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Horizon 2020 research and innovation programme

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Scale-up of low-carbon footprint **ma**terial **r**ecovery **t**echniques in existing wastewater treatment **plant**s (SMART-Plant)

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Responsible author	**Name:**	Christian Remy	**E-mail:**	christian.remy@kompetenz-wasser.de
	Partner:	KWB	**Phone:**	+49 30 53653 808
	Name:	Lea Conzelmann	**E-mail:**	lea.conzelmann@kompetenz-wasser.de
	Partner:	KWB	**Phone:**	+49 30 53653 842

Brief Description	This report presents 13 marketing flyers for the marketing support of the SMART-PLANT technologies, products and services. The two-page flyers include information on the challenge and goal of the process, service or product together with a graphical representation, a list of unique selling points and contact information of the respective partners.
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EXECUTIVE SUMMARY

Proper marketing of the SMARTechs and related products or services from the EU innovation action is crucial to enable a successful commercial exploitation of the project outputs. To help the project partners and product owners with this task, the project consortium decided to develop marketing support material for each technology, service or product developed and demonstrated in the action.

This report contains 13 informative flyers for marketing purposes, which support the targeted communication towards key stakeholders in this sector. The two-page flyers include information on the challenge and goal of the process, service or product together with a graphical representation, a list of unique selling points and contact information of the respective partners. The uniform design generates a high memorability and a close association to the SMART-PLANT innovation action and provides professional marketing material for the targeted end-users such as wastewater treatment plant operators and managers or other professionals in this field.

SMART-Plant has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690323.

1. INTRODUCTION

Proper marketing of the SMARTechs and related products or services from the EU innovation action is crucial to enable a successful commercial exploitation of the project outputs. To help the project partners and product owners with this task, the project consortium decided to develop marketing support material for each technology, service or product developed and demonstrated in the action. This task was led by KWB, but relied heavily also on the input of all project partners.

Based on a proposal of KWB and the related discussion at the general assembly in Lisbon (June 2018), the consortium agreed that marketing flyers for all SMARTechs should be generated in this task to support the marketing activities of the partners. They should be visually attractive and in a common SMART-PLANT layout and design to achieve high memorability and close association with the SMART-PLANT innovation action. The content of the two-page flyers should explain the basic characteristics of each SMARTech in an easy-to-understand level of detail, but still relying on a technical background of wastewater treatment plant (WWTP) operation. The main target group for the flyers was identified as WWTP operators or managers, but also engineers and other professionals working in the field of WWTP.

Starting from these defined requirements, KWB developed a suitable flyer pre-design and collected the related information about the SMARTechs from the partners (e.g. introductory text, photos, technical flow charts, unique selling points) or the available deliverables. KWB also subcontracted a professional designer to develop a visually attractive design of the flyers based on the SMART-PLANT branding. The first draft of the flyers for selected SMARTechs were presented and discussed at the general assembly in Barcelona (January 2019) to adjust the design and collect feedback from the consortium. It was also decided to have the flyers ready for promotion for the international conference in Venice (3rd IWA Resource Recovery Conference) in September 2019. Final feedback on the SMARTech flyers was collected at the general assembly in Athens (July 2019), and nine SMARTech flyers plus a matching cover could finally be presented and distributed to over 350 participants at the Venice conference.

Due to the very positive reception of the SMARTech flyers, the consortium decided then to extent the marketing flyers also to the SMART products and services, using the same SMART-PLANT design. This new set of four flyers was drafted for the last general assembly in Berlin (January 2020), again collecting feedback from the partners. Final versions of all 13 SMARTech flyers were ready in March 2020 and have been distributed to all partners and also uploaded on the SMART-PLANT website.

This report presents 13 SMART-PLANT marketing flyers in their final layout.

2. FLYERS FOR MARKETING OF SMARTECHS AND RELATED PRODUCTS

The following chapter contains 13 informative flyers for marketing purposes, which support the targeted communication towards key stakeholders in this sector. These flyers contain general and technical information of the different SMARTechs, products and services, and also information about their unique selling points to illustrate the specific benefits of these innovative technologies.
A list of the relevant processes and their related SMART products is provided below (**Table 2-1**).

Table 2-1: List of SMARTechs and SMART products or services with related marketing flyers

No	SMARTech	Process name	Recovered SMART products	Input and validation
1	1	Cellvation	Cellulose pellets or fluff	Cirtec
2	2a	AAT	Biogas	Agrobics
3	2b	SCEPPHAR mainstream	PHA-rich sludge and struvite	UAB
4	3	IEX (Ion exchange)	Aqueous ammonia, ammonium sulfate and calcium phosphate	CRAN
5	4a	SCENA	P-rich sludge	UNIVR
6	4b	SCENA-THP	-	NTUA
7	5	SCEPPHAR sidestream	PHA-rich sludge and struvite	UNIVR
8	A	PHA extraction and bio-composites	PHA powder and bio-composites	Biotrend, Ecodek
9	B	Biodrying and dynamic composting	Cellulose pellets and biofertilizer	UVIC
10	SMART-DSS	Decision support system	-	UAB
11	Monitoring	Online monitoring of energy and GHG	-	Wellness, UBRUN
12	SMART Materials	Materials recovered	Cellulose fluff, cellulose pellets, PHA-rich sludge, PHA powder, bio-composites	Cirtec, UAB, Ecodek
13	SMART Nutrients	Nutrient products recovered	Calcium phosphate, aqueous ammonia, ammonium sulphate, spent zeolite resin, struvite, biofertilizer	CRAN, UAB, UNIVR, UVIC

In particular, the two-page flyers are composed of the following items:

FRONT PAGE
- Header with project logo and EU map to locate the implementation site
- Name of the technology/product/service and short claim
- Informative text about challenges, goals, and related activities in the innovation action
- Photo of demonstration site or product, screenshot of software
- Footer with website of the project and reference to the H2020 funding instrument

BACK PAGE
- Graphical representation of the SMARTech or service (e.g. flow diagram), photos of products
- List of unique selling points with reference to their impact within the flow diagram
- Footer with contact information (website and/or email address) and logos of partner institutions within the consortium

This chapter shows all flyers in their final layout as of March 2020. The content of the flyers was produced and validated in close cooperation of KWB and the related case study partners. They have been distributed in electronic format to all partners and can be used for marketing purposes.

For all flyers, two file versions are available: one file with crop marks for printing, and one file optimized for web download without crop marks. The flow diagrams are also available as single file (jpg-format) for further use in presentations, print material or reports.

All flyers in web-format are available for download on the project website:

http://www.smart-plant.eu/index.php/the-project/technical-factsheets

2.1 Marketing flyer No.1 for SMARTech 1 (Cellvation)

SMART-Plant

Scale-up of low-carbon footprint material recovery techniques in existing sewage treatment plants

Cellvation®

Cellulose Recovery with Dynamic Sieving as Primary Treatment

Municipal sewage water contains a high amount of suspended solids, and up to 70 % of this material consists of cellulose fibers originating from the use of toilet paper. This cellulose is a valuable resource, but is also puts an additional burden on the wastewater treatment process. CirTec has developed a dedicated process called Cellvation® to separate the cellulose from the incoming sewage water and turn it into clean cellulose fibers: the product Recell®. During primary treatment, a special Salsnes fine-sieve separates cellulosic screenings from sewage water in a separate stage, which is washed and further processed to gain clean cellulose fibers. This product can be reused in construction materials or for down-stream blending with bioplastic such as PHA to form a robust bio-composite material.

Within the SMART-Plant project, a Cellvation® system with a capacity of up to 90 m³/h was installed at the sewage treatment plant Geestmerambacht (Netherlands). It demonstrates the technical feasibility of cellulose recovery and illustrates the potential of this new technology to contribute to a circular economy in the water sector.

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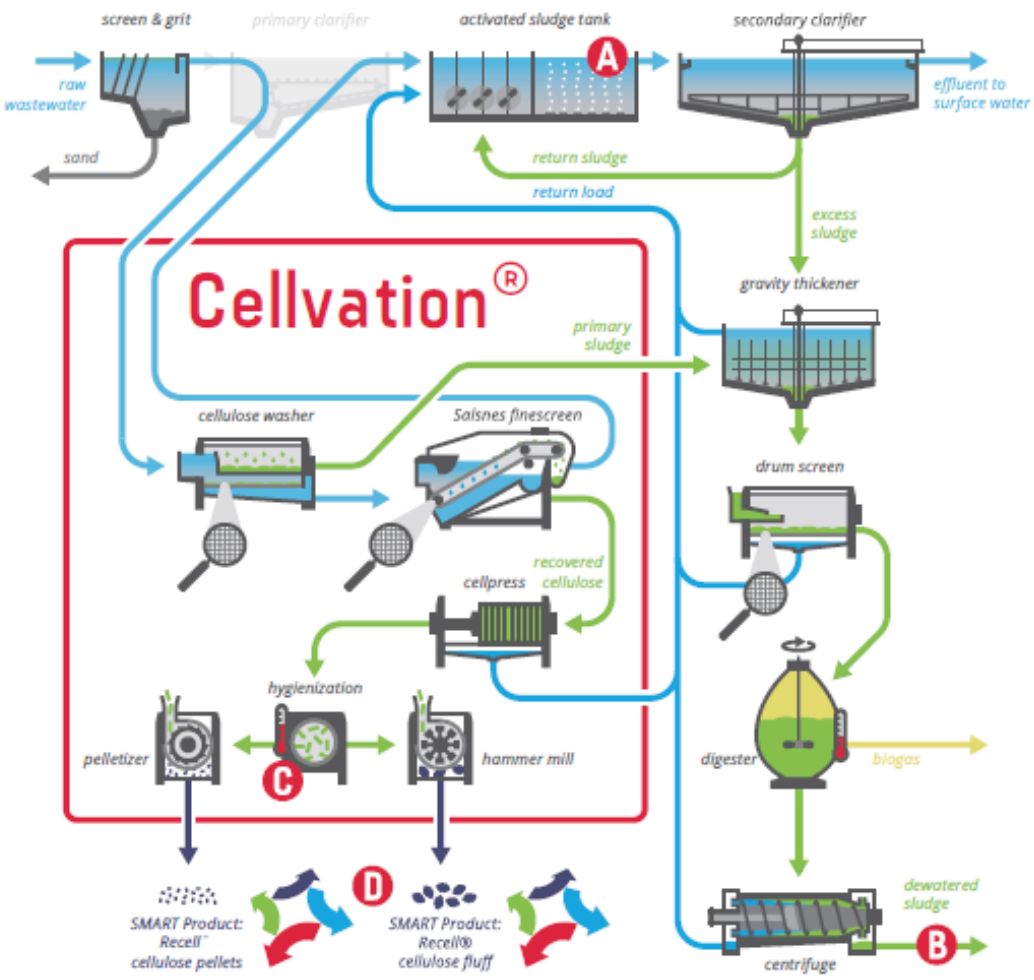

Unique Selling Points

A Reduction of energy consumption for aeration by up to 20 % and increase of treatment capacity at the plant due to reduction of organic load in the activated sludge process

B Reduction of sludge volume which leads to lower polymer use for dewatering and lower sludge disposal costs

C Reaching EPA class A rating for the cellulose product

D Recovery of a high quality product: clean cellulose fluff or pellets for reuse in road construction (e.g. as additive in asphalt) or as a raw material for bio-composites and other buildings materials

www.cell-vation.nl
info@cell-vation.nl

Cellvation CINTEC salsnes filter

2.2 Marketing flyer No.2 for SMARTech 2a (AAT)

SMART-Plant

Scale-up of low-carbon footprint material recovery techniques in existing wastewater treatment plants

AAT

Biogas Recovery in Primary Treatment with Polyfoam Biofilter

AgRobics has developed a patented anaerobic biofilter (AAT) that transforms wastewater into renewable energy. The system combines high COD and TSS removal as well as biogas production and is installed upstream of the aerobic treatment step. It decreases the organic load of the sewage by 30 %, which results in a reduction of the energy consumption of the biological stage by 30 % and an increase of the biogas production by 25 %. An integrated polymeric based immobilization matrix acts as a surface for the attachment of a biofilm, which prevents biomass losses and allows high biomass concentrations.

Within the SMART-Plant project, a demo system with a reactor volume of 25 m^3 with the aim to treat 100-120 m^3/d of sewage was installed at the municipal wastewater treatment plant of Karmiel (Israel). This plant has special challenges due to organic load peaks (e.g. fat and olive mill residuals) from a slaughterhouse and olive mill wastewater and can serve as a representative model of many treatment plants in warm regions.

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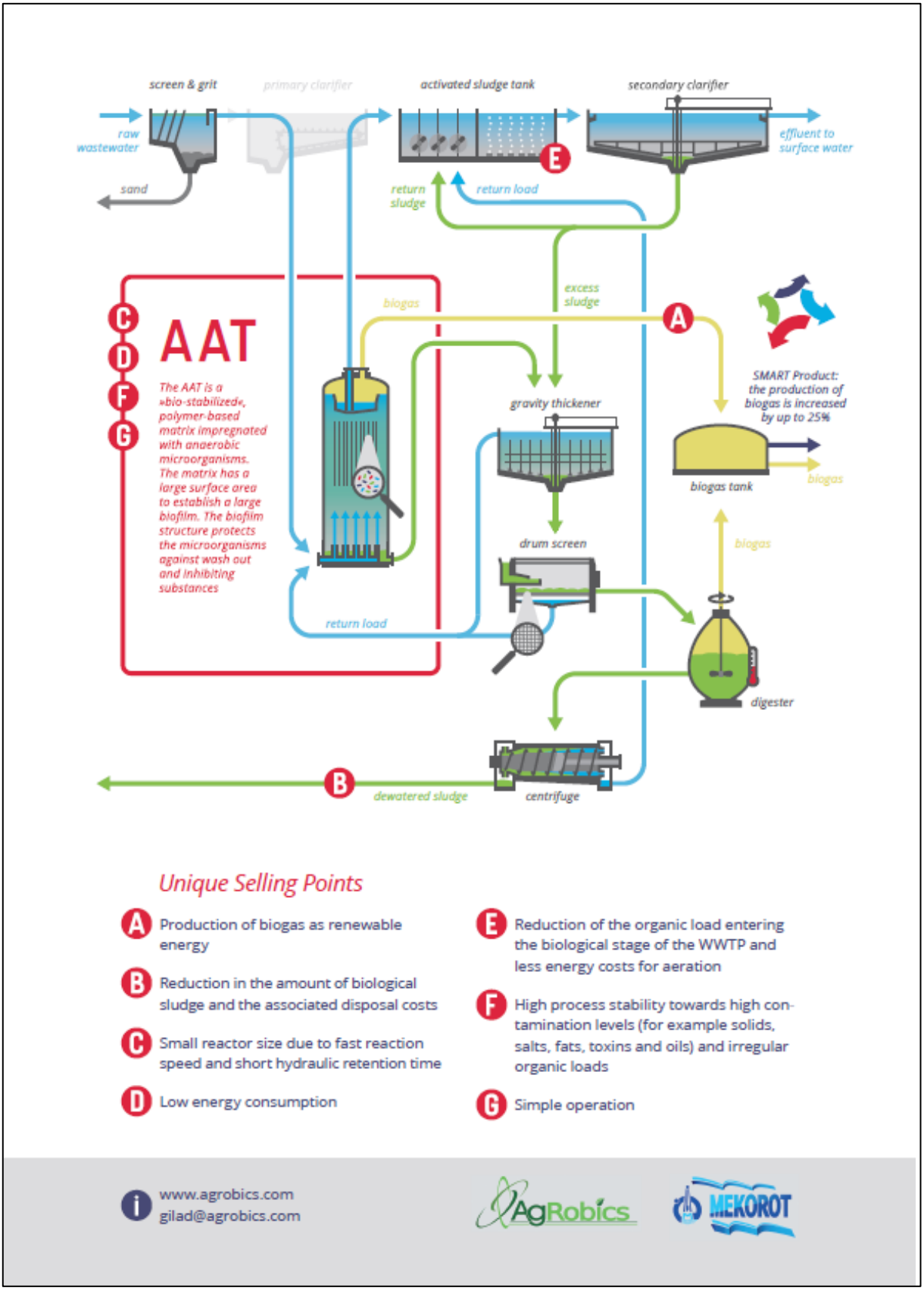
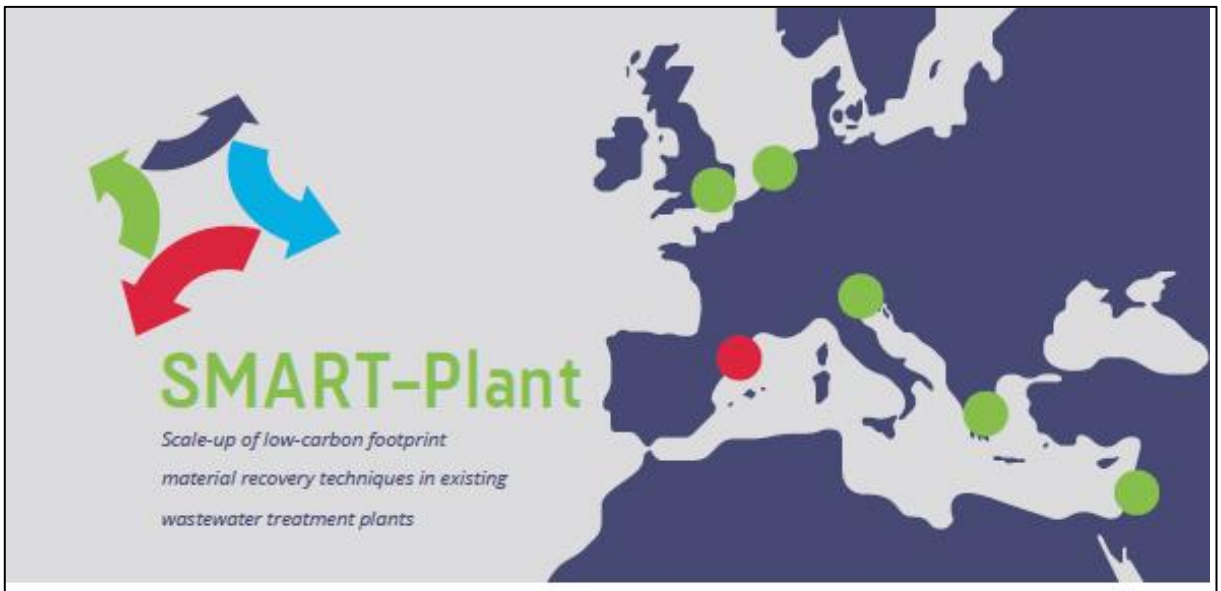

screen & grit
primary clarifier
activated sludge tank
secondary clarifier
raw wastewater
sand
effluent to surface water
return sludge
return load
E
excess sludge
biogas
A
C
D
F
G
AAT
The AAT is a »bio-stabilized«, polymer-based matrix impregnated with anaerobic microorganisms. The matrix has a large surface area to establish a large biofilm. The biofilm structure protects the microorganisms against wash out and inhibiting substances
SMART Product: the production of biogas is increased by up to 25%
gravity thickener
biogas tank
biogas
drum screen
biogas
return load
digester
B
dewatered sludge
centrifuge
Unique Selling Points
A Production of biogas as renewable energy
B Reduction in the amount of biological sludge and the associated disposal costs
C Small reactor size due to fast reaction speed and short hydraulic retention time
D Low energy consumption
E Reduction of the organic load entering the biological stage of the WWTP and less energy costs for aeration
F High process stability towards high contamination levels (for example solids, salts, fats, toxins and oils) and irregular organic loads
G Simple operation
www.agrobics.com
gilad@agrobics.com
AgRobics
MEKOROT

2.3 Marketing flyer No.3 for SMARTech 2b (SCEPPHAR mainstream)



SCEPPHAR

mainstream

Short-Cut Enhanced Phosphorus and PHA Recovery in Mainstream

Treating wastewater while simultaneously recovering products in a mainstream process: these ambitious goals have been realised by the SCEPPHAR process developed by the Universitat Autònoma de Barcelona together with Aigües de Manresa S.A.. This two-sludge SBR system recovers up to 50 % of phosphorus and produces a sludge enriched with PHA, which can be processed to bioplastics or used to increase methane production during anaerobic digestion. While meeting comparable effluent targets, operational costs of the SCEPPHAR process are lower than traditional activated sludge systems.

Within the SMART-Plant project, the SCEPPHAR process is demonstrated in a mainstream configuration with a capacity of 10 m^3/d at the Manresa wastewater treatment plant (Spain).

The system is built to achieve effluent limits of P < 1 mg/L and N < 10 mg/L, removal up to 90 % of N via nitrite, recovery of around 50 % of the influent P and production of a waste sludge with a PHA content up to 30 %.

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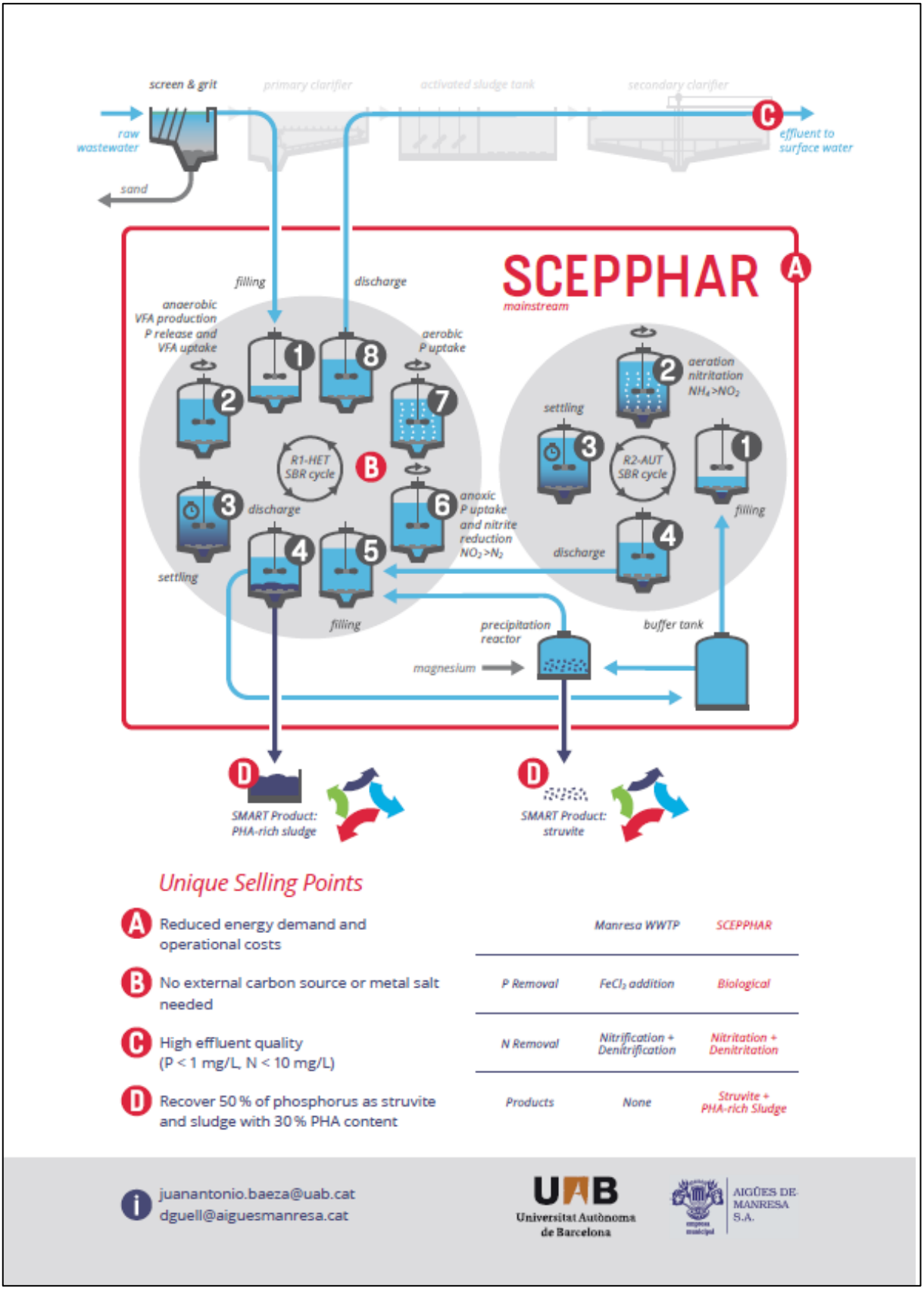
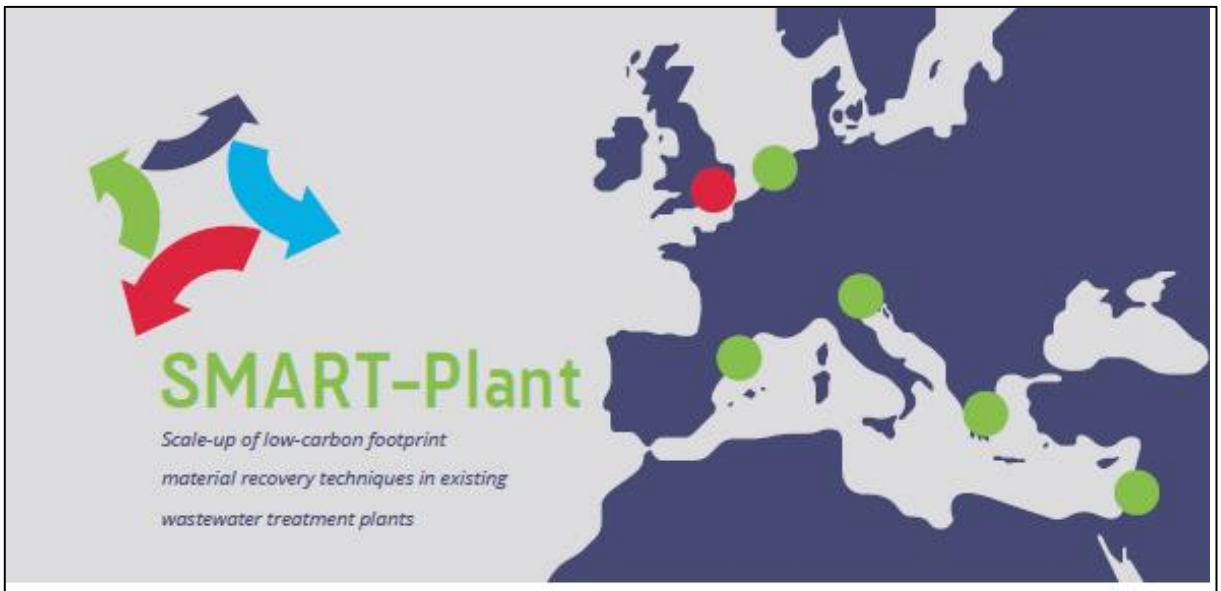

screen & grit
primary clarifier
activated sludge tank
secondary clarifier
raw wastewater
sand
effluent to surface water
SCEPPHAR
mainstream
filling
discharge
anaerobic VFA production P release and VFA uptake
aerobic P uptake
aeration nitritation NH_4>NO_2
settling
R1-HET SBR cycle
R2-AUT SBR cycle
anoxic P uptake and nitrite reduction NO_2>N_2
discharge
settling
filling
discharge
filling
precipitation reactor
buffer tank
magnesium
SMART Product: PHA-rich sludge
SMART Product: struvite
Unique Selling Points
A Reduced energy demand and operational costs
B No external carbon source or metal salt needed
C High effluent quality (P < 1 mg/L, N < 10 mg/L)
D Recover 50 % of phosphorus as struvite and sludge with 30 % PHA content
Manresa WWTP
SCEPPHAR
P Removal
$FeCl_3$ addition
Biological
N Removal
Nitrification + Denitrification
Nitritation + Denitritation
Products
None
Struvite + PHA-rich Sludge
juanantonio.baeza@uab.cat
dguell@aiguesmanresa.cat
UAB Universitat Autònoma de Barcelona
AIGÜES DE MANRESA S.A.

2.4 Marketing flyer No.4 for SMARTech 3 (IEX)



IEX

Ion Exchange for Ammonia and Phosphorus Removal and Recovery from Wastewater

Cranfield University has developed a tertiary nutrient removal and recovery technology based on ion exchange (IEX) processes. After secondary treatment, ammonia and phosphate are selectively removed from the wastewater with specific IEX media. The capacity of the IEX media is regularly restored by regeneration solutions, where the nutrients accumulate. With an ammonia stripper or a combined precipitation and filtration process, the nutrients are removed as products from the regenerants. Multiple use of the regenerants and high recovery rates are key aspects of the technology to ensure economic feasibility and sustainably. The recovered products are ammonia solution and calcium phosphate salts, which can be directly re-used in the chemical and fertilizer industries.

Within the SMART-Plant project, the IEX technology is demonstrated at Cranfield's wastewater treatment plant (UK) at a flow of 10 m³/day. The challenge of this pilot-plant is to demonstrate its long-term operation with optimized regeneration, high nutrient removal and minimized losses of the IEX media.

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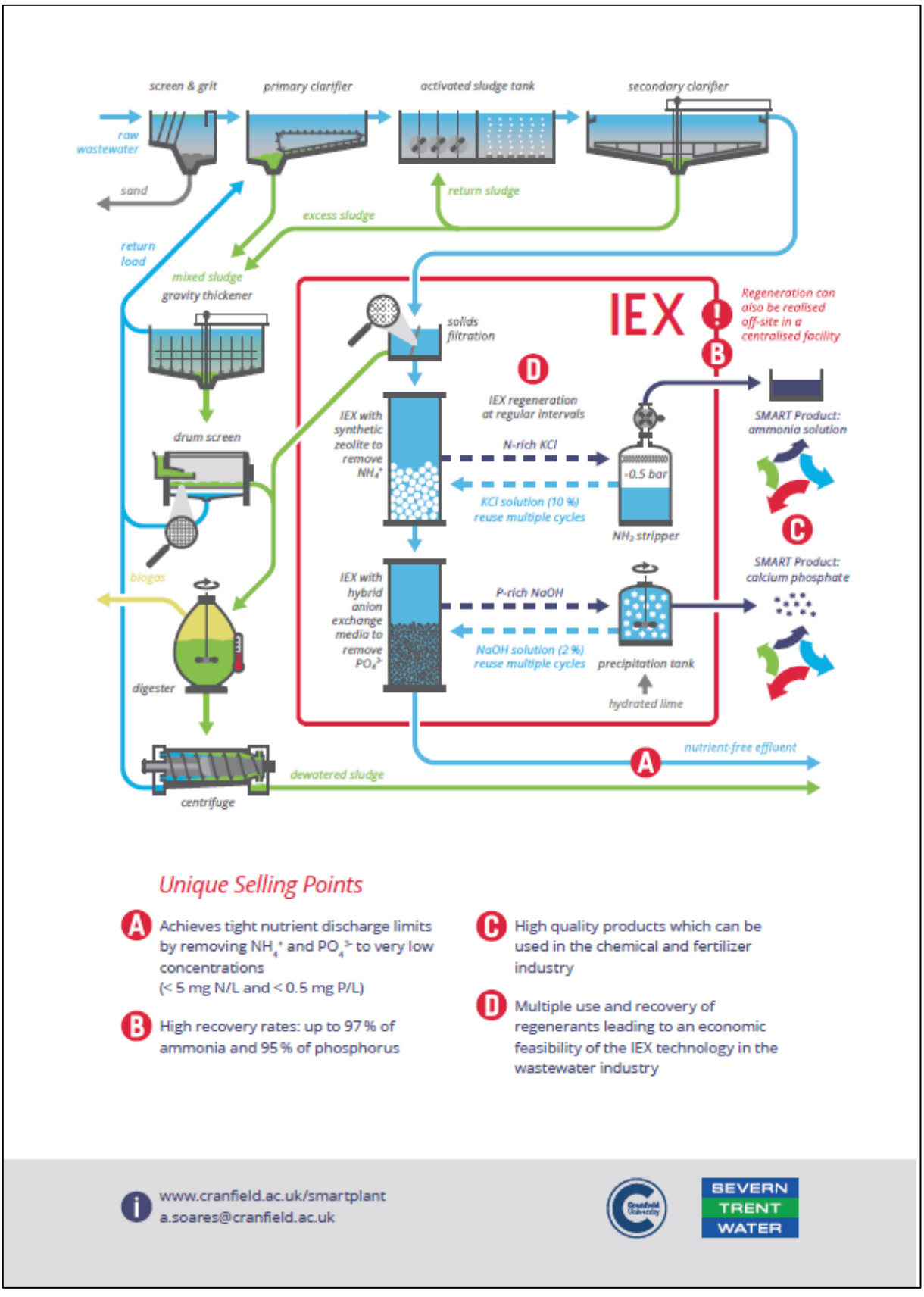
screen & grit
primary clarifier
activated sludge tank
secondary clarifier
raw wastewater
sand
return sludge
excess sludge
return load
mixed sludge
gravity thickener
drum screen
biogas
digester
centrifuge
dewatered sludge
IEX
Regeneration can also be realised off-site in a centralised facility
solids filtration
IEX regeneration at regular intervals
IEX with synthetic zeolite to remove NH_4^+
N-rich KCl
KCl solution (10 %) reuse multiple cycles
-0.5 bar
NH_3 stripper
SMART Product: ammonia solution
IEX with hybrid anion exchange media to remove PO_4^{3-}
P-rich NaOH
NaOH solution (2 %) reuse multiple cycles
precipitation tank
hydrated lime
SMART Product: calcium phosphate
nutrient-free effluent
Unique Selling Points
A Achieves tight nutrient discharge limits by removing NH_4^+ and PO_4^{3-} to very low concentrations (< 5 mg N/L and < 0.5 mg P/L)
B High recovery rates: up to 97 % of ammonia and 95 % of phosphorus
C High quality products which can be used in the chemical and fertilizer industry
D Multiple use and recovery of regenerants leading to an economic feasibility of the IEX technology in the wastewater industry
www.cranfield.ac.uk/smartplant
a.soares@cranfield.ac.uk
SEVERN TRENT WATER

2.5 Marketing flyer No.5 for SMARTech 4a (SCENA)

SCENA

Short-Cut Enhanced Nutrients Abatment

Energy-efficient Nutrient Removal from Sludge Liquor without External Carbon Source

Sludge dewatering effluent after anaerobic digestion represents a highly concentrated stream of nitrogen and phosphorus, which may contribute up to 25 % of the total load of the mainline WWTP. The SCENA process developed by the University of Verona aims to eliminate nitrogen and phosphorus from sidestream liquors by means of a short-cut biological process via nitrite and volatile fatty acids (VFAs) produced from acidogenic fermentation of sewage sludge. The process avoids the use of an external carbon source, which decreases the operational costs and the excess sludge production.

Within the SMART-Plant project, the SCENA process is demonstrated at full-scale within the wastewater treatment plant of Carbonera (Italy). The system treats 40-50 m^3/d of anaerobic reject water under reliable and stable conditions and removes more than 75 % of nitrogen and phosphorus. The produced excess sludge with a P content of up to 5 % can be a valuable product for use as agricultural fertilizer.

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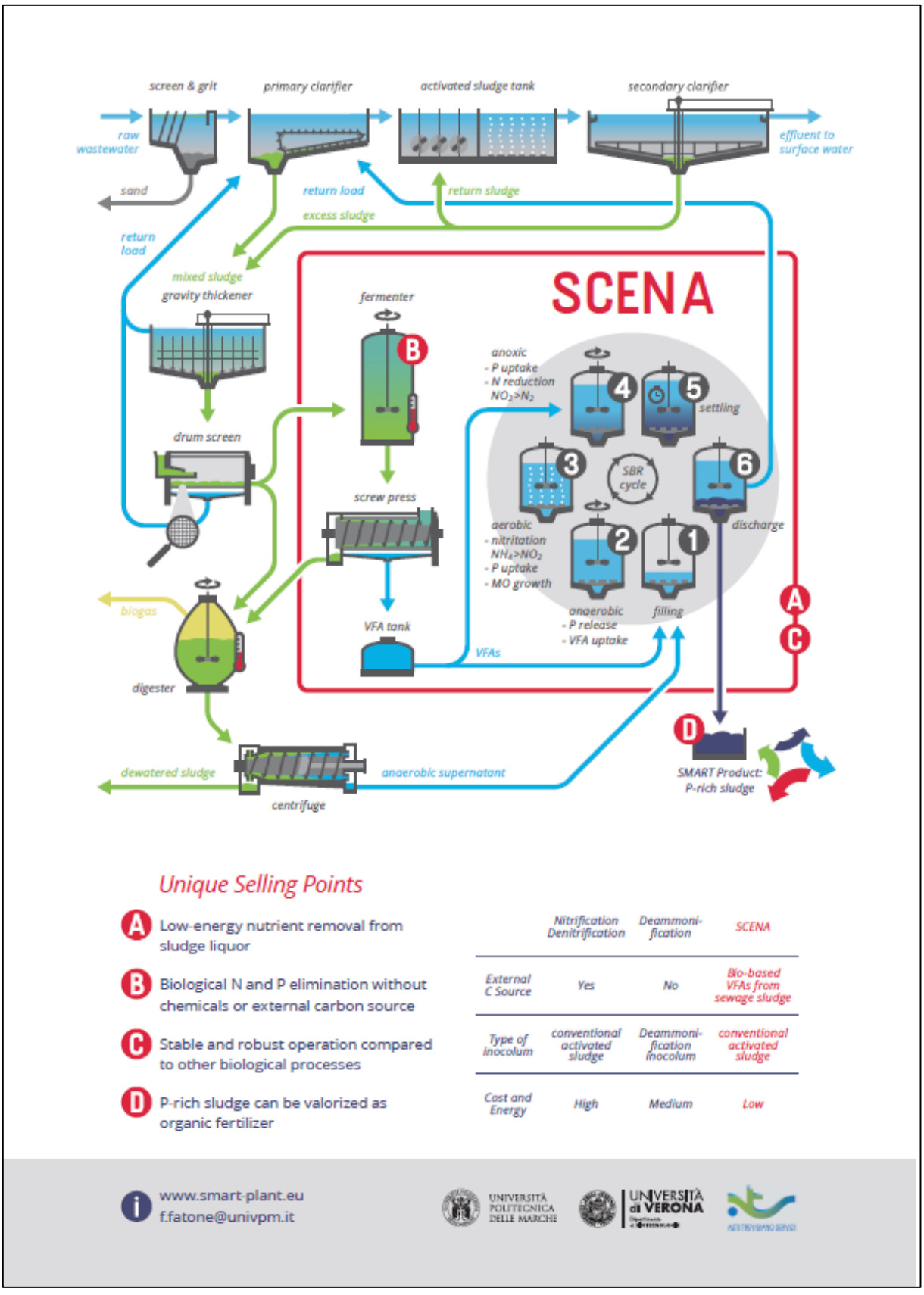


Unique Selling Points

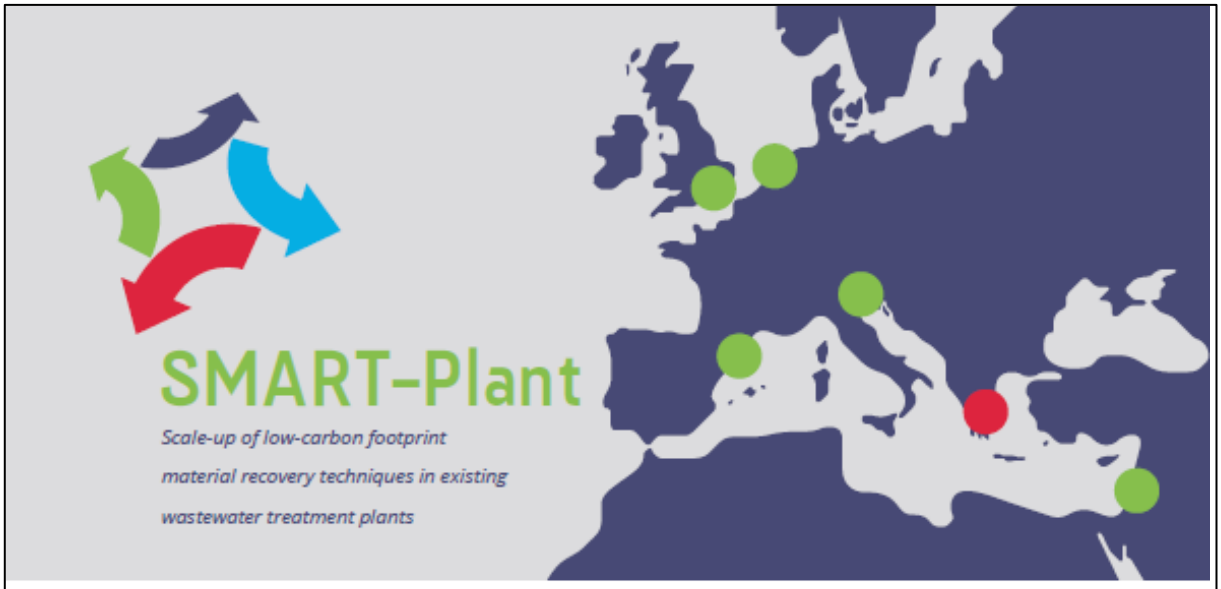
- **A** Low-energy nutrient removal from sludge liquor
- **B** Biological N and P elimination without chemicals or external carbon source
- **C** Stable and robust operation compared to other biological processes
- **D** P-rich sludge can be valorized as organic fertilizer

	Nitrification Denitrification	Deammoni-fication	SCENA
External C Source	Yes	No	Bio-based VFAs from sewage sludge
Type of inoculum	conventional activated sludge	Deammoni-fication inoculum	conventional activated sludge
Cost and Energy	High	Medium	Low

www.smart-plant.eu
f.fatone@univpm.it

UNIVERSITÀ POLITECNICA DELLE MARCHE
UNIVERSITÀ di VERONA

2.6 Marketing flyer No.6 for SMARTech 4b (SCENA-THP)



SCENA-THP

Energy-efficient Nitrogen Removal from Sludge Liquor after Thermal Hydrolysis

Sludge liquor from dewatering of digested sludge is heavily loaded with nitrogen and phosphorus, especially when the sludge is pre-treated by thermal pressure hydrolysis (THP) before digestion. Hence, wastewater treatment plants (WWTPs) using THP exhibit a high fraction of N and P return load, putting an additional load on the mainline and limiting the overall treatment capacity of the plant. Moreover, sludge liquor after THP contains a low fraction of biodegradable organic carbon, so that conventional biological processes for nutrient removal in sludge liquor have to be operated with costly addition of an external carbon source.

The SCENA process can remove nitrogen and phosphorus from sludge liquors with low energy demand and using an internal carbon source such as supernatant from primary sludge thickening or VFA from fermentation of sludge. In the SMART-Plant project, this process is demonstrated at pilot scale (2 m³/d) at the Psyttalia WWTP in Athens (Greece), which operates a THP for the treatment of 50 % of the excess sludge.

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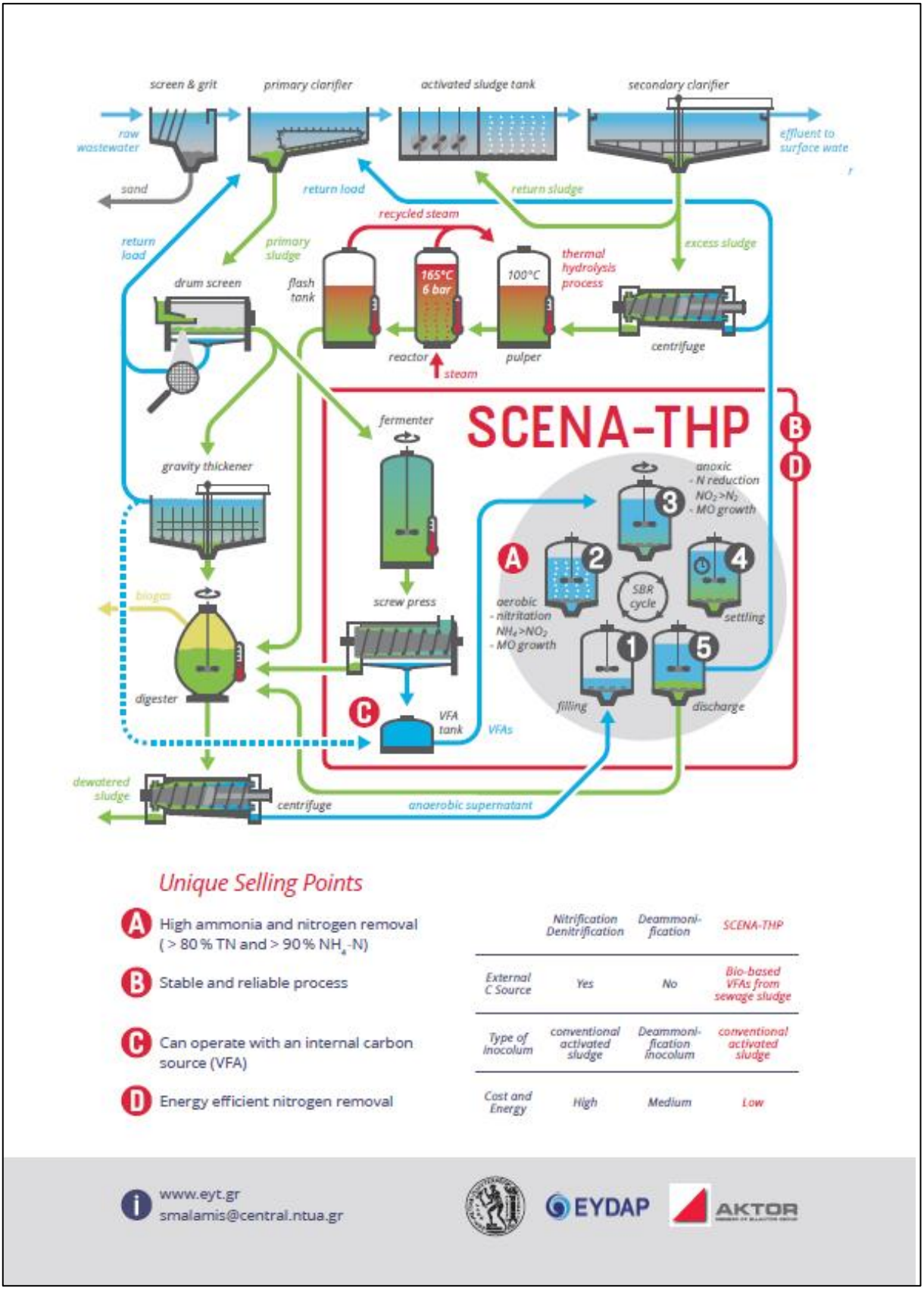

Unique Selling Points

- **A** High ammonia and nitrogen removal (> 80 % TN and > 90 % NH_4-N)
- **B** Stable and reliable process
- **C** Can operate with an internal carbon source (VFA)
- **D** Energy efficient nitrogen removal

	Nitrification Denitrification	Deammoni-fication	SCENA-THP
External C Source	Yes	No	Bio-based VFAs from sewage sludge
Type of Inocolum	conventional activated sludge	Deammoni-fication inocolum	conventional activated sludge
Cost and Energy	High	Medium	Low

www.eyt.gr
smalamis@central.ntua.gr

EYDAP AKTOR

2.7 Marketing flyer No.7 for SMARTech 5 (SCEPPHAR sidestream)

SCEPPHAR

sidestream

Removal and recovery of nutrients and biopolymer production in sidestream

The sidestream SCEPPHAR (short-cut enhanced phosphorus and PHA recovery) process was developed by the University of Verona to treat sludge liquor, which is highly loaded with nutrients nitrogen (N) and phosphorus (P). The process achieves up to 85 % N removal, enables the recovery of phosphorus as struvite and produces a sludge enriched with biopolymer (PHA). In addition, it decreases the energy costs for sidestream treatment by up to 20 %.

The system is tested in pilot scale at the wastewater treatment plant of Carbonera (Italy), treating 4-5 m³ of sludge liquor per day. The carbon source for optimised biopolymer production is produced on-site by fermentation of cellulosic sludge, which is recovered from raw wastewater using a rotating dynamic filter. The recovered struvite can be used as P-based fertilizer while the PHA content in the biomass achieves up to 50 % on dry weight basis.

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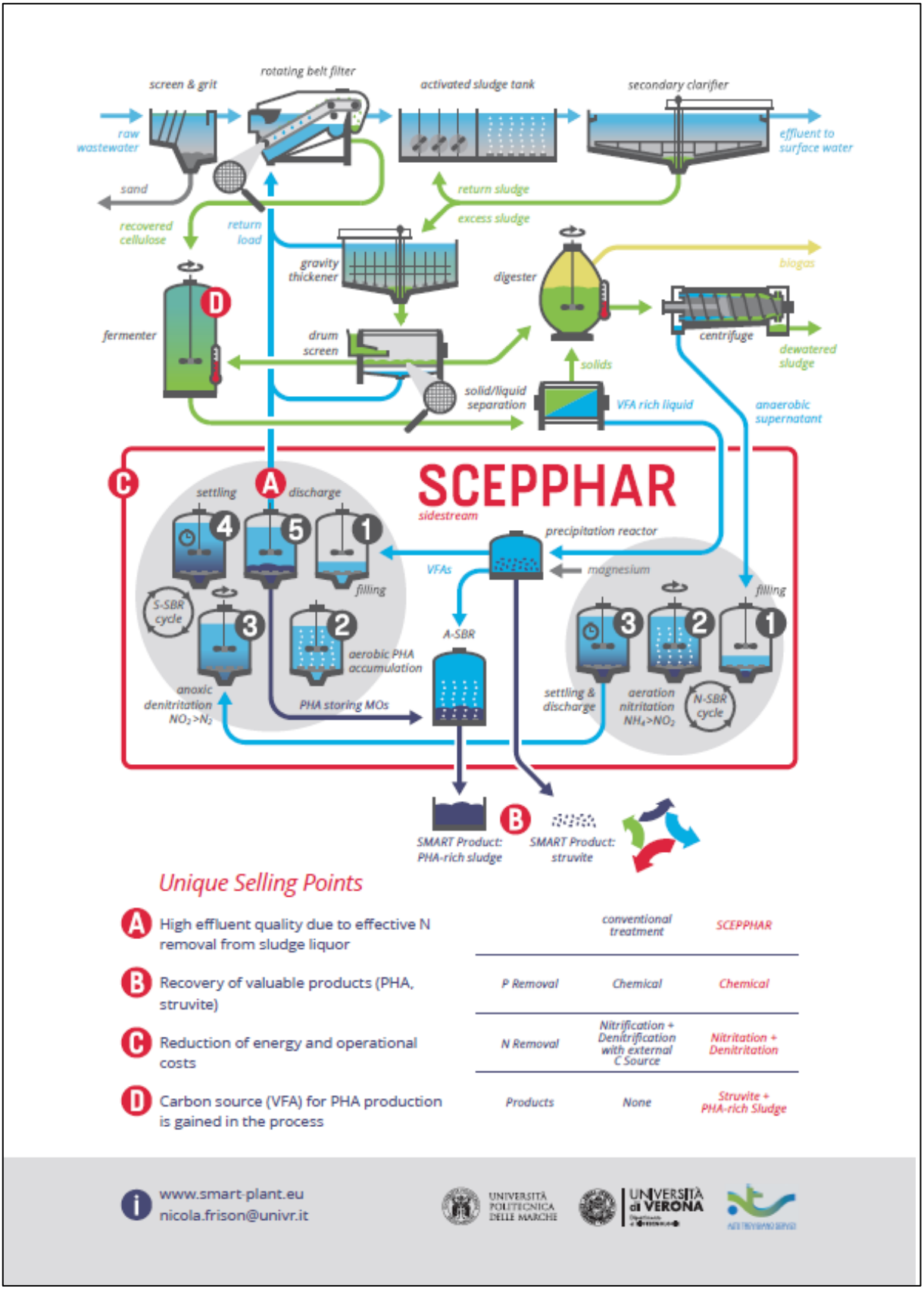

Unique Selling Points

- **A** High effluent quality due to effective N removal from sludge liquor
- **B** Recovery of valuable products (PHA, struvite)
- **C** Reduction of energy and operational costs
- **D** Carbon source (VFA) for PHA production is gained in the process

	conventional treatment	SCEPPHAR
P Removal	Chemical	Chemical
N Removal	Nitrification + Denitrification with external C Source	Nitritation + Denitritation
Products	None	Struvite + PHA-rich Sludge

www.smart-plant.eu
nicola.frison@univr.it

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UNIVERSITÀ di VERONA

2.8 Marketing flyer No.8 for SMARTech A (PHA extraction and bio-composites)

Bio-Composites

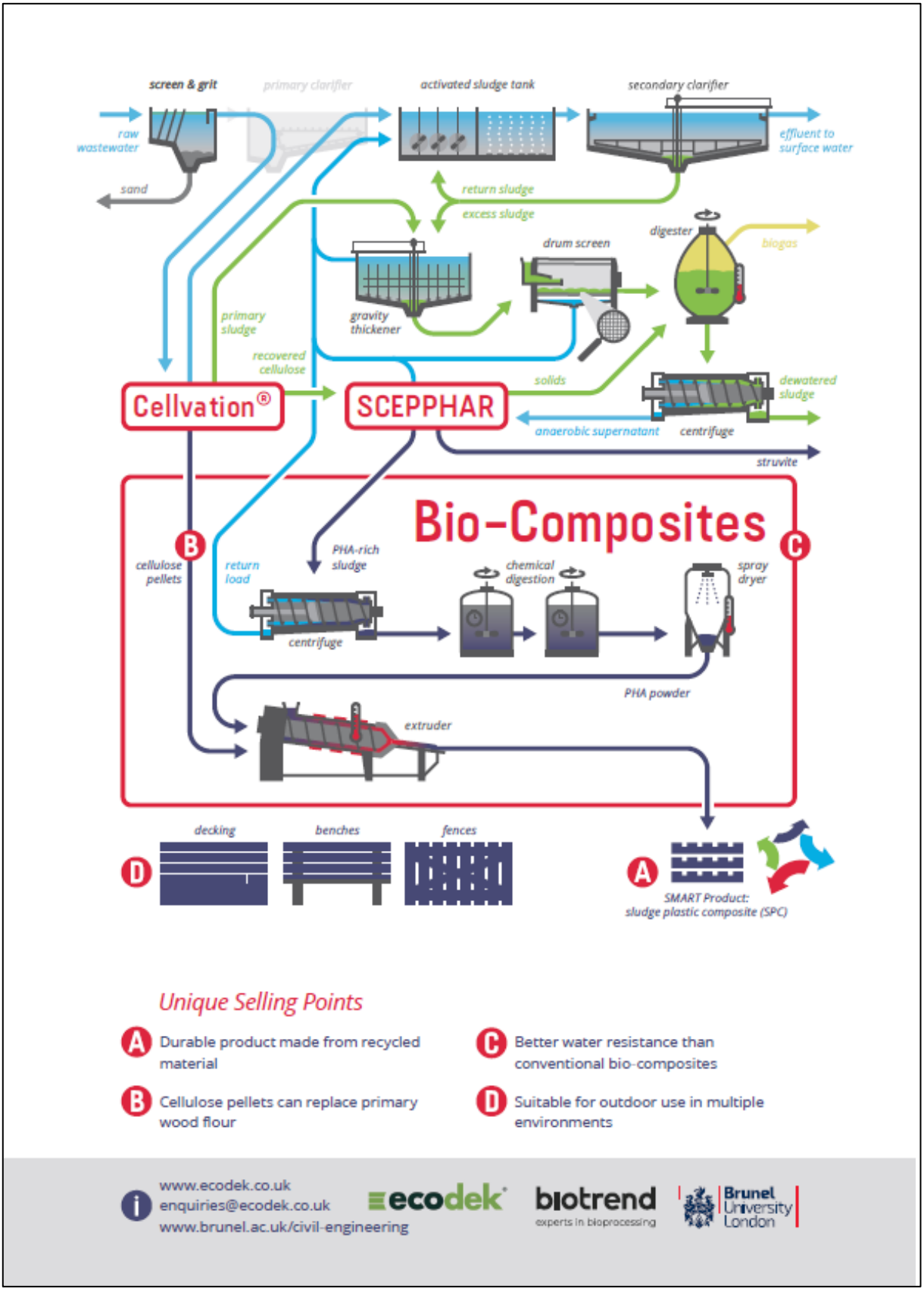
Composite Materials from Recovered Cellulose and PHA

Composite materials based on a combination of biological materials and polymers are widely used in outdoor applications such as benches, fences and decking, amongst others. These bio-composite materials have excellent properties for long-lasting outdoor use and provide good mechanical strength and stability. Usually, they are produced by extrusion of a mixture of wood flour and polymer granulates. Recovered products from municipal wastewater such as cellulose or bioplastic (PHA) can also be used in the production of bio-composites, but these new materials require an adaptation of the existing production process.

Within the SMART-Plant project, different combinations of materials, additives and production conditions have been investigated at lab-scale by Brunel University London to generate high quality bio-composite products using recycled material from the wastewater sector. The bio-composite producer SBPL (Ecodek®) has optimised the production of bio-composites based on recovered cellulose at industrial scale.

WWW.SMART-PLANT.EU

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690323


screen & grit
primary clarifier
activated sludge tank
secondary clarifier
raw wastewater
sand
effluent to surface water
return sludge
excess sludge
drum screen
digester
biogas
gravity thickener
primary sludge
recovered cellulose
Cellvation®
SCEPPHAR
solids
dewatered sludge
anaerobic supernatant
centrifuge
struvite
Bio-Composites
B
cellulose pellets
return load
PHA-rich sludge
chemical digestion
spray dryer
centrifuge
PHA powder
extruder
C
decking
benches
fences
D
A
SMART Product: sludge plastic composite (SPC)
Unique Selling Points
A Durable product made from recycled material
B Cellulose pellets can replace primary wood flour
C Better water resistance than conventional bio-composites
D Suitable for outdoor use in multiple environments
www.ecodek.co.uk
enquiries@ecodek.co.uk
www.brunel.ac.uk/civil-engineering
ecodek
biotrend
experts in bioprocessing
Brunel University London

2.9 Marketing flyer No.9 for SMARTech B (Biodrying and dynamic composting)

Biodrying and Dynamic Composting

Producing biomass fuel or biofertilizer from sewage sludge with low-energy biotechnology

High prices for sludge disposal and goals of the circular economy demand for innovative processes to convert sludge into value-added materials or energy. For this purpose, BETA Tech. Center (TECNIO) from the University of Vic - Central University of Catalonia has developed advanced biodrying and composting processes to recover both energy and nutrients contained in sludge. These processes aim at producing biomass fuels with valuable calorific value and high quality biofertilizers, closing in turn material and energy cycles.

Within the SMART-Plant project, a modular pilot plant for biodrying and composting was operated at the wastewater treatment plant of Manresa (ES). Using an energy-efficient aeration system, the biodrying plant converts cellulosic sludge into a biofuel with moisture content below 40 % and a lower calorific value between 9 and 12 MJ/kg of product. Dynamic composting of P-rich biological sludge yields a stabilised biofertilizer with high content of both phosphorus and nitrogen (> 5 % TS).

WWW.SMART-PLANT.EU

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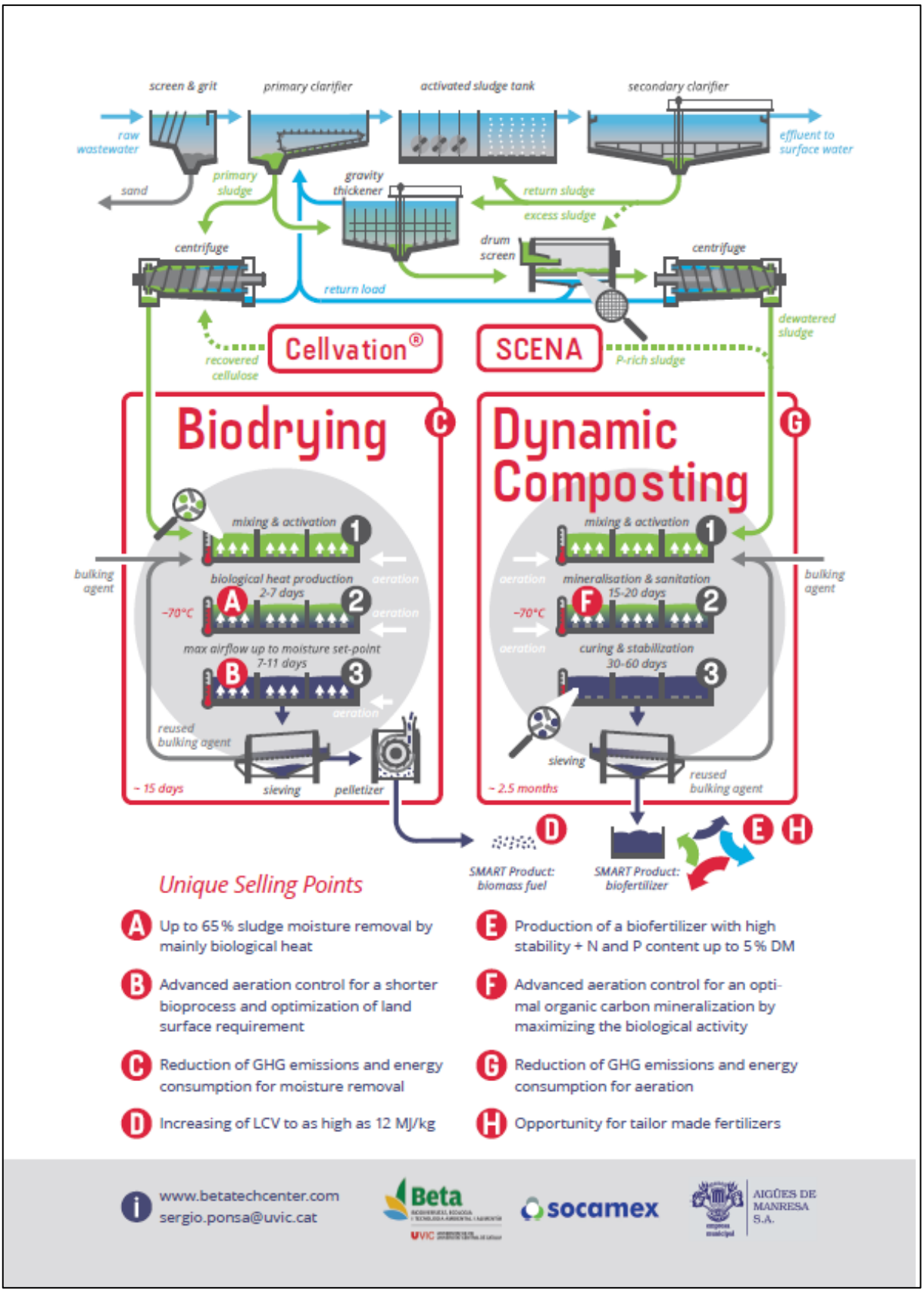
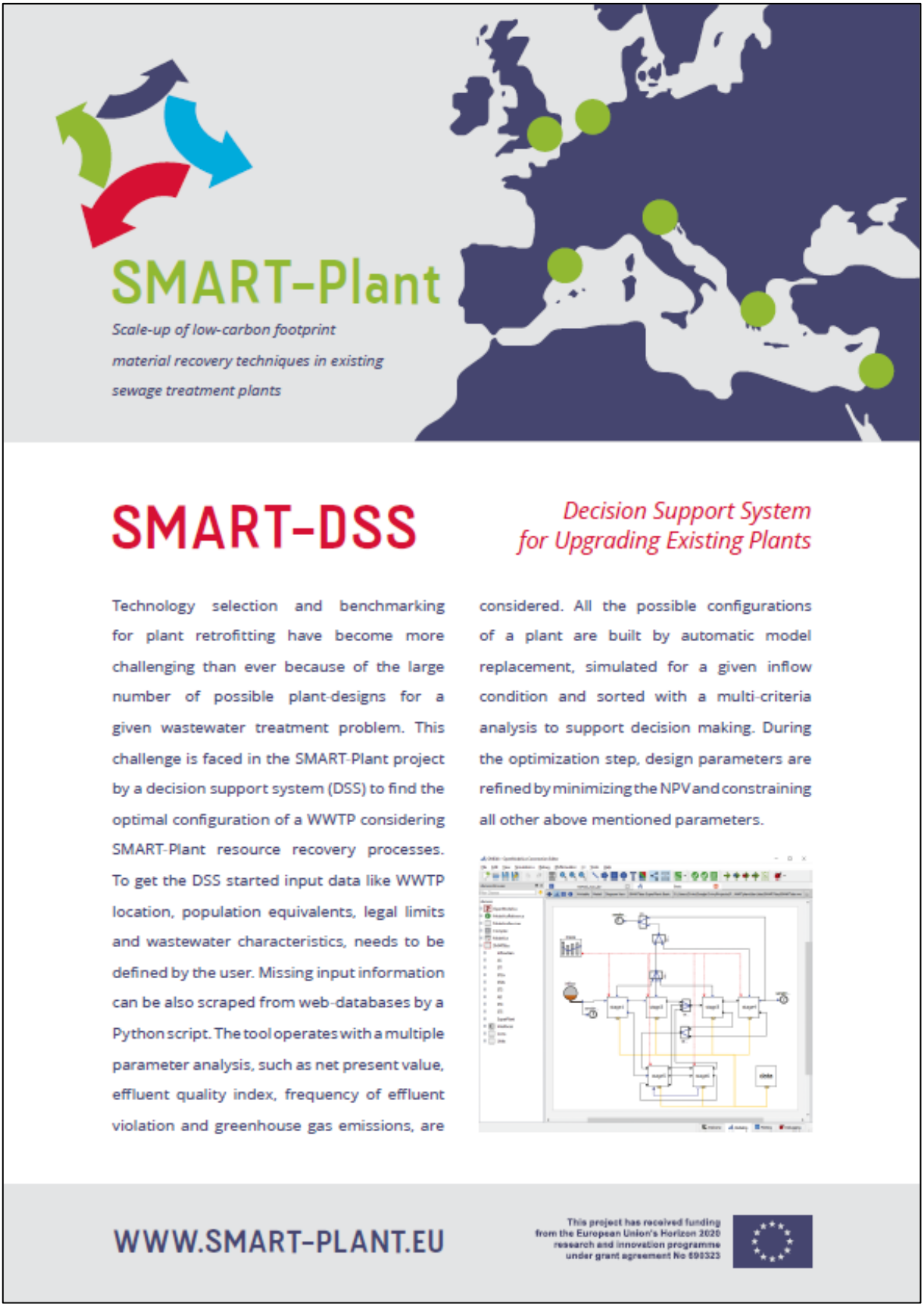
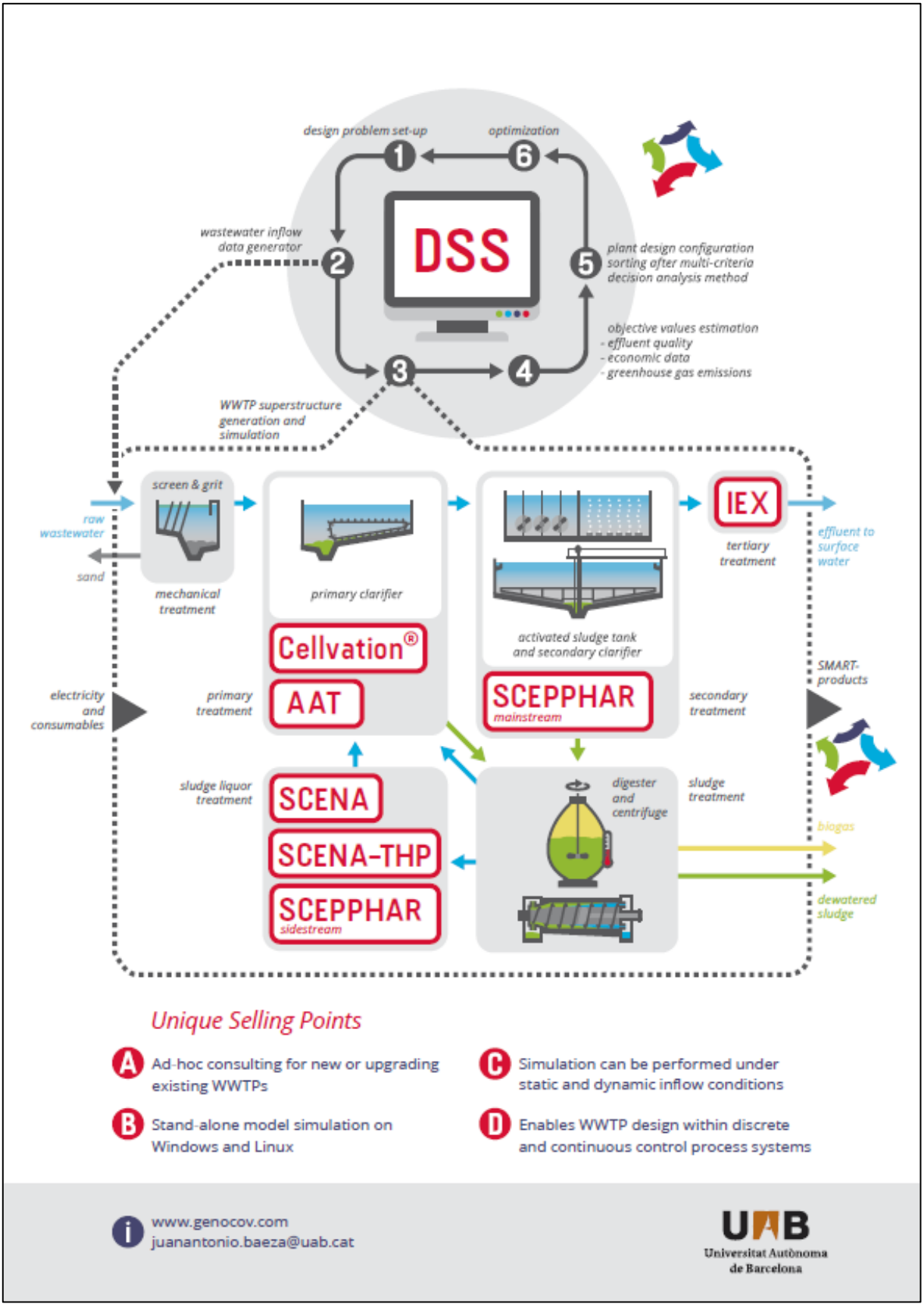
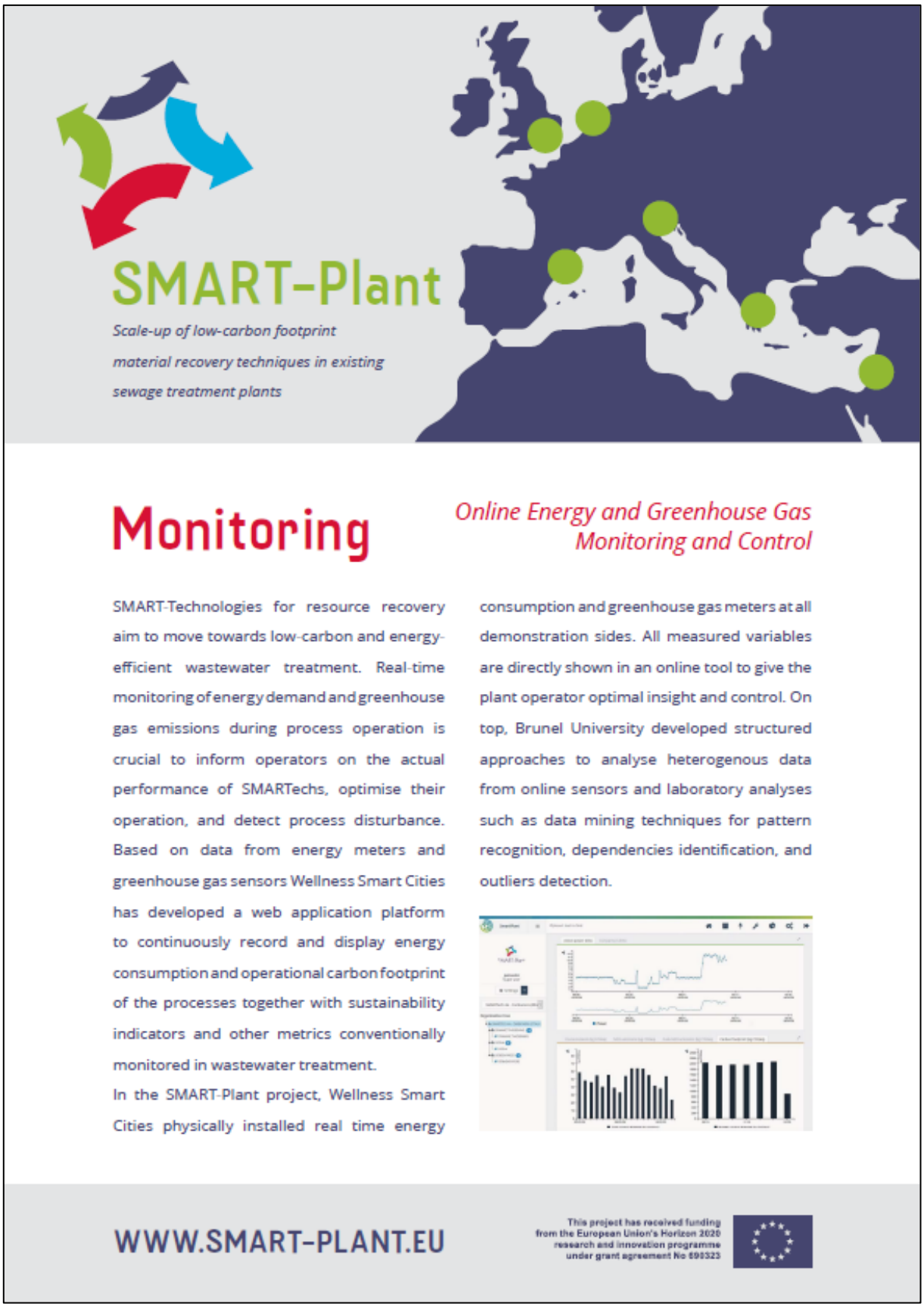

screen & grit
primary clarifier
activated sludge tank
secondary clarifier
raw wastewater
effluent to surface water
sand
primary sludge
gravity thickener
return sludge
excess sludge
centrifuge
drum screen
centrifuge
return load
dewatered sludge
recovered cellulose
Cellvation®
SCENA
P-rich sludge
Biodrying
C
Dynamic Composting
G
mixing & activation
1
bulking agent
biological heat production
2-7 days
aeration
A
~70°C
2
max airflow up to moisture set-point
7-11 days
B
3
reused bulking agent
~ 15 days
sieving
pelletizer
mixing & activation
1
aeration
mineralisation & sanitation
15-20 days
F
~70°C
2
curing & stabilization
30-60 days
3
sieving
reused bulking agent
~ 2.5 months
D
SMART Product: biomass fuel
SMART Product: biofertilizer
E
H
Unique Selling Points
A Up to 65 % sludge moisture removal by mainly biological heat
B Advanced aeration control for a shorter bioprocess and optimization of land surface requirement
C Reduction of GHG emissions and energy consumption for moisture removal
D Increasing of LCV to as high as 12 MJ/kg
E Production of a biofertilizer with high stability + N and P content up to 5 % DM
F Advanced aeration control for an optimal organic carbon mineralization by maximizing the biological activity
G Reduction of GHG emissions and energy consumption for aeration
H Opportunity for tailor made fertilizers
www.betatechcenter.com
sergio.ponsa@uvic.cat
Beta
socamex
AIGÜES DE MANRESA S.A.

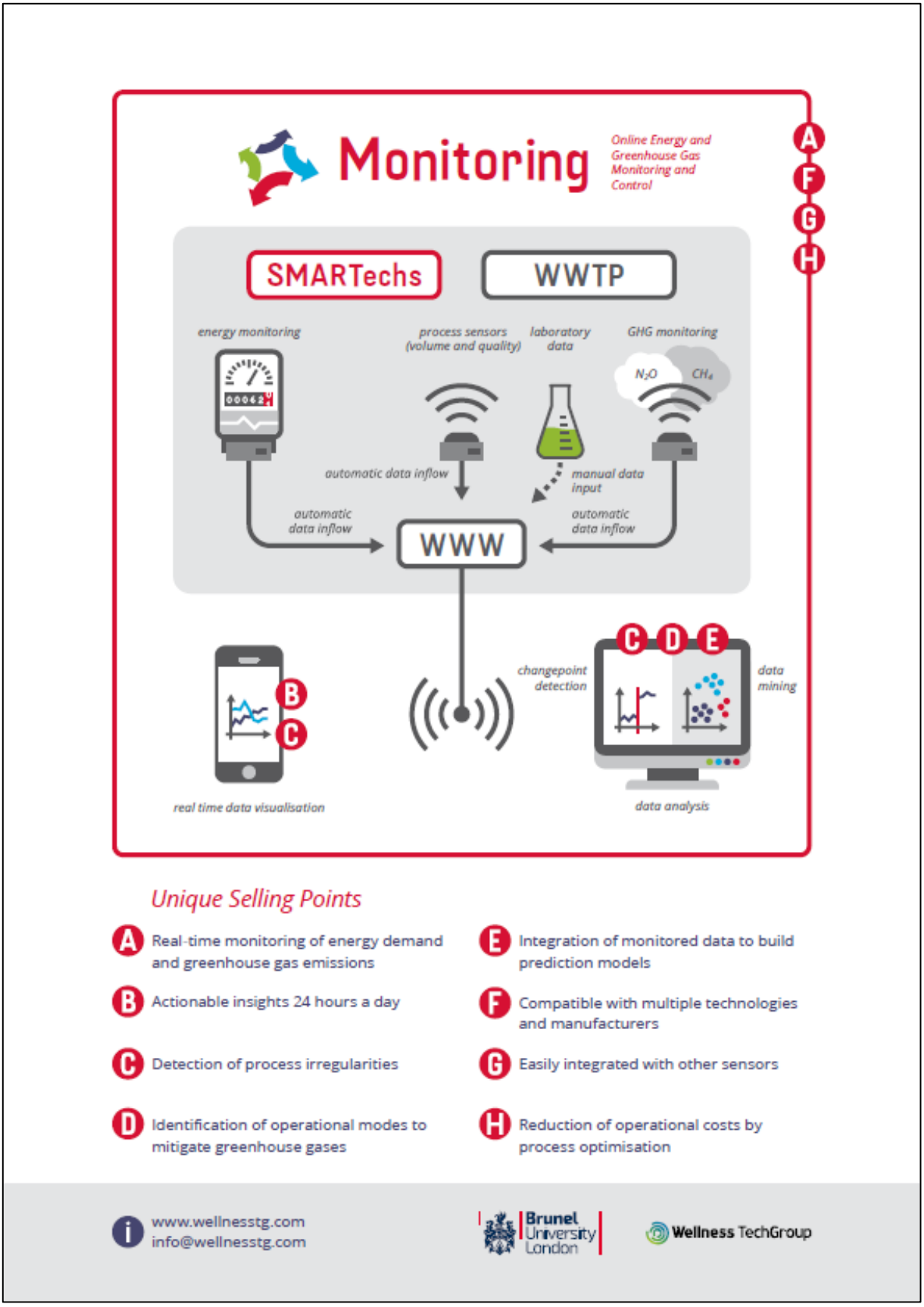
2.10 Marketing flyer No.10 for DSS (Decision support system)




design problem set-up
optimization
DSS
wastewater inflow data generator
plant design configuration sorting after multi-criteria decision analysis method
objective values estimation
- effluent quality
- economic data
- greenhouse gas emissions
WWTP superstructure generation and simulation
screen & grit
raw wastewater
sand
mechanical treatment
primary clarifier
Cellvation®
AAT
primary treatment
activated sludge tank and secondary clarifier
SCEPPHAR
mainstream
secondary treatment
IEX
tertiary treatment
effluent to surface water
SMART-products
electricity and consumables
sludge liquor treatment
SCENA
SCENA-THP
SCEPPHAR
sidestream
digester and centrifuge
sludge treatment
biogas
dewatered sludge
Unique Selling Points
A Ad-hoc consulting for new or upgrading existing WWTPs
B Stand-alone model simulation on Windows and Linux
C Simulation can be performed under static and dynamic inflow conditions
D Enables WWTP design within discrete and continuous control process systems
www.genocov.com
juanantonio.baeza@uab.cat
UAB
Universitat Autònoma de Barcelona

2.11 Marketing flyer No.11 for Monitoring (Online monitoring of energy and GHG)




Monitoring
Online Energy and Greenhouse Gas Monitoring and Control
A
F
G
H
SMARTechs
WWTP
energy monitoring
process sensors (volume and quality)
laboratory data
GHG monitoring
N_2O
CH_4
automatic data inflow
manual data input
automatic data inflow
automatic data inflow
WWW
B
C
C D E
changepoint detection
data mining
real time data visualisation
data analysis
Unique Selling Points
A Real-time monitoring of energy demand and greenhouse gas emissions
B Actionable insights 24 hours a day
C Detection of process irregularities
D Identification of operational modes to mitigate greenhouse gases
E Integration of monitored data to build prediction models
F Compatible with multiple technologies and manufacturers
G Easily integrated with other sensors
H Reduction of operational costs by process optimisation
www.wellnesstg.com
info@wellnesstg.com
Brunel University London
Wellness TechGroup

2.12 Marketing flyer No.12 for SMART Materials (Materials recovered with SMARTechs)

Cellvation®

Cellulose Fluff

- Light-weight structural material
- Hygienically safe (EPA class A)
- Odour-neutral
- Use as insulation material or asphalt binder
- Organic residue < 10 %

Cellulose Pellets

- Dry pellets easy to handle
- Structural material for bio-composites
- Cellulose content: 60-80 %
- Reaching EPA class A rating

SCEPPHAR

PHA-rich Sludge

- PHA-rich organic material
- PHA content < 40 % of dry matter
- Recovery of 1 kg of PHA per pe and year
- Suitable as bio-based ingredient for bio-composites

PHA Powder

- Dry PHA powder
- PHA content > 95 %
- Pure product with high market value
- Suitable for bio-composite production

Bio-Composites

Bio-Composites

- Bio-composite for outdoor use
- Suitable for benches, fences and decking
- High water resistance and stability
- Low potential for slip
- Made from recycled materials such as r-HDPE

UNIVERSITÀ di VERONA
UNIVERSITÀ POLITECNICA DELLE MARCHE
UAB Universitat Autònoma de Barcelona
biotrend experts in bioprocessing
ecodek salsnes filter

2.13 Marketing flyer No.13 for SMART Nutrients (Nutrient products recovered with SMARTechs)

IEX

Calcium Phosphate

- High purity product with 13 % P content
- Low impurities (Al < 0.4 mg/g, heavy metals < 0.1 mg/g)
- Used as a raw material for fertiliser, pesticide and chemical production

Aqueous Ammonia and Ammonium Sulphate

- Aqueous ammonia (3 - 7 g N/ L) as raw material for plastic, textile and cleaning products
- Ammonium sulphate (21 % N) as raw material for fertiliser and in chemical production
- Low impurities (heavy metals < 5 µg/L)

Spent Zeolite Resin

- IEX media rich in potassium and ammonia that can be used as a conditioner in composting
- Direct use as slow release fertiliser in agriculture, forestry, energy crops and gardening

SCEPPHAR

Struvite

- Use as a feedstock in fertiliser industry
- Direct use in agriculture, forestry, energy crops and gardening
- Slow-release fertiliser
- High purity and safe for the environment

Dynamic Composting

Biofertiliser

- Direct and safe use in agriculture
- Bio-based fertiliser: nutrient rich stabilised organic amendment
- Demonstrated high agronomic quality equivalent to mineral fertiliser

www.cranfield.ac.uk/smartplant
www.innoven.it
www.betatechcenter.com
www.genocov.com

Cranfield University

Università Politecnica delle Marche

Università di Verona

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Beta