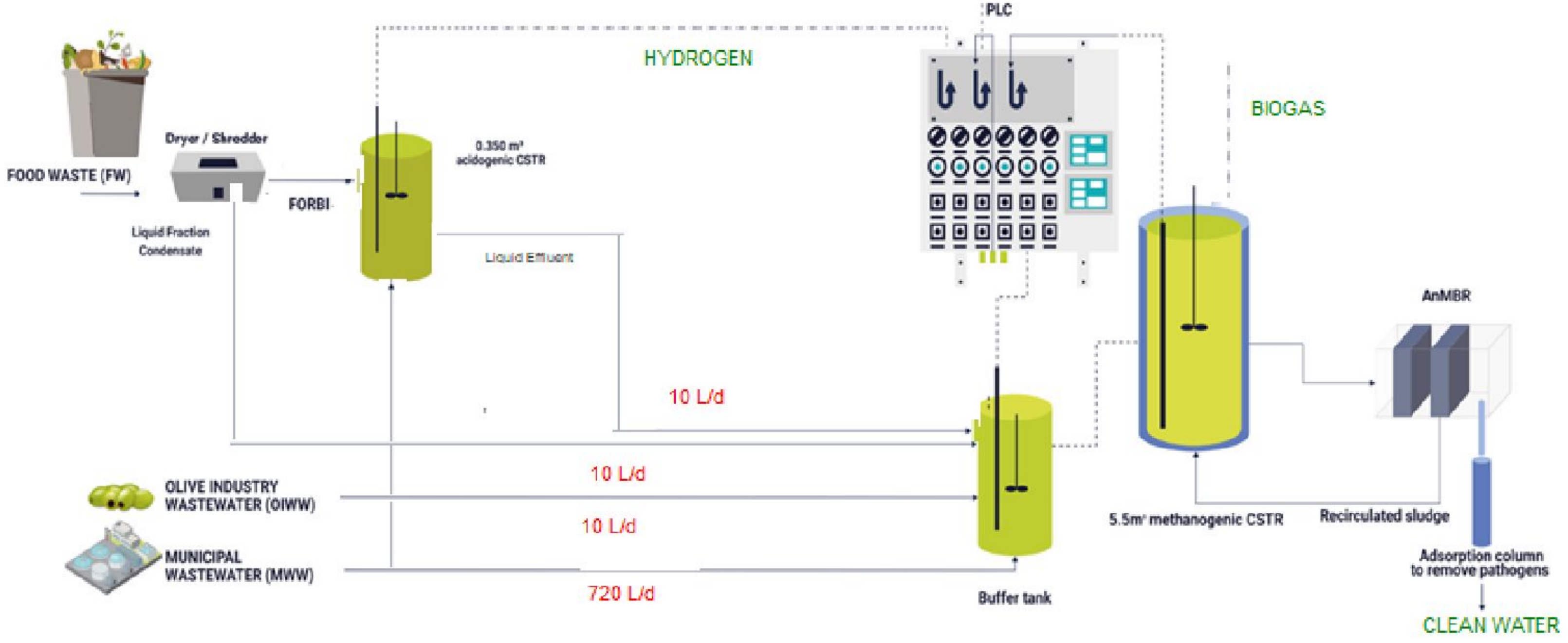

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CONCLUSIONS FROM TREATING EFFLUENT WITH BIOCHAR FROM OLIVE STONE

- Treatment with biochar from pyrolyzed olive stone removes most of the organic carbon
- The concentrations of emerging contaminants is significantly reduced to acceptable levels.

COMPOSTING

3 composting experiments (250 L composters) were carried out with the following mixture characteristics:

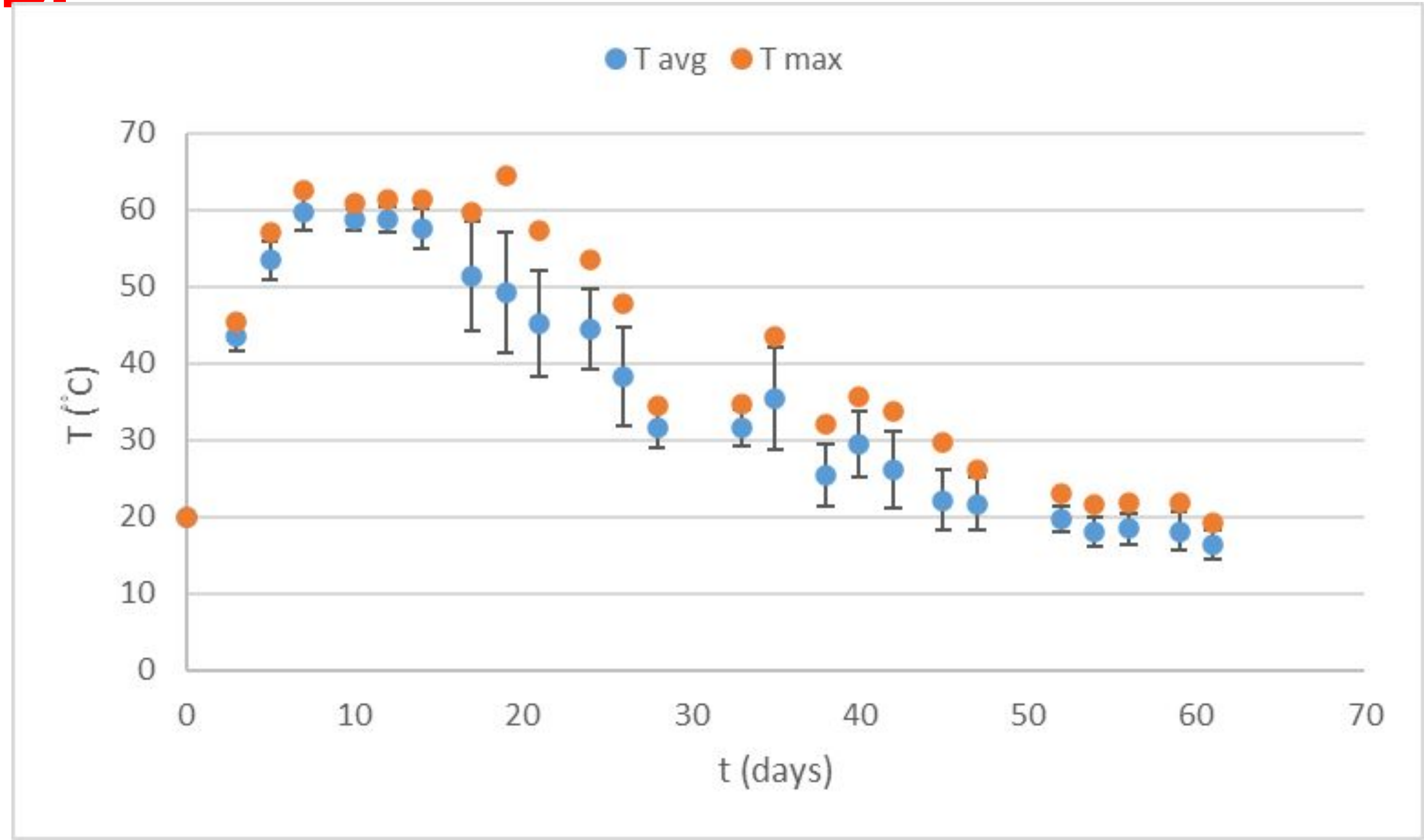
COMPOST 1: 50% prunings and 50% olive stone

COMPOST 2: 50% prunings and 50% FORBI

COMPOST 3: 34% prunings, 33% olive stone, 33% FORBI

Water was added to maintain moisture level close to 50%.

COMPOST 3: 34% prunings, 33% olive stone, 33% FORBI



Benefits for the Municipality and the Industry

- Municipality

(a) cheaper treatment (no cost for aeration and sludge management)

(b) compost for use in parks etc.

(c) hydrogen to be used as a fuel

(d) water for irrigation

- Industry:

(a) no treatment cost

(b) biogas (following upgrade to be used as BioCNG for vehicles)

(c) Water for washing and/or process

(d) compost

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Webinar Agenda – Panel discussion

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10:25-10:30	Wrap up and outlook	ICLEI – Felix Schumacher

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Main Lessons Learned

- Anaerobic membrane bioreactors (ANMBRs) are perfect and economically viable systems for municipal wastewater (MWW) treatment
- Industrial wastewater may be co-treated with MWW increasing the production of biogas that may be used as a fuel or for the production of electricity
- Municipal food waste may be dried and shredded providing a liquid stream (condensate) that may be effectively cotreated in an AnMBR along with the other streams, and a solid fraction that may be used for the production of hydrogen or composted along with prunings and/or olive stone to produce high quality for compost
- The AnMBR effluent may be treated with biochar generated from olive stone to generate water suitable for irrigation
- I-US reduces the overall treatment cost while producing useful products such as biogas, hydrogen, water, compost and bioplastics

Why stakeholder involvement is structurally critical

Industrial–Urban Symbiosis (I-US) is not only a technical system but a social system.

At the Greek EcoSite, multiple waste streams (municipal, industrial, food waste) are co-treated. This only works if:

Waste suppliers are reliable and willing

Authorities allow flexible permitting

Citizens accept reuse outputs (irrigation water, compost, biogas)

Without stakeholder buy-in, even a technically perfect AnMBR becomes an expensive aquarium.

Stakeholder involvement

Dissemination activities in **schools and the general public** are very important for raising the awareness and securing social acceptance of an industrial-urban symbiosis framework

Dissemination activities with **municipality** are important so that the mutual benefits of I-US are properly understood and potential barriers are identified and addressed

Dissemination activities with **industries** in the region are important so that they can seek and identify the possible opportunities that arise from I-US.

Dissemination activities with **regulatory officials** are important so that a proper legal framework is developed and possible financing is secured.

Stakeholder mapping (who is involved)

- **Primary operational stakeholders**
- Municipality of Western Achaia (MWW, food waste, public acceptance)
- Olive oil industry (OIWW supplier, by-product valorisation)
- WWTP operators (system performance, day-to-day feasibility)
- **Secondary enabling stakeholders**
- Regulatory authorities (permits, reuse standards, financing frameworks)
- Schools and general public (social licence to operate)
- Regional industries (future replication and scale-up)

Barriers identified and neutralised through involvement

This is where stakeholder involvement becomes a **problem-solving tool**, not a checkbox.

Typical barriers addressed through engagement:

- Fear of wastewater reuse in agriculture
- Uncertainty about co-treating industrial and municipal waste
- Regulatory hesitation around novel technologies (AnMBR, biochar polishing)
- Industry scepticism about reliability and costs

Through early and continuous dissemination, these barriers were:

- Identified before scale-up
- Discussed using real performance data
- Reduced through shared ownership of outcomes

Lessons learned

The transferable insights

- Stakeholder involvement must start **before** technology deployment
- Public communication is as important as process optimization
- Regulatory dialogue enables innovation rather than blocking it
- I-US success depends on trust loops, not linear supply chains

WORKSHOP FOR NON-TECHNOLOGICAL BARIER

Information on Waste Sorting and I-US at the Ano Alissos Primary School

Information on Waste Sorting at the old Townhall of Iousika

SYMSITES project – GA number: 101058426


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ΠΡΟΣΚΛΗΣΗ

Βιομηχανική και Αστική-Συμβίωση

Απαραίτητη προϋπόθεση για μια βιώσιμη και κυκλική οικονομία.

Ο Δήμος Δυτικής Αχαΐας σε συνεργασία με το Εθνικό Μετσόβιο Πολυτεχνείο, την εταιρεία ΣΥΡΜΕΤ Α.Ε. και τις Ελαιουργικές Επιχειρήσεις Πατρών σας προσκαλούν την Δευτέρα 15 Μαΐου 2023 στο Δημοτικό σχολείο Αλισσού και ώρα 10:00 πμ προκειμένου να σας παρουσιάσει το Ευρωπαϊκό χρηματοδοτούμενο έργο "SYMSITES".

www.symsites.eu

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Industrial–Urban Symbiosis only works if society understands that “waste” is a resource in the wrong place.

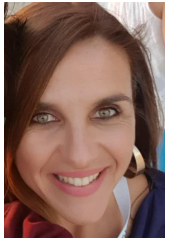
Building the Brown Bin Network in Alisos at MWA:
How the SYMITES Project Turns Waste into Resources

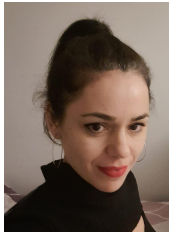
SIRMET
ENGINEERING & MANAGEMENT

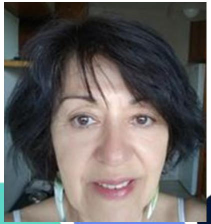
The Greek Team of EcoSite











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Webinar Agenda – Wrap up

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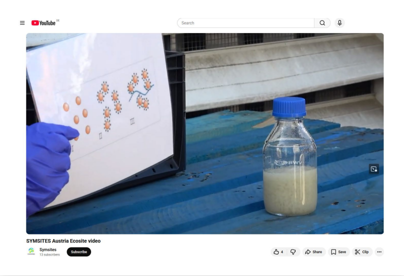
SYMSITES replication guidance package

Virtual tours



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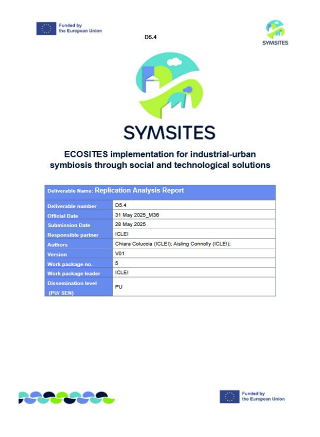
Replication analysis



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D5.4

SYMSITES

ECOSITES implementation for industrial-urban symbiosis through social and technological solutions

Deliverable Name:	Replication Analysis Report
Deliverable number	D5.4
Official Date	31 May 2025_M36
Submission Date	28 May 2025
Responsible partner	ICLEI
Authors	Chiara Coluccia (ICLEI); Aisling Connolly (ICLEI);
Version	V01
Work package no.	5
Work package leader	ICLEI
Dissemination level (PU/ SEN)	PU

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https://www.linkedin.com/company/symsites/

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