



**POWERSTEP**

## **WP6 – Dissemination and valorization**

### ***D 6.6: Knowledge transfer website***



The project "Full scale demonstration of energy positive sewage treatment plant concepts towards market penetration" (POWERSTEP) has received funding under the European Union HORIZON 2020 – Innovation Actions - Grant agreement<sup>o</sup> 641661

<b>Deliverable 6.6</b>	<b>Knowledge transfer website</b>
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Website:	www.powerstep.eu
Abstract	Deliverable 6.6 is the third and follow-up development phase of the POWERSTEP website. It is aimed at specialist community, consisting of WWTP operators and planners and scientific community. The website showcases, in a structured way, a number of approaches and technologies that improve the energy efficiency of wastewater treatment plants and highlights case study results and best practices.

### Dissemination level of this document

<input checked="" type="checkbox"/>	PU	Public
<input type="checkbox"/>	PP	Restricted to other programme participants (including the Commission Services)
<input type="checkbox"/>	RE	Restricted to a group specified by the consortium (including the European Commission Services)
<input type="checkbox"/>	CO	Confidential, only for members of the consortium (including the European Commission Services)

### Versioning and Contribution History

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	2018-06-06	Boris Lesjean (Veolia Germany)	1 <sup>st</sup> review
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	2018-06-11	Boris Lesjean (Veolia Germany))	2 <sup>nd</sup> review
v.03	2018-06-12	Riikka Pohjankoski (ARCTIK)	3 <sup>rd</sup> Draft
	2018-06-14	Christian Loderer (KWB)	3 <sup>rd</sup> review
	2018-06-15	Riikka Pohjankoski (ARCTIK)	Final version based on feedback Christian Loderer



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## Executive summary

The objective of the third development phase of the POWERSTEP website is to increase the awareness of the concept of energy-positive wastewater treatment plant (WWTP) and related approaches and technologies among the scientific community and WWTP operators and planners.

The website communicates about the relevant processes, purposes, approaches and technologies in a structured and detailed way. While technical in content, the website uses images and interactive elements (e.g. pop-up windows), and provides links to further reading, in order to enhance the user-friendliness of the website.

A new entry door on the POWERSTEP website's landing page has been activated to offer a direct access to the knowledge transfer platform. The website will stay alive for a minimum of two years after the end of the project and various communication actions have been undertaken to ensure that the website will become known among and will be used by the target audiences (social media, conferences, etc.).



## 1. Introduction

This document is the final version of Deliverable 6.6 – Knowledge transfer website. It lays out the features of the 3<sup>rd</sup> portal of the POWERSTEP website aimed at specialist stakeholders in the water sector (utilities, water industry, scientific community).

The rest of the document is organised as follows:

- First, we recall the objectives of the project and the dissemination support as well as the role of the POWERSTEP knowledge transfer website in the overall communication and website development strategy.
- Secondly, we explain the process of building the website and the main features of the portal.
- Finally, we shortly outline how we aim to ensure the exploitation of the website.



## 2. Objective of the project<sup>1</sup>

The POWERSTEP project is built to achieve a real paradigm shift in wastewater treatment processes: to convert sewage treatment plants (STEPS) into power production facilities (POWER) while still achieving a high effluent quality for the treated wastewater.

### 2.1. Objective of WP6: Dissemination and communication support

As indicated in the Deliverable 6.1 "Target-oriented communication plan"<sup>2</sup> ARCTIK follows a three-step dissemination strategy. The aim of the **first step**: "Information and knowledge management: set the foundation and process" (M1 – M36) has been to install, develop and spread the branding and values of POWERSTEP as a community of organisations working on the future wastewater treatment plant (WWTP). The purpose has also been to ease the exchange of information and knowledge between the different partners. The **second phase**, "Know-how translation and targeted brokerage" (M1 – M36) has aimed at establishing a strong relationship with primary target groups, whilst the **third phase**, "Large spectrum communication" (M18-M36) has promoted POWERSTEP as a key breakthrough of innovation at a larger scale, to reach the public and media interest.

The Deliverable 6.6 "Knowledge transfer website" fits into the second step of the dissemination strategy by providing a platform for know-how translation between experts in the water sector.

<sup>1</sup> Description of Action (DoA)

<sup>2</sup> Deliverable 6.1 "Target-oriented communication plan submitted on Cordis in November 2015.



### 3. Deliverable 6.6: Knowledge transfer website

#### 3.1. POWERSTEP website: recalling the 3 portals

The development of the POWERSTEP website is based on three integrated and incremental steps that have been designed to follow the overall progress of the project activities:

- **Institutional website (D6.2)**: the main knowledge hub containing information about the project (description, objectives, partners, Work packages, case studies, videos, news and events...) – published in March 2015;
- **Innovative website (D6.4)** – A public oriented website explaining the concept of an energy positive wastewater treatment plant. - published in February 2017;
- **Knowledge transfer website (D6.6)** providing the information on the technologies and concepts for possible market replication – published in May 2018.

#### 3.2. POWERSTEP communication funnel

The creation of the knowledge transfer website (D6.6) helps to complete the general POWERSTEP website development strategy:

- **The motion design video** introduces the POWERSTEP concept of energy-positive WWTP. It also serves as an in-bound marketing tool to attract all types of public to the website(s);
- **The institutional website (D 6.2)** presents POWERSTEP to main stakeholders;
- **The interactive website (D 6.4)** presents the concept of energy-positive WWTP in more detail and will reach the most interested audiences, but also the general public and media;
- **The knowledge transfer website (D 6.6)** presents POWERSTEP technologies to scientific experts, WWTP operators and planners.

As such, each of these on-line communication tools is aimed at a specific target, ranging from a wide audience (i.e. general public) to the expert community (i.e. scientific experts).



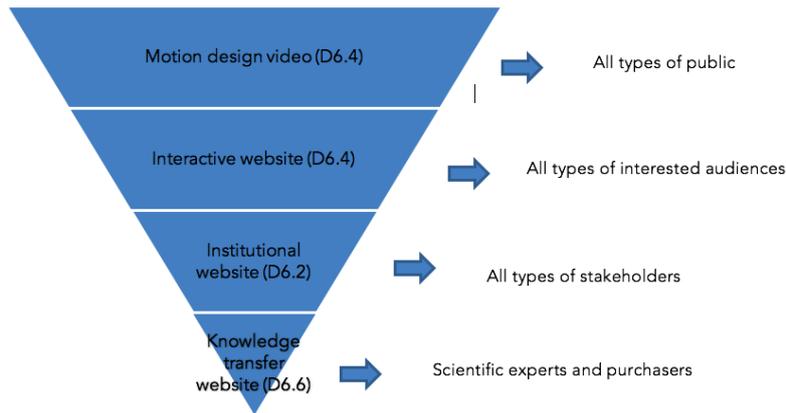


Figure 1: POWERSTEP website’s communication funnel

### 3.3. Knowledge transfer website: process

To ensure a logical way of presenting all information, ARCTIK and KWB, together with consortium partners, worked out a structure for implementing the information online (see Figures below). This consisted of looking into all interlinkages between the different topics and areas to be showcased (processes, purposes, approaches, technologies, case studies) and laying out in detail how they can be presented in a user-friendly and logical way to the web visitors.



Figure 2: POWERSTEP structure based on technologies



By purpose	Level 1: Purpose	Level 2: Choose approach	Level 3: Choose technology	Level 4: choose case study	
access: click on respective button	Reduce electricity consumption	Enhanced C extraction	CEPT		
			DAF	Westewitz, Sjölanda, ...	
		Low-carbon N removal		Microsieve	Westewitz
				Advanced control	Westewitz
				Mainstream Anammox (1-stage)	Sjölanda, ...
	Increase energy production	Enhanced C extraction		Microsieve	Westewitz, Sjölanda, ...
				DAF	
		Improved digestion		Thermal hydrolysis processes	
				Cascade digestion	
				...	
	Utilize unused energy	Heat-to-power	SRC/ORC	Brunschweig, ...	
			Thermoelectric generators		
		Power-to-gas	Biological methanation	Avedore, ...	
	Use dynamic energy market	SmartGrid		Catalytical methanation	
				Optimize electricity use	
				Load shifting	
	Recover nutrients	Sidestream N recovery		Load balancing market	
				Membrane stripping	Altenhein
	More ...?				

Figure 3: POWERSTEP structure based on purpose



By location	Level 1: by country	Level 2: choose case study	Level 3: choose approach	Level 4: related technology
access: click on map	Germany	Westewitz	Enhanced C extraction	Microsieve
			Low-energy N removal	Advanced control
		Brunschweig	Heat-to-power	Thermoelectric generators
		...	SmartGrid	Optimize electricity use
			Nitrogen recovery	Membrane stripping
	Switzerland	Altenhein		
		...		
	Austria	Kirchbichl	Nitrogen removal	Nitritation/Denitritation
		...		
	Sweden	Sjölanda	Enhanced C extraction	Microsieve
			Low-energy N removal	Mainstream Anammox (2-stage)
		...		
	Denmark	Avedore	Power-to-gas	Biological methanation
		...		

Figure 4: POWERSTEP structure based on location

ARCTIK created a detailed website wireframe (Annex 1) and website mock-ups (Annex 2), which were implemented by ARCTIK's web developer. The website has been developed as an individual entity, but it is linked to the other POWERSTEP web pages via a shared landing page (Figure 5).



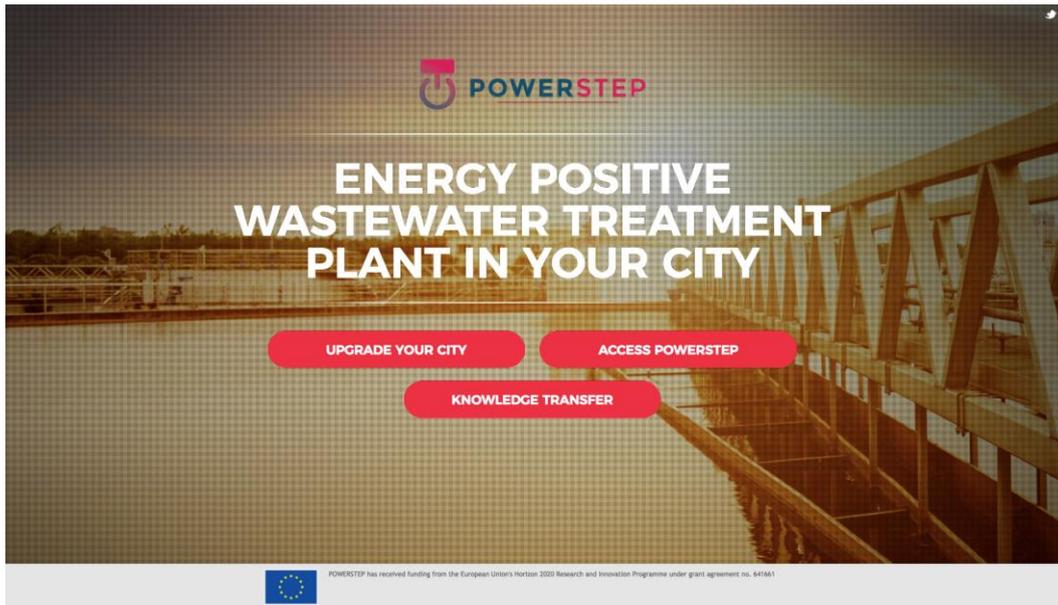


Figure 5: POWERSTEP landing page with 3 entry doors

The content for the website was drafted and collected by KWB, with consortium partners providing inputs on specific technologies and case studies. KWB, together with ARCTIK, took care of the final editing of the content provided.

### 3.4. Knowledge transfer website: main features

The knowledge transfer website provides information on:

- 7 wastewater treatment processes
- 5 purposes for an energy-positive wastewater treatment plant
- 10 approaches
- 24 technologies
- 6 case studies showcasing best practices

The home page of the website features three main sections:

- Illustration of an energy-positive WWTP
- A list of five purposes for an energy-positive WWTP
- An interactive map with case studies

Each of these sections contains interactive elements (clickable images, clickable links) which allow the web visitor to continue browsing the website and to access further information.

For the first two sections, pop-ups are used to display for the visitor further information and to provide further options to click on (Figure 6).



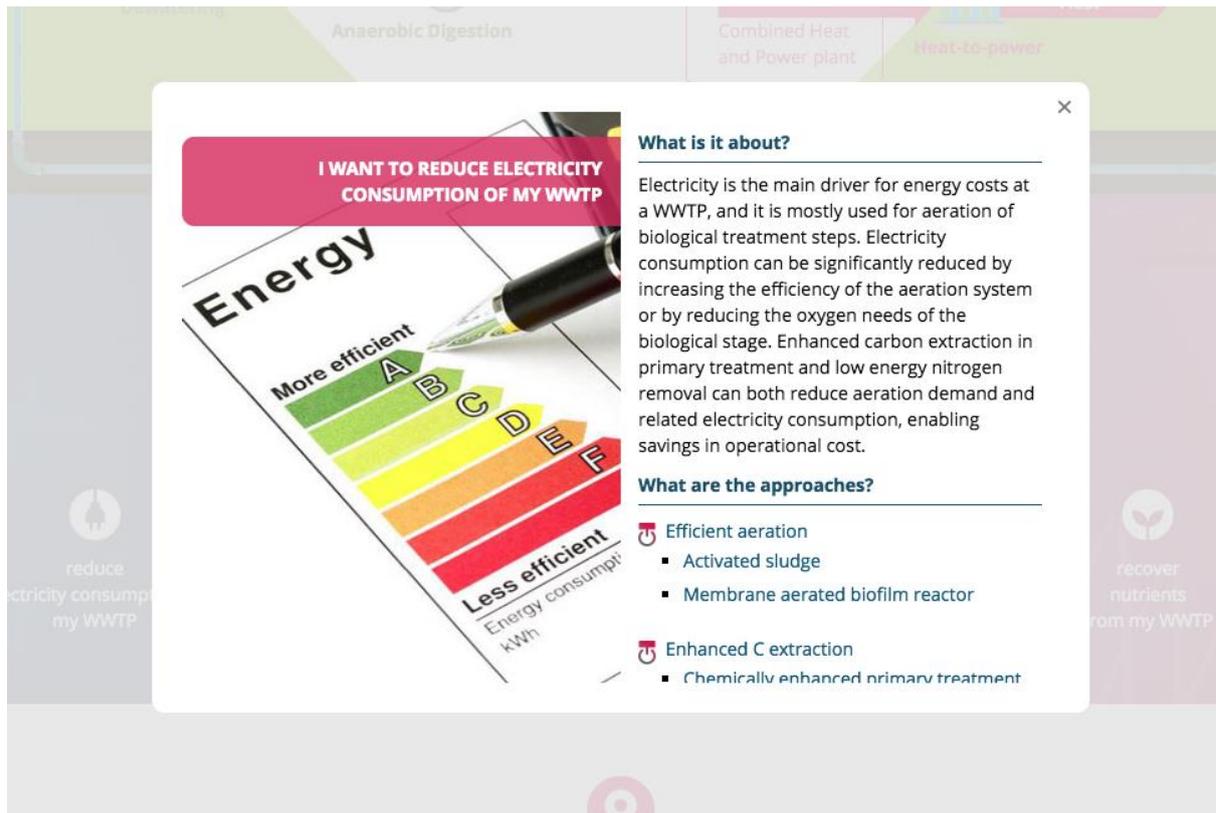


Figure 6: Example of a pop-up

For each process and purpose, a specific page has been created, which explains the process/purpose approaches and/or technologies (Figure 7).

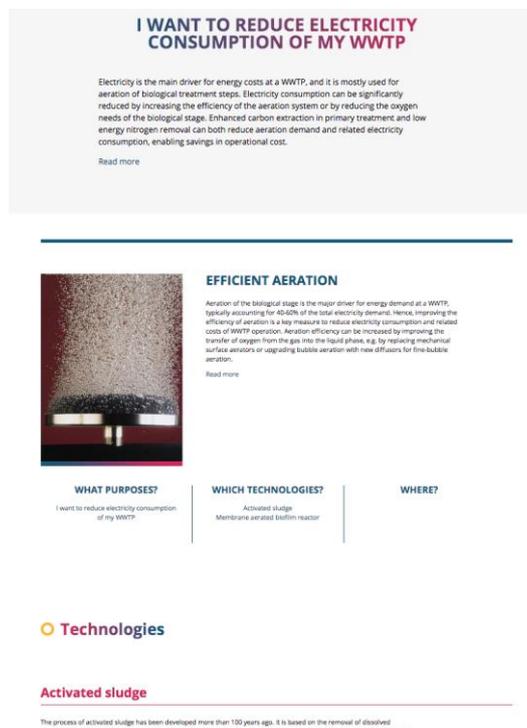


Figure 7: Example of a page



By choosing to click on one of the locations on the map (3<sup>rd</sup> main section on the home page), the web visitor is directly taken to a section where the energy-positive WWTP operations of the plant in question are explained (Figure 8).



FIND THE DIFFERENT ENERGY-POSITIVE WWTP

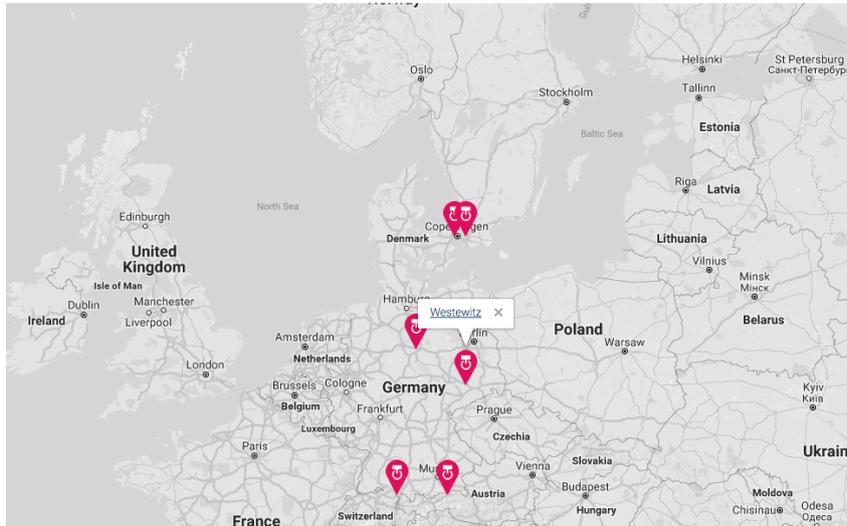


Figure 8: Interactive map

More generally, the website has been designed in such a way that each section on the website allows the visitor to directly and easily access other information related to a specific process, purpose, approach, technology, or case study. In other words, the different sections and related topics have been linked together through clickable links and pop-up elements. For example, a person reading about the Nitrogen removal approach can easily continue reading about the purpose for which this approach is used, which technologies are used and where this approach is being implemented. This has been realised using hyperlinks and anchors on the website (Figure 9).





### N REMOVAL

Nitrogen in sludge dewatering effluent represents a highly concentrated sidestream at a WWTP, which is usually recycled to the inlet of the plant and contributes significantly to the total nitrogen load of the mainline (up to 20%). This sidestream can be separately treated for N removal using different biological or physico-chemical processes.

[Read more](#)

#### WHAT PURPOSES?

I want to reduce electricity consumption of my WWTP

#### WHICH TECHNOLOGIES?

Deammonification  
Moving Bed Bioreactor (MBBR)  
Nitrification/Denitrification

#### WHERE?

Kirchbichl: full-scale nitrification in sidestream

**Figure 9: Interlinkages between different sections on the website**

Similarly, to give another example, when reading about a case study, the web visitor can easily access information about the related purposes, approaches and technologies. Whenever relevant, further links to reports and websites are also provided (Figure 10).



### KIRCHBICHL, Austria

The WWTP Kirchbichl treats municipal wastewater for 100,000 pe. The process consists of mechanical treatment and a two-stage activated sludge process with a high-load stage for BOD removal and low-load stage for nitrification. Sludge is digested on-site, dewatered, composted and disposed in agriculture.

[Read more](#)

[Powerstep](#)

[Full-scale results of side-stream nitrification](#)

[Full-scale results of sidestream membrane stripping](#)

#### WHAT PURPOSES?

I want to reduce electricity consumption of my WWTP

I want to increase energy production of my WWTP

#### WHICH APPROACHES?

Sidestream N removal or recovery

#### WHICH TECHNOLOGIES?

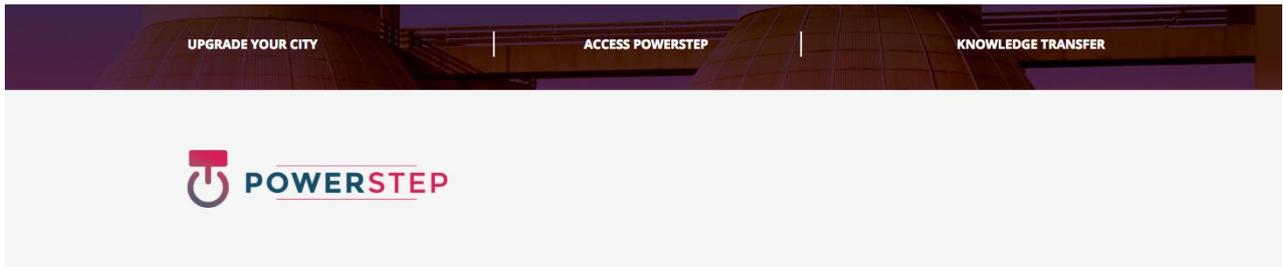
Nitrification

Two-stage activated sludge

**Figure 10: Interlinkages between different sections on the website**

The purpose is to make the overall experience informative while keeping the website dynamic and interactive. Visitors are also offered the possibility to access the institutional website as well as the interactive/innovative website (Figure 11) from the knowledge transfer website (Figure 11).





### ENERGY POSITIVE WASTEWATER TREATMENT PLANT

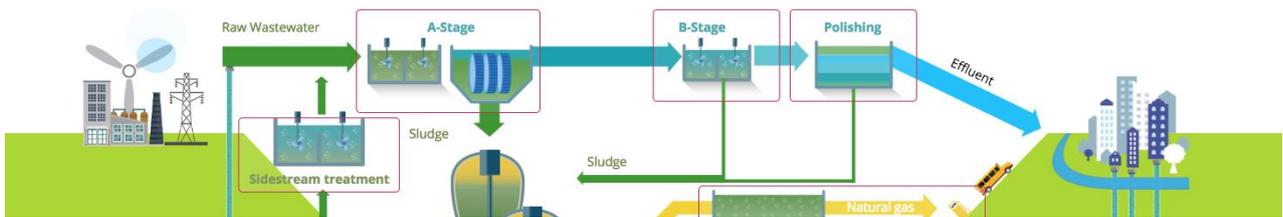


Figure 11: Menu to access other POWERSTEP web portals

### 3.5. Dissemination and exploitation activities

Since its publication in May, the website has been promoted via social media (Figure 12) as well in conferences and via partners' networks. In addition, a news item (Figure 13) and a banner (Figure 14) to promote the new website have also been published on the institutional website of POWERSTEP in order to increase the visibility of the new portal among visitors of this website.



Figure 12: Example of a social media post



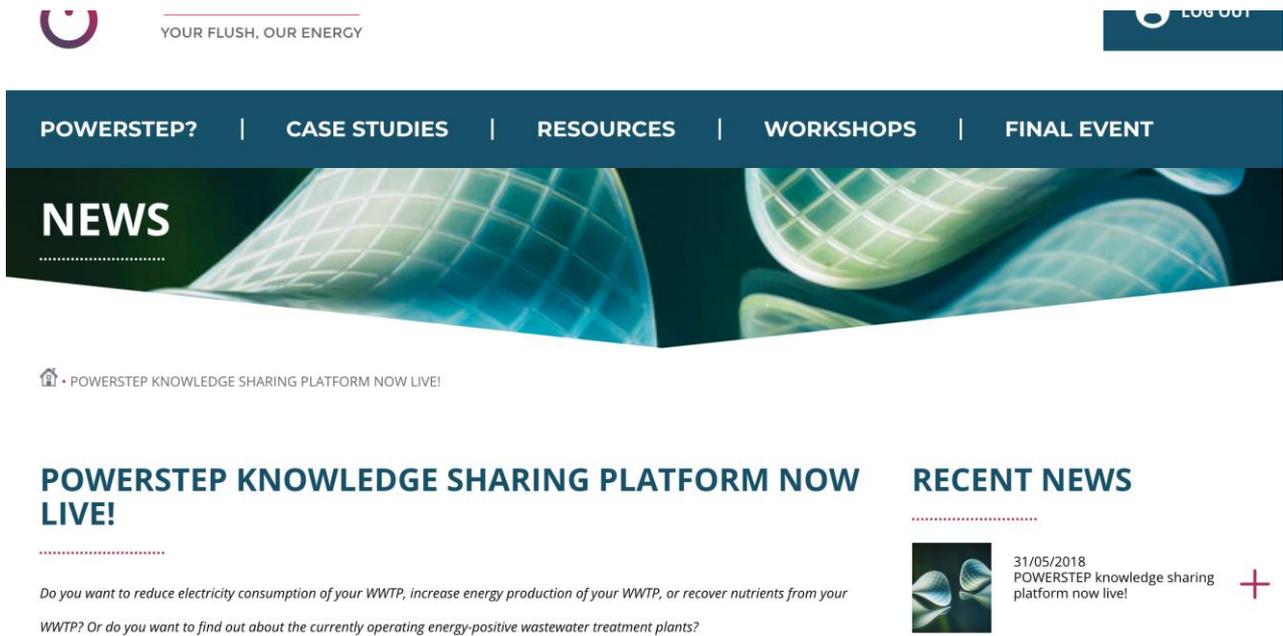


Figure 13: News on POWERSTEP institutional website

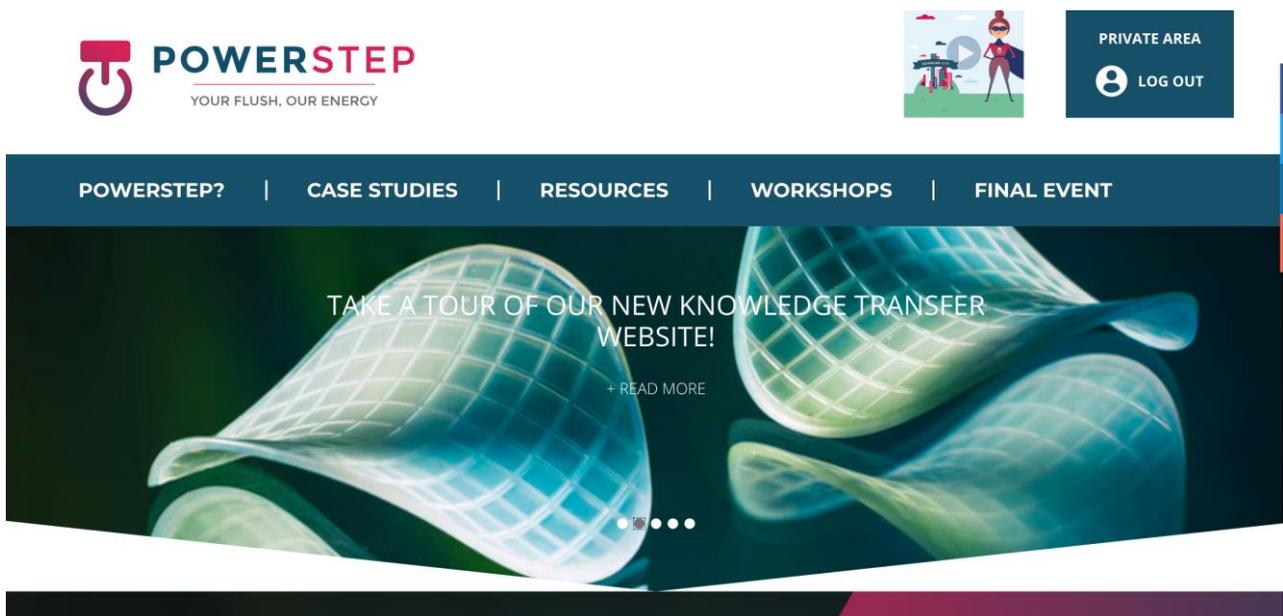


Figure 14: Banner on POWERSTEP institutional website

The website will be kept alive for a minimum of 2 years after the end of the project to ensure that it reaches a maximum audience and remains available for future exploitation by the water expert community. A developed template can be used by different actors in the field to be part of this "knowledge-transfer" webpage. The webpage should finally be a support tool for operators to get an overview on actual activities in their field as well as should be a support for starting decision on how to improve their own WWTP.



# Annex 1 – Website wireframe

Bookmarks

- Entry door
- Level #1 - main page
- Level #1 - main page, part 2 with pop-ups
- Page 1.1
- Page 2.1
- Page 3
- Page 4 - list of approaches
- Page 5 - list of technologies

Level #1 - main page 2 / 8

Scroll-down page with anchors

1 Technology transfer

2 Choose your option to become energy positive

3 Spot it!

1

POWERSTEP schema  
(from interactive website)

Anchor

2

Your options for an energy-positive WWTP

I want to reduce electricity consumption of my WWTP	I want to increase energy production of my WWTP	I want to use wasted unavoidable energy at my WWTP	I want to use the dynamic energy market at my WWTP	I want to recover nutrients of my WWTP
---	---	--	--	--

Anchor

3

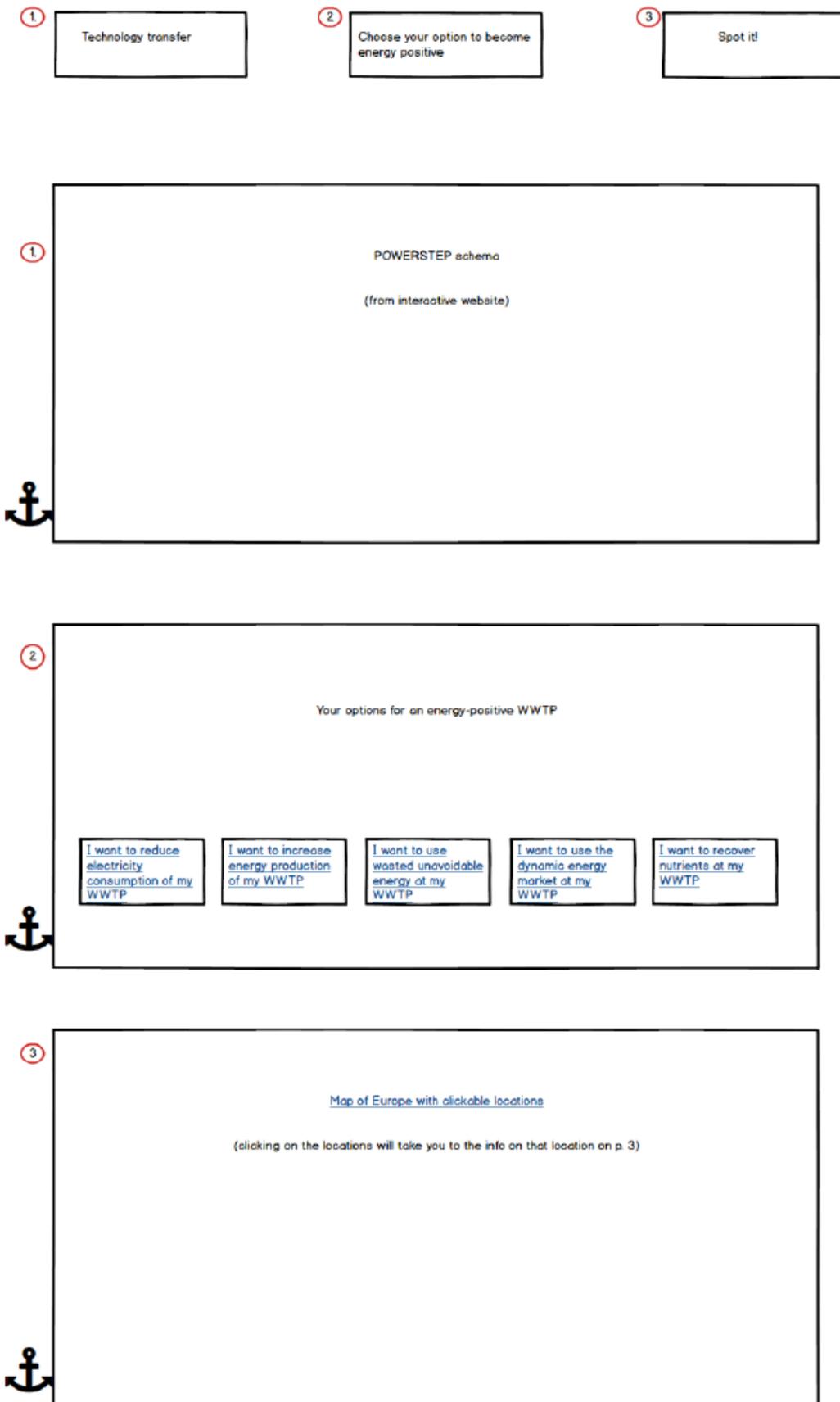
[Map of Europe with clickable locations](#)

(clicking on the locations will take you to the info on that location on p 3)

Anchor



Scroll-down page with anchors



This is the same main page as the previous one but illustrates the different pop-up windows which appear when you click the links in the three different sections (eg in the schema or select one of the 5 options to become energy-positive or click on the map)

Scroll-down page with anchors



(This is a pop-up window where some text will appear about the "Process" and you can click on one of the relevant Technologies => clicking these takes you to a new page (p. 11, 12, ... titled according to the Process) and on this page (using an anchor) to the section dedicated to the Technology, e.g. "Clarifier" - See ex. 4.1 of the wireframe)

Primary treatment  
(text)  
(text)

- Clarifier
- CPT
- DAF
- Microsieve

POWERSTEP schema  
(from interactive website)

Primary treatment (clickable on schema)

(This is a pop-up window where some text will appear about the purpose and you can click on one of the related approaches or technologies => clicking these takes you to a new page (p. 2.1 - 2.5, titled according to the purpose) and within these pages (using an anchor) to the section dedicated to the approach, e.g. "Enhanced carbon extraction" - See ex. p. 2.1 of the wireframe)

Reduce electricity consumption  
(text)  
(text)

- Enhanced carbon extraction
  - CPT
  - DAF
  - Microsieve
- Low-carbon nitrogen removal
  - Advanced control
  - Nitrates Anammox (1-stage)
  - Sulfur Anammox (2-stage)
- Effluent recirculation
  - Membrane aerated biolift reactor

Your options for an energy-positive WWTP

I want to reduce electricity consumption of my WWTP

I want to increase energy production of my WWTP

I want to use wasted unavoidable energy at my WWTP

I want to use the dynamic energy market at my WWTP

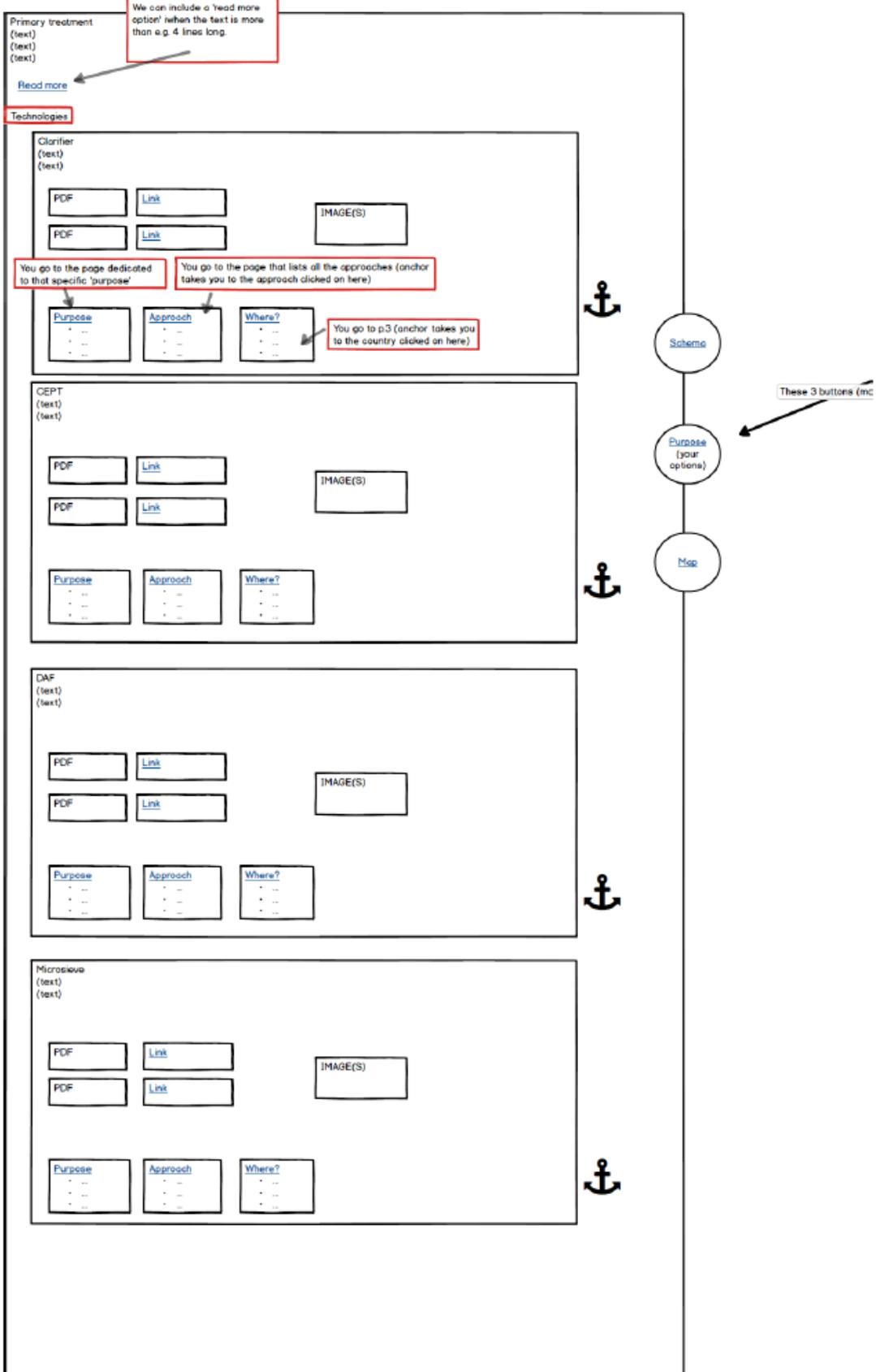
I want to recover nutrients at my WWTP

Map of Europe with clickable locations  
(clicking on the locations will take you to the info on that location on p. 3)



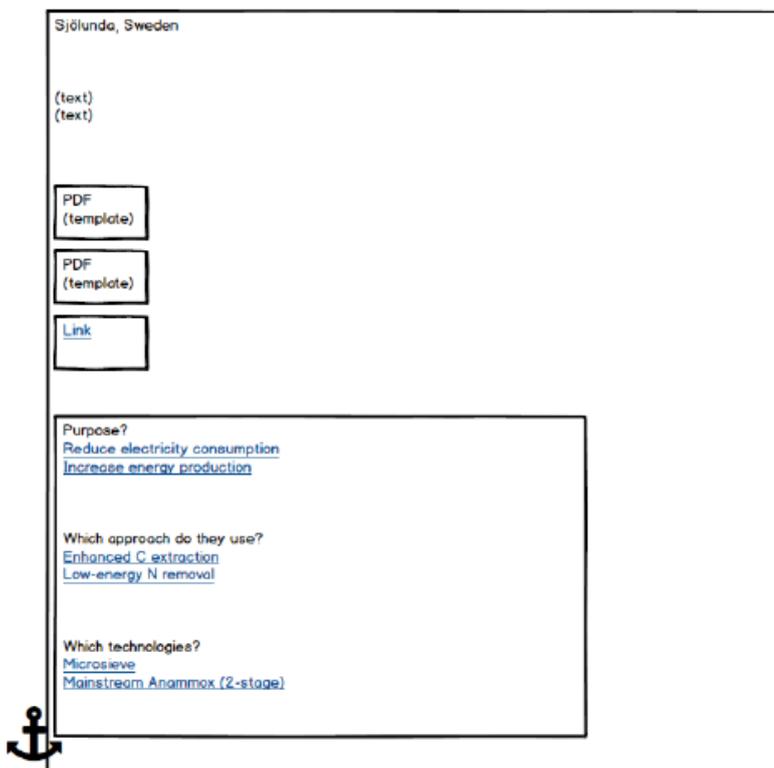
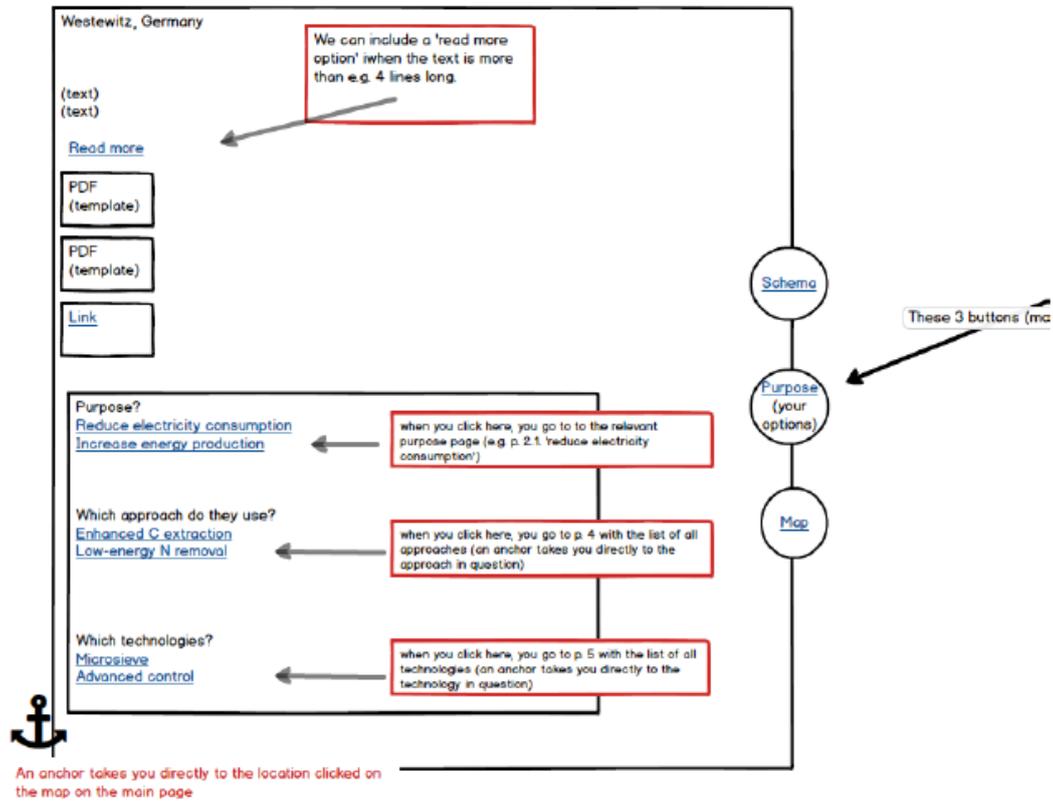
This page design will be the same for all the Processes (Primary treatment, Secondary treatment, Tertiary treatment, Nitrogen removal, Valorization on site, Grid gas production, Smart grid). This example illustrates a page created for 'Primary treatment' (the others will follow the same logic).

You reach this page by clicking on the schema on the main page and from there you click first on one of the Processes (e.g. primary treatment) from the schema and in the pop-up box that opens, you can click on 'Primary treatment' or on one of the Technologies (related to the selected Process). An anchor takes you directly to the Technology clicked.





You reach this page by clicking on a location on the map on the main page. An anchor takes you directly to the location clicked on.



:



This page lists all the approaches in alphabetical order (in total, 11 approaches)

Efficient navigation  
User1  
User2

[Read more](#)

PDF  List  PHASED

PDF  List

What purpose? What technologies? What?

We can include a third menu option when the text is more than a page or two long



Enhanced C-entruction  
User1  
User2

PDF  List  PHASED

PDF  List

What purpose? What technologies? What?



These 3 buttons (moving along as you scroll the page) take you back to the three options on the right

Hard to Power  
User1  
User2

PDF  List  PHASED

PDF  List

What purpose? What technologies? What?



Improved digestion  
User1  
User2

PDF  List  PHASED

PDF  List

What purpose? What technologies? What?



Learn about 10 network  
User1  
User2

PDF  List  PHASED

PDF  List

What purpose? What technologies? What?



Learn about 10 network  
User1  
User2

PDF  List  PHASED

PDF  List

What purpose? What technologies? What?



Navigation necessary  
User1  
User2

PDF  List  PHASED

PDF  List

What purpose? What technologies? What?



Navigation necessary  
User1  
User2

PDF  List  PHASED

PDF  List

What purpose? What technologies? What?



Power-to-go  
User1  
User2

PDF  List  PHASED

PDF  List

What purpose? What technologies? What?



Subtle about 10 necessary  
User1  
User2



This page lists all the technologies in alphabetical order (in total 30 technologies).

Activated sludge  
(text)  
(text)

[Read more](#)

PDF

Link

IMAGE(S)

PDF

Link

[What purposes?](#)

· ..

· ..

[Which processes?](#)

· ..

· ..

[Where?](#)

· ..

· ..

Advanced control  
(text)  
(text)

PDF

Link

IMAGE(S)

PDF

Link

[What purposes?](#)

· ..

· ..

[Which processes?](#)

· ..

· ..

[Where?](#)

· ..

· ..

Air stripping

Biological methanation

Cascade digestion

Catalytical methanation

CEPT

CHP plant

Clarifier

DAF

Deammonification

Gas boiler

Gas scrubbing

Load balancing market

Load shifting

Mainstream Anammox (1-stage)

Mainstream Anammox (2-stage)

MBBR

Membrane aerated biofilm reactor

Membrane stripping

Microgas turbine

Microcieve

Nitrification/Denitrification

Optimize electricity use

Ozonation

Sand filter

SRC/DFC

Thermal hydrolysis processes

Thermoelectric generators

The technologies to be listed in alphabetical order

⋮

Two-stage activated sludge  
(text)  
(text)

PDF

Link

IMAGE(S)

PDF

Link

[What purposes?](#)

· ..

· ..

[Which processes?](#)

· ..

· ..

[Where?](#)

· ..

· ..

Schema

Purpose  
(your options)

Map

We can include a 'read more option' when the text is more than e.g. 4 lines long.

These 3 buttons (mc)

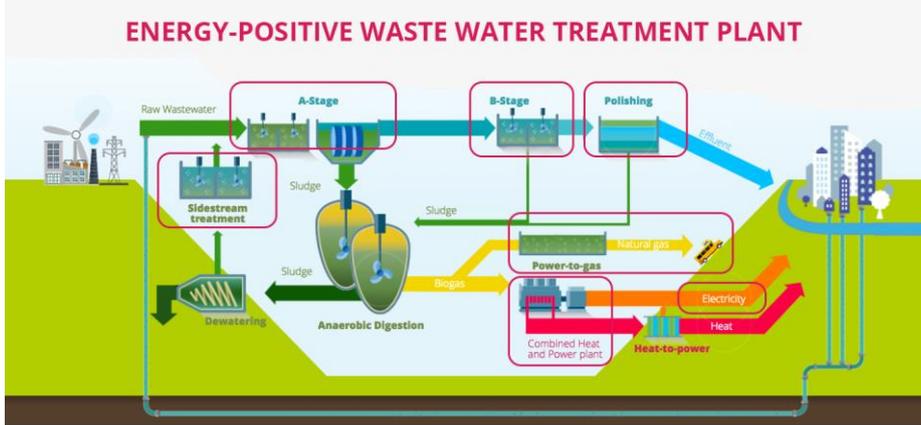


## Annex 2 – Website mock-ups

UPGRADE YOUR CITY | ACCESS POWERSTEP | KNOWLEDGE TRANSFER



### ENERGY-POSITIVE WASTE WATER TREATMENT PLANT



### YOUR OPTIONS FOR AN ENERGY-POSITIVE WWTP

I want to

- reduce electricity consumption of my WWTP
- increase energy production of my WWTP
- use wasted unavailable energy at my WWTP
- use the dynamic energy market at my WWTP
- recover nutrients of my WWTP

### FIND THE DIFFERENT ENERGY-POSITIVE WWTP



POWERSTEP YOUR FLUSH, OUR ENERGY

POWERSTEP has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 641671

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Anick S.P.R.L. - Environmental communication



UPGRADE YOUR CITY | ACCESS POWERSTEP | KNOWLEDGE TRANSFER

**POWERSTEP**  
YOUR FUTURE. OUR ENERGY.

## ENERGY-POSITIVE WASTE WATER TREATMENT PLANT

**PURPOSE**  
**REDUCE ELECTRICITY CONSUMPTION**

**WHAT IS IT ABOUT?**  
Reducing electricity consumption is dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo fritu consequat. Duis aute irure dolor in reprehenderit in

**WHAT ARE THE APPROACHES?**

- Enhanced carbon extraction
  - CEPT
  - DAF
  - Microsieve
- Low-carbon nitrogen removal
  - Advanced control
  - Mainstream Anammox (1-stage)

**FIND THE DIFFERENT ENERGY-POSITIVE WWTP**

**POWERSTEP**  
YOUR FUTURE. OUR ENERGY.

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POWERSTEP is a registered trademark of the European Union Horizon 2020 - Innovation Actions.



The project "Full scale demonstration of energy positive sewage treatment plant concepts towards market penetration" (POWERSTEP) has received funding under the European Union HORIZON 2020 – Innovation Actions - Grant agreement n° 641661

UPGRADE YOUR CITY

ACCESS POWERSTEP

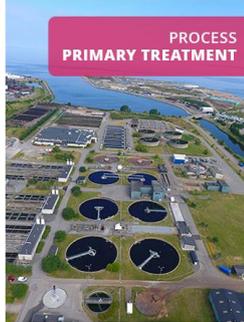
KNOWLEDGE TRANSFER



## ENERGY-POSITIVE WASTE WATER TREATMENT PLANT

**PROCESS**  
**PRIMARY TREATMENT**

✕



**WHAT IS IT ABOUT?**

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**WHAT ARE THE TECHNOLOGIES AT STAKE?**

- ⚙️ Classifier
- ⚙️ CEPT
- ⚙️ DAF
- ⚙️ Microsieve

## YOUR OPTIONS FOR AN ENERGY-POSITIVE WWTP

I want to

- ⚡  
 reduce electricity consumption of my WWTP
- ⚡  
 increase energy production of my WWTP
- ♻️  
 use wasted unavailable energy at my WWTP
- €  
 use the dynamic energy market at my WWTP
- 🌱  
 recover nutrients of my WWTP

## FIND THE DIFFERENT ENERGY-POSITIVE WWTP



POWERSTEP was created building upon the European Union's Horizon 2020 research and innovation programme under grant agreement no. 647401

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Actik S.P.A. - Environmental communication





## LOCATIONS

A - B - C - D - E - F - G - H - L - M - N - O - S - T



### AVEDÖRE, Denmark

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#### WHAT PURPOSES?

Reduce electricity consumption  
 Increase energy production

#### WHICH APPROACHES?

Enhance carbon extraction  
 Low-carbon nitrogen removal

#### WHICH TECHNOLOGIES?

Microsieve  
 Advanced control



### SJÖLUNDA, Sweden

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#### WHAT PURPOSES?

Reduce electricity consumption  
 Increase energy production

#### WHICH APPROACHES?

Enhance carbon extraction  
 Low-carbon nitrogen removal

#### WHICH TECHNOLOGIES?

Microsieve  
 Mainstream Anammox (2-stage)



### WESTEWITZ, Germany

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#### WHAT PURPOSES?

Reduce electricity consumption  
 Increase energy production

#### WHICH APPROACHES?

Enhance carbon extraction  
 Low-carbon nitrogen removal

#### WHICH TECHNOLOGIES?

Microsieve  
 Advanced control

X 30



## PRIMARY TREATMENT

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### Technologies

#### Clarifier

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[Clarifier at WWTP Westweitz](#)  
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PURPOSE	APPROACH	WHERE?
Reduce electricity consumption Recover nutrients	Enhance carbon extraction Low carbon nitrogen removal	Westweitz (Germany) Sjölunda (Sweden)

#### CEPT

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PURPOSE	APPROACH	WHERE?
Reduce electricity consumption Recover nutrients	Enhance carbon extraction Low carbon nitrogen removal	Westweitz (Germany) Sjölunda (Sweden)

#### DAF

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PURPOSE	APPROACH	WHERE?
Reduce electricity consumption Recover nutrients	Enhance carbon extraction Low carbon nitrogen removal	Westweitz (Germany) Sjölunda (Sweden)

#### Microsieve

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PURPOSE	APPROACH	WHERE?
Reduce electricity consumption Recover nutrients	Enhance carbon extraction Low carbon nitrogen removal	Westweitz (Germany) Sjölunda (Sweden)







## REDUCE ELECTRICITY CONSUMPTION

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### ACTIVATED SLUDGE

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### Technologies

#### CEPT

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#### DAF

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### LOW CARBON N REMOVAL

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### Technologies

#### CEPT

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#### DAF

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## TECHNOLOGIES

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### ACTIVATED SLUDGE

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#### WHAT PURPOSES?

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#### WHICH PROCESSES?

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#### WHERE?

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### ADVANCED CONTROL

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#### WHAT PURPOSES?

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#### WHICH PROCESSES?

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#### WHERE?

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### AIR STRIPPING

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#### WHAT PURPOSES?

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#### WHICH PROCESSES?

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