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Innovative Eco-Technologies for Resource Recovery from Wastewater

INCOVER

Deliverable D5.4

Communication and dissemination material

Work Package 5

Boosting INCOVER Technologies uptake

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Version	Date	Modified by	Modification details
V1	30/03/2019	C. Madec (OIEau)	First version
V2	12/07/2019	C. Madec (OIEau)	Updated version
V3	31/07/2019	C. Madec (OIEau)	Updated version with last figures available



Executive summary

This deliverable D5.4 named "*Communication and Dissemination Material*" is the detailed overview of all the communication and dissemination activities carried out during the three-year INCOVER project. It is part of the task T5.5 dedicated to the "Production and implementation of a communication and dissemination plan", led by OIEau.

These activities were conducted according to the Communication and Dissemination Plan (D5.3) defined at the beginning of the project (First version at M6, updated at M26). This plan set out the objectives of the communication strategy, the targeted audiences and the tools and channels to be used to reach the objectives.

The targeted groups identified were the scientific community, the public and private water utilities, the industrial and agricultural sectors, the decision-making stakeholders and the public at large.

The current deliverable presents the whole communication and dissemination actions done all along the project life and assesses each of them in the light of the initial objectives, thanks to the monitoring results. This document will hence contain the following chapters:

- The communication kit designed at the beginning of the project and used by all the partners
- The digital tools and channels used to communicate about all the project activities and outputs (and the ad hoc monitoring results): website, social media, etc.
- The scientific publications
- The media coverage of the project by external channels, including press-releases
- The participation in communication and dissemination events
- The application for awards

This deliverable was submitted first in M34. The current version was updated at the end of the project (M38). This updated version includes, in particular, the last communication and dissemination activities done during the 2-months extension of the project.

Objectives	WP	Estimated KPI at month36 (May19)	Estimated KPI at month 38 (July19)	KPI explanation
 Utilise an extensive range of communication routes to: > Disseminate key information on the different stages of the INCOVER project; > Inform and promote INCOVER to a wider audience. 	WP5	90%	100%	The two months extension permitted to : -disseminate INCOVER results in 8 more events in June and July (SOFIE Summit, WETPOL congress, Anaerobic Digestion Conference AD16, International Conference on Sustainable Solid waste management, IWAlgae 2019 with a specific INCOVER session, etc.). - the events were promoted through social media, a gain of more than 60 followers - prepare a 5 th Newsletter which will be released in September - participate and win the POWER Idea contest - provide Open Access to scientific articles and datasets Detailed description of the activities in the D5.4



1 Communication kit

To ensure a maximum visibility for INCOVER project, a specific logo and project presentation materials were designed, based on the same colour palette (graphic charter).

1.1 Visual identity

The logo is a key tool to introduce the project to the public and to make people remember the name of the project. The logo (shown in Figure 1) was professionally designed (OIEau's subcontractor). It was used in all communication materials, project documents, information boards on case-studies sites, etc.



Figure 1: INCOVER logo

For example, to ensure and increase the visibility of the project, outdoors panels were installed in case studies to inform the public that research was carried out in these sites, thanks to EC funding (as it is illustrated in Figure 2 below).



Figure 2: Example of use of INCOVER logo on case study 1

Based on the same colour palette, templates for Word documents, project deliverables and Power Point presentations have been developed and used by all the partners.



Figure 3: Example of the template developed for Power point presentations

In respect of the brochure "Communicating EU research and innovation guidance for project participants", EU funding's were acknowledged, displaying the EU emblem, on all communication materials, publications and infrastructures, and the following text was mentioned: "This project has



received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 689242. The dissemination of results herein reflects only the author's view and the Commission is not responsible for any use that may be made of the information it contains".

1.2 Project presentation materials

As it was initially planned in the Grant Agreement (T5.5), the following communication materials were designed, used and distributed throughout the project: 2 leaflets, 1 power point presentation, 1 roll-up, 1 poster and 1 brochure (1 page). They were designed by OIEau and all partners contributed to write their content.

They were and still are easily available for project partners on INCOVER website and internal platform, so that they can use them when needed.

According to their needs, each partner had specific budget to professionally print one or several of these materials.

Communication material	Specificities
<section-header><complex-block><complex-block><complex-block><complex-block><complex-block></complex-block></complex-block></complex-block></complex-block></complex-block></section-header>	Leaflet available in English, French, Spanish and Greek (M6).
<section-header></section-header>	Poster giving a general presentation of the project, used by partners and adapted as necessary for conferences, congress, etc. (M6). Available in English.
Standard powerpoint presentation	Standard power presentations, giving information about the project's objectives, impacts, technologies. This presentation was used and

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The last two project presentation materials (the one-page project description and the leaflet n°2) are presented in Annex F.

Additionally, two other leaflets were produced by ICLEI within Task 5.7 aiming at enhancing the awareness of treated wastewater reuse. The leaflet "Reclaimed water: the untapped resource" is dealing with reuse in the agricultural sector. The second leaflet "Wastewater is too precious to waste" is targeting local governments and aims at stimulating them to reuse water in their municipal services. It mainly contains a few examples of cities in Europe that already practice water reuse successfully. These two deliverables are available for download on INCOVER website, <u>section documents</u>.

2 Digital tools and channels

This section presents all the digital tools and channels which were used to communicate about INCOVER project and increase its visibility on the Internet and on partners' networks: website, social media activities, videos and online newsletters.

2.1 Project website

The website for INCOVER project was created in M6 by OIEau's subcontractor, at the following addresses: <u>www.incover-project.eu</u> and <u>www.incover.org.</u> Then, it was and still is fully managed and hosted by OIEau. The website is key to reach a large range of audiences. Anyone interested in INCOVER project can easily access to information (both technical and non-technical) about its objectives, the case studies or the innovative technologies developed. A regular update (at least every 2 weeks) allowed to give news about the progress of the project (case studies results) and its activities (public events, latest news, publications, etc.). All the partners have contributed to this regular update.

The objective set out in the Communication and Dissemination Plan was to reach at least **9000** visits by the end of the project. Data retrieved from Google Analytics on INCOVER website are presented in the following table:



	M6 (28/11/2016) – M18 (28/11/2017)	M18 (29/11/2017) – M30 (29/11//2018)	M30 (30/11/2018) – M36 (31/05/2019)	M36 (31/05/2019) - M38 (31/07/2019)	TOTAL
Number of sessions ¹	3215	7040	3184	1106	14,526
Average number of sessions per month	267	586	531	553	382
Number of users ²	2213	5094	2441	870	10,414
Average duration session ³	00:03:11	00:02:25	00:02:11	0:09:00	02:31:0 0
Pageviews ⁴	9247	17 379	7051	2484	36,127
Pages / session⁵	2,88	2,47	2,21	2.25	2.49
Percentage of new visitor	85,6 %	86,8%	86,7%	86,1%	87,2%

The objective has been reached as the website received more than 14,500 visits.

Moreover, several persons or organizations contacted INCOVER partners through <u>the contact form</u> on the website. More than 20 messages were received from companies interested by the project, students, etc. Other emails have been received directly to INCOVER email address (<u>incover-contact@oieau.fr</u>), in particular from journalists, publishers and magazines.

As it is stated in the Grant Agreement, the website and the 2 domain names will be maintained by OIEau during 5 years beyond project life.

2.2 Social media

Social media profiles permit to promote the project to a wide range of audiences. From the beginning of the project, social media were identified as key promotional tools, due to their popularity, ease of access and rapid information flow. Accounts were created on Twitter, LinkedIn and YouTube.

2.2.1 Twitter page

The <u>INCOVER twitter page</u> was launched at M6 by OIEau (@INCOVER project). Twitter was mainly used to relay the latest information about the project's development and news, and also to relay interesting information from the web, related to INCOVER topics (wastewater treatment, circular

¹ A session is the period time a user is actively engaged with the website (Google analytics).

² Users who have initiated at least one session during the date range.

³ The average length of a Session.

⁴ Pageviews is the total number of pages viewed. Repeated views of a single page are counted.

⁵ Pages/Session (Average Page Depth) is the average number of pages viewed during a session. Repeated views of a single page are counted.



economy, etc.). The Twitter page was mainly managed by OIEau who did the majority of the tweets, based on the content received by all the partners (information communicated about events in which they were participating, or about case studies progresses).

The table below presents the objectives which were written in the Communication and Dissemination Plan and the results achieved.

Objective	Status	Comment
Number of followers by M18: >300	M18 : 255	
Number of followers by M36: > 900	M38 : 748	Despite intense efforts, the objective of 900 followers was not achieved. However, a significant increase was observed the last months of the project (more than 150 new followers in 3 months).

Table 1: Results monitoring for twitter activities all along the project

Throughout the project, the activity on Twitter has increased progressively. For example, at M12 75 tweets were posted, 223 at M27 and more than 480 at M38. This increase of tweets allows to increase the number of followers, even if we did not manage to reach the initial objective. As a lesson learnt, we can conclude that maintaining a regular activity on twitter and attracting more followers is very important to reach the widest possible audience and make known a project. However, it implies a huge human involvement and time which should not be underestimated. The involvement of a community manager is highly recommended to get the most out of social media.

2.2.2 LinkedIn

At M9, an <u>INCOVER group</u> was created on LinkedIn. Partners of the project were first invited to join the group, to invite their own networks to join the group and to initiate discussions. The aim of the group was to reach people interested in water issues and wastewater experts, and discuss about INCOVER's related topics.

The objective set out in the Communication and Dissemination plan was to reach **100** members in the group at M18. However, only **78** members were registered at this month and there was very little activity.

That is why it was decided, as explained in the updated version of the Communication and Dissemination plan (submitted at M28), to create a <u>company page for INCOVER project</u> in July 2018. A company page is easier to manage than a group, because several persons involved in INCOVER project can publish posts on behalf of INCOVER. Moreover, contrary to the group, the company page is public and everybody can see, like and share its activity. It seems that this was a good idea, because in only 6 months, the page had more followers than the group in 12 months.

The table below presents the key results achieved at M38.

Table 2 : Results monitoring for LinkedIn activities at the end of the project (M38)

Status	Comment
Number of followers of the page at M38 : 192	The objective written in the Communication and Dissemination Plan was to reach 180 followers by M36. Objective achieved.



Number of posts at M38 : >135	
Number of "likes" at M38 : >1284	The total number of "likes" shows that the posts received quite a good audience. This indicator is important because the "likes" permit to multiply the audience.
Number of clics at M38: >1193	

As a lesson learnt, we can conclude that a public company page on LinkedIn is more attractive than a private group and allows to reach a wider audience. We saw that the partners were more active in publishing posts, sharing or liking the posts on the company page than on the group, because the news of INCOVER page appeared directly in their newsfeed and they could share it easily. However, it implies a huge human involvement and time which should not be underestimated. The involvement of a community manager is highly recommended to get the most out of social media.

2.2.3 YouTube

An <u>INCOVER channel on YouTube</u> was created to disseminate the videos produced. It was not initially planned, but it appeared that it was the best channel to release the videos produced during the project. In the Grant Agreement, it was only planned to develop one video. But given its success, 5 videos have finally been produced and published on the channel (and another one will be released soon). This channel permitted also to create a playlist, referring to other videos dealing with INCOVER project and produced by local media (8th Chiclana, Ayutamiento de Almeria Noticias, AjutamentViladecans and Interalmeria TV).

More information about the videos published on the channel is available in the next section (2.3 Videos).

As a lesson learnt, we can say that YouTube is an effective way to publish videos and monitor the statistics (number of views, etc.). It allows creating playlists and embedding easily the videos in webpages and social media.

2.3 Videos

Project presentation video:

A motion design video (2:36 min) has been created by OIEau's subcontractor and released at M22. The whole creation of the video was supervised by OIEau.

The video is in English and has subtitles in English, French, Portuguese and Spanish. All the partners have also the video in mp4 format, so that they can use it as they want where they want.

It introduces <u>INCOVER project and the technologies</u> developed within the project, showing their impact and advantages in terms of cost and energy efficiency, reduction of GHG emissions and resources recovery. The objective was to communicate about the project objectives and technologies to a large public.

The video has been published on the INCOVER channel on Youtube and also on the homepage of the INCOVER website. The video was well received by the public. Several partners published the video on their own website. INCOVER accounts on Twitter and LinkedIn referred to this video. The video has also been displayed on the <u>EU-funded R&I projects channel</u>, managed by the European Commission.





Figure 4: Link to INCOVER video (URL: https://youtu.be/7CPb6xe8Pxs)

According to the Communication and Dissemination Plan, the objective was to have **300 new** views every six months. At M38, the results are the following:

Objective: > 300 views every 6 months			
Status	Comment		
Period M22 – M28 : 1513 views	The objectives have been achieved and even surpassed, with		
Period : M 28 – M34 : 685 views	a total of 2514 views. The average view duration is 1:20 min.		
Period : M 34 – M38: 264 views			

Case-studies videos:

Given the success of the motion design video, it was decided to develop other videos and add them on INCOVER channel on Youtube. 2 additional videos about case-studies 2 and 3 have been produced by OIEau.

- A short video about case-study 3 and the development of FTIR spectroscopy to measure organic acid concentration. This video lasts 3:10 min and is in English. It was developed in M32 by OIEau with UFZ and AIMEN contributions. It got 136 views since its publication. This video is targeting more the scientific and water manager's communities.



Figure 5: Link to case-study 3 video (https://www.youtube.com/watch?v=3cm57xnfhb4)

Another video about case-study 2 in El Torno wastewater treatment plant, in Chiclana. It was filmed during the second innovation workshop (M33). The video have been published on INCOVER Youtube channel and lasts 3:16 min. It was developed in M34 by OIEau with AQUALIA, IBET and RECIRKU contributions. It got 1984 views since its publication. This video is targeting more the scientific and water manager's communities.





INCOVER case-study 2 -Resources recovery from...

Figure 6: Link to case-study 2 video (https://www.youtube.com/watch?v=QBsrLUyp6Zs)

> Other videos:

Two others videos are published on INCOVER Youtube channel. One is a demonstration of <u>Sludge</u> <u>Treatment Wetland installed on case-study 1_(0:07min, 123 views)</u> and the other one is the recording of the <u>webinar about bioplastics</u> (60 min, in English, 137 views), organized by ICLEI (see section 5.1.3).

In total, 5 videos have been produced during the project life, whereas only 1 video was foreseen in the Grant Agreement. As a lesson learnt, we can conclude that videos can convey a complex message easily and effectively, with images. They permit to reach not only the water community but also the public at large. Short videos and especially motion design videos are becoming a tool increasingly used and fit with the trend of storytelling.

2.4 Newsletters

To keep our audience informed on project's developments, latest activities and events, a newsletter was written and issued, approximately every 6 months, as initially planned in the Grant Agreement. It was sent to each person who subscribed to the newsletter on the project website. Each INCOVER partner also disseminated the newsletter through its own network. Then, each newsletter edition was uploaded on the website in the section "Documents/Newsletter" for the general public to access.

Additionally, sometimes, small "Flash info" were sent to the same mailing list, to inform about specific news (organisation of a webinar, release of the video, etc.).

The objective set out in the Communication and Dissemination Plan was to reach a dissemination list with more than **1 500** persons (objective reached and surpassed)

The results are summarized in the table below, which also provides the URL link of each newsletter:

Date	Number of persons reached
<u>June 2017 – Newsletter n°1</u>	1410 + network of each partner
January 2018 – Newsletter n°2	1520 + network of each partner
March 2018 – Flash info : INCOVER video	1599 + network of each partner
<u>April 2018 – Flash info : Stakeholder</u> Engagement Event – Run4Life	1738 + network of each partner
July 2018 – Flash Info : Webinar on bioplastics	1788 + network of each partner

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September 2018 – Newsletter n°3	1827 + network of each partner
February 2019 – Newsletter n°4	1857 + network of each partner

The last INCOVER newsletter presenting the results of the project is being prepared. It will be released in September 2019.

3 Publications and availability of research results

To disseminate INCOVER research results and to reach the scientific community, several peerreviewed articles have been published in SCI scientific journals. Particular attention was paid to making the results available, findable and reusable, using the open repository ZENODO.

3.1 Scientific publications

Partners were committed to submit papers for peer-reviewed publication in international journals. The objective set out in the Communication and Dissemination Plan was to have **12 to 20** papers published by the end of the project. At the time of writing, **14** peer-reviewed articles have been published. **4** others have been submitted and are being reviewed and more than 4 other papers are planned to be published.

The articles published are mainly dealing with the technologies implemented in each case studies, and especially:

- Photosynthetic biogas upgrading system, parameters influencing the efficiency of the process (temperature, alkalinity, liquid-to-biogas ratio, etc.) and operating conditions of the system
- Anaerobic co-digestion of waste yeast biomass and biogas production
- Production and isolation of citric acid
- Bioplastics production: use of photobioreactors, nutrients and biomass dynamics in reactors, nutrients removal, etc.

The papers submitted and under review are more about bioprocess control by optical and soft sensors and also sustainability assessment of bioprocesses.

The number of scientific publications per year and the names of the journals are summarized in Table 3 below.

Objective: between 12 to 20 papers published at M36							
Period	Number of scientific publications published	Journals					
M1 – M7 (2016)	0						
M8 – M19 (2017)	4	Organic Process Research & Development (1) Biosystems Engineering (1) Water Science and Technology (1) Biogas: Fundamentals, Process, and Operation, (1 chapter)					

Table 3 : Review of the scientific articles published during project life



M20 – M31 (2018)	8	Journal of Engineering and Life Sciences (1) Ecological Engineering (2) Bioresource Technology (2) Algal Research (1) Science of the Total Environment (1) New Biotechnology (1)
M32 – M38	2	Bioresource Technology (2)

The objective is achieved, because 14 papers are published. The list of these papers is available at the end of this document (ANNEX A). For each of them, type of access granted is detailed. The list of papers which are under review are available in ANNEX B.

Each time a scientific publication was published, it was largely advertised on INCOVER website and on social media.

incover-project.eu/s	s of @INCOVERproject about #biogas upgrading ites/default/	68 abonnés 1 mois Road Universita Relitàcnica de Cataluma last publication in Ecological
@VOC_Odours		Engineering. Open access for 50 days ! https://lnkd.in/de-XFwV
ELSEVIER	Insulant Totalog 20 (201) 54.0 Cancer In available at Konsultance Bioresource Technology Journal hompaga: www.slawice.com/Sociate/Sociate/Sociate/	
Seasonal variation an outdoors pilot so David Marine ^{1,6} , Bether P Raúl Muño ^{1,6} ¹⁰ Seguence of Divide Payorence and ¹⁰ Seguence of Divide Payorence and ¹	of biogas upgrading coupled with digestate treatment in ale algal-bacterial photobioreactor mades", Patricia Canev, Victor Peter, Sail Blanco ¹ , Raquel Lebrero ¹ , onreased theory, Saint Patricia, Saint Canev, or Mysics, v. COT Habit, Spec- man Market Canevant, Specific Mark Tanava, or Mysics, v. COT Habit, Spec- man Market Canevant, Specific Mark	
GRAPHICAL ABSTRAC		
		Nutrient removal from agricultural run-off in demonstrative full scale tubular photobioreactors for microalgae growth sciencedirect.com
Figure -		10 j'aime

Figure 7: Example of posts done about scientific publications



3.2 Open access

Significant efforts were made by partners to ensure open access to the publications, so that research impact is maximized and results shared as far as possible.

All the scientific publications are published in open access except the book chapter. Depending on the partner and on the publisher, open access was granted either to the pre-manuscript version (Green Open Access for 8 articles) or to the final version (Gold Open Access for 5 articles). See ANNEX A for details.

In order to ensure the findability of the results and their wide accessibility, all the publications are available on INCOVER website and on ZENODO open repository. Some publications are also available on other repositories such as <u>Arxiv</u> or partner's own repository such as <u>UPCcommons</u>.

As explained in the updated version of the Data Management Plan (D5.2 submitted M28), <u>a</u> <u>community for INCOVER project</u> has been created on ZENODO (between M25-M30). It has allowed to centralize all the results and productions of INCOVER project and to maximize the visibility of the EC funded research.

Moreover, as stated in the article 29.3 of the Grant Agreement, efforts were made to provide access to the data needed to validate the results presented in the scientific publications (underlying data). Several datasets (excel files for example) were hence uploaded on ZENODO.

At the time of writing, Table 4 summarises the figures about INCOVER community on ZENODO.

Uploads	Number	Comment
Peer-reviewed articles	14	The monitoring system of ZENODO allows to say that most of the publications have received more than 15 views and have been downloaded more up to 23 times.
Datasets	13	The monitoring system of ZENODO allows to say that the datasets have received around 5 to 15 views and some of them have been downloaded 13 times.
Posters	5	One of the posters was viewed 48 times and downloaded 15 times. The other posters received around 6 views and were downloaded 5 to 18 times.
Presentations	3	Up to 8 views and 13 downloads.
Other	1	Leaflet about water reuse

Table 4 : Review of all the documents produced by INCOVER and shared on ZENODO

Other data will be uploaded after the end of the project on ZENODO. To illustrate the ZENODO community created for INCOVER project, an example of publication is shown in Figure 8.





Figure 8: Example of publication uploaded on ZENODO

More information about the use of ZENODO and data management can be found in the Data Management Plan (D5.6).



4 Media coverage

A collective effort was made to engage with journalists and have INCOVER information relayed in media as much as possible. In this chapter all the communication activities done by people external to INCOVER consortium are summarized.

4.1 Press-releases

A total of **73 articles** mentioning INCOVER project have been published, both in specialized magazines and local newspapers.

Specialized magazines such as *FuturENVIRO*, *TechnoAqua*, *RETEMA*, etc. permitted to reach water stakeholders, public and private water utilities, industries, etc.

Local newspapers permitted to reach the general public, in particular at the locations where casestudies were implemented. This is especially true in the regions of Chiclana and Almeria in Spain, where local newspapers and media largely relayed the innovation projects taking place in the local wastewater treatment plants (El Torno and El Toyo). It allowed to make the civic society aware of the European research impacts and for example, that their wastewater and flush can be a source of energy (to drive cars) and bioproducts.

The objective set out in the Communication and Dissemination Plan was to have **at least 2 press**releases published per year. This objective was largely achieved thanks to the active involvement of all the partners, especially the ones responsible for case studies. The results are summarized in Table 5 below.

Objective: at least 2 press-releases published per year							
Period	Number of	Examples of journals					
M1 – M7 (June – December 2016)	16	Diario de Cadiz, Ayutamiento de Chiclana, Iresiduo, FuturENVIRO, Technoaqua, IAgua, RETEMA, etc.					
M8 – M19 (year 2017)	9	Hydroplus, FuturEnviro, Express Journal (IBET), ict4water newsletter, RETEMA, International news (OIEau) etc.					
M20 – M 31 (year 2018)	38	WWT Online, aguasresiduales.info, RETEMA, ESEFICIENCIA, sostenible.cat, la Voz de Almería, technoacqua, Be Sustainable magazine, FuturENVIRO, etc.					
M32 – M38	10	IAgua, Diario de Cadiz, 8Cadiz, Diario de Almeria, International News (OIEau), Aguas residuales, etc.					

Table 5 : Review of all the media coverage realised during project life

The list of all press releases and articles in magazines published between M1 and M38 is available in Annex C.

Each time a press-release was published, it was widely relayed through the INCOVER website and social media, as illustrated in Figure 9.





Figure 9: Example of tweet and retweet done about press-releases

4.2 Video reports

Several local and national media did and released videos reports mentioning INCOVER project. They contributed to reach the citizens and make them know the innovation in wastewater treatment. The list of these **7 video reports** can be found in annex D. These videos were realised either because a partner informed local media about the project or at the initiative of the social media.



5 Events

All the partners actively participated in events to communicate about INCOVER project and disseminate the results. These events were an opportunity to target directly water utilities, agricultural and industrial sectors, private sector and also decision-makers.

The input to this section is based on the Communication and Dissemination Activities template filled in every three months by all the partners to describe their activities.

5.1 Organisation of internal events

5.1.1 Innovation workshops

ISLE utilities delivered and organized three Innovation Workshops to put INCOVER technology developers in direct contact with technology end-users. The Innovation Workshops **connect INCOVER technology developers directly with end-users** which their solutions are being developed for. The targeted audience of these workshops were European municipality water/wastewater sector (technology end-users).

Many emerging technologies face the 'valley of death', which is the stage of their development where full-scale on-site demonstrations with end-user partners would be extremely valuable and enable a smooth ride to commercialisation. The Innovation Workshops therefore support the development of the INCOVER technologies by taking into account the feedback and input from technology end-users (and potential future customers). It also facilitates future relationships and collaborations.

The feedback and intelligence received from all participating end-users is recorded (and anonymised) to help INCOVER technology developers refine their solutions (if relevant) and business models for market penetration.

Innovation workshop	Date	Location	Participants	Organisation
Innovation Workshop n°1	June 2018	Lisbon, Portugal	8 + 6 members of the Advisory Board	Bourges plus (FR), Catalan Water Agency (ES), Aguas do Norte (PT), OIEau (FR), EGEH (FR), Aarhus Vand (DK), Canal de Isabel II (ES) + Copa-Cogeca, Region of Attica, EUREAU, Aguas do Porto, WssTP, Agracor (PT)
Innovation Workshop n°2	February 2019	Chiclana, Spain	5	Bourges plus (FR), OIEau (FR), EGEH (FR), Severn Trent Water (UK)
Innovation Workshop n°3	July 2019	Almeria, Spain	7	Aguas do Norte (PT), Bourges Plus France (FR), EGEH (FR), Severn Trent (UK), International Impact partners (FR), OIEau (FR)

For the second Innovation Workshop, a specific brochure was designed for the participants, to give an overview of each case-study and each technology. This brochure is presented in Annex F.



5.1.2 Stakeholder workshops

ICLEI organized three Stakeholder workshops and a third one will be organized by the end of the project. The objectives of these workshops were:

- To familiarise end-users with the products generated through the INCOVER innovative technologies
- To get an expert opinion from end-users with regard to the requirements which the INCOVER products would have to comply with in order to increase their future success on the market
- To receive recommendations from end-users on how to accelerate up-take and acceptance of the products obtained by INCOVER solutions.

Stakeholder workshop	Date	Location	Participants	Organisation
Stakeholder Workshop n°1	June 2017	Leipzig, Germany	18 including project partners and AB members	UFZ (DE), Vogelbusch Biocommodities GmbH (AT) + WssTP (EU), Agracor (PT), Aguas do Porto (PT)
Stakeholder Workshop n°2	October 2018	Freiburg, Germany	12 including project partners	Water Competence Center Berlin (DE), Eurometropolis of Strasbourg (FR), ISINNOVA (IT) ICLEI (UK)
Stakeholder Workshop n°3	May 2019	Brussels, Belgium	15	DG Environment, EurEau, CER, CEBAS-CSIC,

5.1.3 Other events

Case study visits

On the 21st June 2018, UPC organized a free guided tour to visit photo-bioreactors and further innovative wastewater treatment systems on INCOVER case study 1, in the Agròpolis Campus (Viladecans). The technologies were presented to the media and stakeholders. More than **30 people** from universities, research centres, public and private companies, and managers of the public administration attended to this dissemination session. The day started with a welcome by representatives of the municipality of Viladecans and UPC. Then, the INCOVER project was introduced and a technical visit to the pilot plant was performed. More information about this visit can be found on INCOVER website.

Three other case study visits were organized by AQUALIA in El Toyo Wastewater treatment plant, as described below:

Public	Date
Visit of El Toyo wwtp with Spanish Society of Civil engineers	22/03/2019
Visit of El Toyo wwtp with students from the master of water management from Montpellier (France)	01/04/2019
Visit of El Toyo wwtp with sutdents of the master of Chemical Engineering of the University of Almería.	26/04/2019





Figure 10: Visit of El Toyo wwtp, 22/03/2019

> Bioplastics webinar

On 18th September 2018, ICLEI organized a webinar around the question: *"Bad plastics, good plastics: Can PHA from wastewater reverse the trend?"*. They invited experts in the area of bio-plastics to critically examine the market available for PHAs produced from wastewater.

Over **20 experts** joined the discussion which included presentations by project experts from BIOTREND, IBET and UPC. The presentations gave an overview of past and present PHA production. This was followed by a discussion which tackled some specific questions around the market for PHA. More information about this webinar can be found <u>on INCOVER website</u> and the recording of the webinar is available <u>here</u>.

> Joint meeting with SMART-Plant project

A strong link has been established between INCOVER and SMART-Plant projects and a joint meeting was held in Lisbon, 6th June 2018. This was a great opportunity to exchange information and boost the innovative aspects of two projects that aim to move wastewater treatment from being primarily a sanitation technology towards a bio-product recovery industry. More information about this event can be read on INCOVER website (here).

5.2 Participation in external events

All the partners participated in external events such as European wide conference and businessoriented events. Each external event was an opportunity to raise awareness about INCOVER project and/or to wider disseminate the project results. At these events, INCOVER communication materials were used, printed and distributed. Conferences, round tables, poster presentations, etc. were done. Partners attended different kind of events, such as:

- Scientific conferences
- Business-oriented events: shows, traid fairs, congress, etc.
- **EU-related events**: Workshops or activities with other EU projects and other specific events (Water Knowledge Europe, EIP water conference, etc.)
- **Face-to-face meetings:** For example, meeting with local water utilities and municipalities, meeting with private companies, etc.

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- Other type of events: This category includes international, national or local events, gathering a lot of stakeholders, and in particular decisions makers, political world or European committees, and dealing with specific challenges (circular economy, smart cities, agriculture sector, etc.). The category also includes awareness events for the public at large.

The objective was to attend at least **8 events per year**. The results are summarized in the table below.

Period	Business- oriented events	EU-related events	Face-to- face meetings	Scientific conferences	Other type of events	TOTAL
2016 (M1-M7)	1	1		2	1	5
2017 (M8 – M19)	1	8	2	12	4	27
2018 (M20 – M31)	11	10	5	15	9	50
2019 (M32 - M38)	5	4	2	6	2	19
TOTAL	18	23	9	16	35	101

The objective was largely achieved and finally the partners participated in **101 different events**. The list of all the events is available at the end of this document (ANNEX E).

Moreover, participation in **other events** is foreseen by partners after the end of the project (3rd IWA Resource Recovery Conference 2019 in Venice, IWA World Water Congress & Exhibition 2020 in Copenhague, Denmark).



6 Awards

6.1 Industry Water Award 2018

INCOVER project participated in the UK Water Industry Awards 2018 organised by WET News and Water & Wastewater Treatment. The Sludge & Resource Recovery Initiative of the Year award – a new category for the awards in 2018 – went to Isle Utilities and AIMEN who represented the entire INCOVER project consortium at the event.

More information about this award and the award ceremony can be read <u>here</u>.



Figure 11: Water Industry Award ceremony

6.2 iWater Award for Best Innovation

INCOVER project was shortlisted for the iWater Awards for Best Innovation. The award was finally presented to the EU Smart-Plant project, during the iWater show in Barcelona, in November 2018. INCOVER was presented at the TechHub session.



Figure 12: INCOVER presentation during iWater show

6.3 POWER Idea Contest

INCOVER project participated in the <u>POWER Idea Contest for Sustainable Communities</u> organized by the EU-funded POWER project (Political and sOcial awareness on Water EnviRonmental challenges) between M30 and M34. INCOVER reached **the second place** in the top 20 finalists



list and participated in the second phase of the contest. For this second phase, a video presenting INCOVER project and its potential impact for Sabadell city was submitted (<u>https://youtu.be/OwWH3FRu24E</u>).

Finally, INCOVER was selected among the 10 finalists of the contest (list of finalists).

The contest award is an invitation for 2 persons to the POWER conference that will take place in Brussels on October 9th and 10th, 2019. There finalists will:

- attend a coaching session on innovation design and implementation;
- pitch your project idea infront of a high-level audience of sustainability and innovation experts;
- network with potential supporters who could help you with the further implementation of your idea.



7 Conclusion

Intensive efforts were made by all the partners of the consortium to implement the Communication and Dissemination Plan properly and efficiently. Particular attention was paid to using appropriate tools to reach the right audiences. Both online and offline channels were used. The main tools used to relay INCOVER information and news were the project website and social media accounts. Statistical data show good results in terms of audience.

Moreover, the scientific community was reached, especially with publication of 14 peer-reviewed articles, published in open access. The objective in terms of media coverage was achieved, with more than 70 press-releases published, targeting both water stakeholders and the public at large. In addition, the project was presented or mentioned in a wide range of events (more than 100), from local meetings with municipalities to important events with decision-makers.

The following table shows the mail results achieved in terms or communication and dissemination activities done during the project.

		Targeted audiences							
Objective	Result achieved at M38	Public and private water utilities	Scientific community	Decision making stakeholders	Agricultural and industrial sectors	Public at large			
900 sessions on INCOVER website by M36	14,526 sessions	V	\checkmark	\checkmark	\checkmark	\checkmark			
> 900 folllowers by M36 on Twitter	748	V	\checkmark	\checkmark	\checkmark	\checkmark			
> 180 followers by M36 on LinkedIn	192	V	\checkmark	\checkmark	\checkmark	\checkmark			
Newsletters sent to more than 1500 persons/organisations	1857 persons/organisations reached (7 newsletters and flash info released)	✓	V		✓	✓			
12 to 20 scientific publications published by M36	14 scientific publications published (6 under review, 4 other papers planned)		✓						
2 press-releases/year	73 press-releases (both in specialized magazines and local newspapers) and 7 video reports	V	V		✓	✓			
Participation in 8 events/year	101 events (scientific conferences, EU- related events, business-oriented events, face-to-face meetings, other type of events)	~	✓	V	V	V			

As explained along this document, the communication and dissemination will be pursued during the last months of the project, and certainly beyond, as new results are continuously obtained. The website and the 2 domain names will be maintained by OIEau during 5 years beyond project life.

8.1 Annex A: List of scientific publications published between M1 and M38.

Title of the scientific publication	Authors	Project Partner	DOI	Title of the journal or equivalent	Number, date	Publisher	Year of Publication	Relevant pages	Open Access ?	Link to the publication
Biogas purification and upgrading technologies (Chapter 11).	Rodero M.R; Ángeles- Torres R; Marin D; Diaz I; Colzi A; Posadas E; Lebrero R; Muñoz R	UVA		Biogas: Fundamentals,Process, and Operation	2017	Edited by Meisam Tabatabaei. Springer-Nature	2017	Chapter 11		
Improved Isolation of Microbiologically Produced (2R,3S)- Isocitric Acid by Adsorption on Activated Carbon and Recovery with Methanol	Aurich, A., Hofmann, J., Oltrogge, R., Wecks, M., Gläser, R., Blömer, L., Mauersberger, S., Müller, R.A., Sicker, D. and Giannis, A.	UFZ	10.1021/acs.op rd.7b00090	Organic Process Research & Development	17/05/2017	Organic Process Research & Development	2017	pp 866-870	Gold Open access	https://incover- project.eu/sites/default/files /delivrables/organic%20rese arch%20and%20developmen t_UFZ_ACS.pdf
Use of full-scale hybrid horizontal tubular photobioreactors to process agricultural runoff	García-Galán, M.J., Gutiérrez, R., Uggetti, E., Maramoros, V., García, J., Ferrer, I.	UPC	10.5281/zenod o.1309380	Biosystem Engineering, ELSEVIER	06/09/2017	Biosystem Engineering, ELSEVIER	2017	Biosystems Engineering: 166 pp. 138-149.	Green Open access	https://arxiv.org/ftp/arxiv /papers/1806/1806.09867 .pdf
Start-up of a microalgae-based treatment system within the biorefinery concept: from wastewater to bioproducts	Enrica Uggetti, Joan García, Juan Antonio Álvarez, María Jesús García Galán	UPC	10.5281/zenod o.1309413	Water Science and Technology	06/11/2017	IWA Publishing	2017		Green Open Access	https://upcommons.upc.e du/bitstream/handle/211 7/118167/manuscript.pdf ?sequence=1
Production of polyhydroxybutyrates and carbohydrates in a mixed cyanobacterial culture: Effect of nutrients limitation and photoperiods	Dulce María Arias, Enrica Uggetti, María Jesús García-Galán, Joan García	UPC	10.5281/zenod o.1309407	New BIOTECHNOLOGY	03/01/2018	ELSEVIER	2018	Vol 42,pp 1- 11	Green Open access	https://arxiv.org/ftp/arxiv /papers/1806/1806.03129 .pdf
Influence of the seasonal variation of environmental conditions on biogas upgrading in an outdoors pilot scale high rate algal pond	David Marína, Esther Posadas, Patricia Cano, Víctor Pérez, Raquel Lebrero, Raúl Muñoz	UVA	10.1016/j.biort ech.2018.01.13 6	Bioresource technology	02/02/2018	ELSEVIER	2018	Bioresource Technology: 255 pp. 354-358	Green Open access	https://incover- project.eu/sites/default/files /delivrables/Influence- Seasonal-variation- Preprint.pdf
Nutrients and biomass dynamics in photo-sequencing batch reactors treating wastewater with high nutrients loadings	Arias, D., Uggetti, E., García-Galán, M.J., García, J.	UPC	10.5281/zenod o.1309399	Ecological Engineering, ELSEVIER	29/03/2018	Ecological Engineering, ELSEVIER	2018		Green Open access	https://arxiv.org/abs/1806 .03882
Anaerobic co-digestion of waste yeast biomass from citric acid production and waste frying fat	Lucie Moeller, Aline Bauer, Andreas Zehnsdorf, Mi-Yong Lee, Roland Mueller.	UFZ	10.1002/elsc.2 01700176	Journal of Engineering in Life Sciences, Wiley	12/04/2018	Journal of Engineering in Life Sciences	2018	Engineering in Life Sciences:	Green Open Access	https://zenodo.org/record/1 320022#.W2IOBSgzaUk



								18, pp 425 -		
								455		
Seasonal variation of biogas upgrading coupled with digestate treatment in an outdoors pilot scale algal-bacterial photobioreactor.	Marin D, Posadas E, Cano P, Pérez V, Blanco S, Lebrero R, Muñoz R	UVA	10.1016/j.biort ech.2018.04.11 7)	Bioresource Technology	30/04/2018	ELSEVIER	2018	Bioresource Technology: 263 pp. 58- 66.	Gold Open access	https://incover- project.eu/sites/default/files /delivrables/seasonal_variati on_biogas_upgrading.pdf
Influence of alkalinity and temperature on photosynthetic biogas upgrading efficiency in high rate algal ponds.	Rodero M.R, Posadas E, Toledo-Cervantes A, Lebrero R, Muñoz R	UVA	10.1016/j.algal. 2018.06.001	Algal Research (Elsevier)	09/06/2018	ELSEVIER	2018	Algal Research: 33 pp. 284- 290	Gold Open access	https://incover- project.eu/sites/default/files /delivrables/Influence%20of %20alkalinity%20and%20te mperature%20on%20photos ynthetic.pdf
Nutrient removal from agricultural run-off in demonstration full scale tubular photobioreactors for microalgae growth	García, J., Ortiz, A., Álvarez, E., Belohlav, V., García-Galán, M.J., Díez- Montero, R., Álvarez J.A., Uggetti E.	UPC	10.5281/zenod o.1316888	Ecological Engineering, ELSEVIER	10/07/2018	ELSEVIER	2018	Ecological Engineering: 120 pp. 513-521	Green Open access	https://arxiv.org/ftp/arxiv /papers/1807/1807.05189 .pdf
Selection of cyanobacteria over green algae in a photo-sequencing batch bioreactor used for wastewater treatment	Arias, D., Rueda, E., Uggetti, E., García-Galán, M.J., García, J.	UPC	10.5281/zenod o.2554829	Science of the Total Environment	27/10/2018	ELSEVIER	2018	pp 485 - 495	Green Open access	https://incover- project.eu/sites/default/files /delivrables/manuscript_sele ction_cyano.pdf
Technology validation of photosynthetic biogas upgrading in a semi-industrial scale algal-bacterial photobioreactor	María del Rosario Roderoa,c, Raquel Lebreroa,c, Esteban Serranob, Enrique Larab, Zouhayr Arbibb, Pedro A. García- Encinaa,c, Raúl Muñoz	UVA, AQUALIA	10.1016/j.biort ech.2019.01.11 0	Bioresource Technology (Elsevier)	24/01/2019	ELSEVIER	2019	43-49	Gold Open access	https://incover- project.eu/sites/default/files /delivrables/bioresource_tec hnology_technology_validati on.pdf
Influence of liquid-to-biogas ratio and alkalinity on the biogas upgrading performance in a demo scale algal- bacterial photobioreactor	David Marín Antonio Ortíz Rubén Díez- Monterod, Enrica Uggetti Joan Garcíad Raquel Lebrero Raúl Muñoz	UVA	10.1016/j.biort ech.2019.01.11 0	Bioresource Technology (Elsevier)	06/02/2019	ELSEVIER	2019	43-49	Gold Open access	https://incover- project.eu/sites/default/files /delivrables/bioresource_tec hnology_influence_liquid_bi ogas_ratio.pdf



8.2 Annex B: List of scientific publications under review

Title of the scientific publication	Authors	Project Partner	Title of the
Is the future of wastewater treatment algae or bacteria-based? Assessing the life cycle sustainability of high rate algae ponds	AuthorsisessingNorbert Kohlheb, Manfred van Afferden*, Enrique Lara, Zouhayr Arbib, Monica Conthe, Mi-Yong Beckers - CaseMi-Yong Lee, Norbert Kohlheb*, Steffi Hunger; Roland A. Mueller, Andreas Aurichhetic vasteEnrique Lara, Esteban Serrano, Joana Fradinho Tenreiro, Víctor Roca, Paula Villar, Santiago Gómez- Cuervo, Juan Antonio Álvarez, Luz Herrero, Francisco Rodriguezted d test inCarlos Arias, Philipp Otter, Peder S. Gregersen	UFZ	Journal of Envi
Early-stage sustainability assessment of biotechnological processes - Case study of citric acid production	Mi-Yong Lee, Norbert Kohlheb*, Steffi Hunger; Roland A. Mueller, Andreas Aurich	UFZ	Engineer
Production of polyhydroxyalkanoates using bacterial photosynthetic mixed cultures treating domestic wastewater and agricultural waste	Enrique Lara, Esteban Serrano, Joana Fradinho	AQUALIA, IBET	
VFA monitoring using UVVIS spectroscopy for Anaerobic digestion control	Miguel Placer, Samuel Costas, Rocío Pena, Gerardo Tenreiro, Víctor Roca, Paula Villar, Santiago Gómez- Cuervo, Juan Antonio Álvarez, Luz Herrero, Francisco Rodriguez	AIMEN	Water Science an
Sludge Treatment Wetland - experiences with digestate	Arias C, Schausser U-H, Gregersen P	RECIRKU, AU	
Reuse of treated wastewater through combination of Constructed wetlands and solar driven Inline electrolysis - experience from field test in spain.	Carlos Arias, Philipp Otter, Peder S. Gregersen	AUTARCON	Environment

8.3 Annex C: List of press-releases and articles in magazines published between M1 and M38.

Туре	Title of the publication	Title of the journal or equivalent	Project Partner	Date	Year 2016	
Speciali zed magazi ne	Aqualia presenta en Regatec, celebrado en Verona, las más recientes avances en materia de biogás	IAGUA	AQUALIA	29/05/2016	2016	https://ww italia/aqualia regatec-cele
Press release	Obtención de productos ecológicos de la depuradora de El Torno	El periodico de Chiclana	AQUALIA	28/10/2016	2016	http://elp
Press release	La depuradora de El Torno acoge otro innovador proyecto de investigación	Diario de Cadiz	AQUALIA	29/10/2016	2016	http://www.di <u>To</u> invest

journal or equivalent

ironmental Management

ring of life sciences

nd Technology (IWA journal)

tal Engineering Journal

Link

vw.iagua.es/noticias/espanaa/17/05/26/aqualia-presentaebrado-verona-mas-recientes

eriodicodechiclana.com/9505-2/

iariodecadiz.es/chiclana/depuradoraorno-innovador-proyectoigacion 0 1076593093.html

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Press release	La depuradora de El Torno acoge un nuevo proyecto de investigación europeo con casi 8,5 millones de euros de inversión	Ayuntamiento de Chiclana	AQUALIA	31/10/2016	2016	https://www. noticia/articulo un-nuevo-proy
Press release	La depuradora de El Torno acoge un nuevo proyecto de investigación europeo ?	Mirabahia	AQUALIA	31/10/2016	2016	<u>http://mii</u> <u>depurador</u>
Speciali zed magazi ne	Aqualia investiga cómo obtener productos ecológicos a partir de las aguas residuales	FuturENVIRO	AQUALIA	02/11/2016	2016	project.eu/site %20de%20prer e%20novi
Speciali zed magazi ne	Como obtener biofertilizantes, biometano y bioplasticos, a partir de las aguas residuales ?.	Iresiduo	AQUALIA	02/11/2016	2016	http://www.ire <u>16/11/02/</u> biometa
Speciali zed magazi ne	Aqualia investiga cómo obtener productos ecológicos a partir de las aguas residuales	RETEMA	AQUALIA	02/11/2016	2016	https://www.r como-obtener-۱ a٤
Speciali zed magazi ne	Aqualia investiga cómo obtener productos ecológicos a partir de las aguas residuales	aclima	AQUALIA	03/11/2016	2016	https://www.a obtener-pro
Newsle tter	H2020 INCOVER project	Flash Informativo - internal newsletter sent to 2700 employees of FCC AQUALIA	AQUALIA	07/11/2016	2016	project.eu/sites 209
Speciali zed magazi ne	Aqualia investiga cómo obtener productos ecológicos a partir de las aguas residuales	TECNOAQUA	AQUALIA	08/11/2016	2016	https://www.te alia-investiga-c agua:
Newsle tter	The UPC investigates how to generate resources from urban wastewater	UPC's press office	UPC	28/11/2016	2016	project.eu/sites PRESS
Speciali zed magazi ne	"Proyecto INCOVER. Generar recursos de las aguas residuales urbanas"	ingenieros.es	UPC, AQUALIA	28/11/2016	2016	http://www.ir incover-genera
Speciali zed magazi ne	Proyecto INCOVER: De agua residual a recursos energéticos	iresiduo	UPC	01/12/2016	2016	http://www.ire 12/01/proyec
Speciali zed	How to generate resources from urban wastewater	FuturENVIRO	UPC	05/12/2016	2016	http://futu resourc

v.chiclana.es/actualidad/detalle-delo/la-depuradora-de-el-torno-acogeyecto-de-investigacion-europeo-concasi-85-millones-de/

rachiclana.com/2016/10/28/lara-torno-acoge-proyecto-incover

http://incoveres/default/files/delivrables/Resumen ensa%20Aqualia%20jueves%203%20d riembre%20de%202016.PDF.pdf

esiduo.com/noticias/espana/aqualia/ /como-obtener-biofertilizantesano-y-bioplasticos-partir-aguas

retema.es/noticia/aqualia-investiga--productos-ecologicos-a-partir-de-lasaguas-residuales-RrpW1

aclima.eus/aqualia-investiga-comooductos-ecologicos-a-partir-de-lasaguas-residuales/

http://incovers/default/files/delivrables/S7%20H20 %20INCOVER_enDEF.pdf

ecnoaqua.es/noticias/20161108/aqu como-obtener-productos-ecologicosıs-residuales#.WikKh1Xibcs

<u>http://incover-</u> s/default/files/delivrables/INCOVER-S%20RELEASE-ENGLISH.pdf

ngenieros.es/noticias/ver/proyectoar-recursos-de-las-aguas-residualesurbanas/6408

esiduo.com/noticias/espana/upc/16/ cto-incover-agua-residual-recursosenergeticos

urenviro.es/en/how-to-generateces-from-urban-wastewater/

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magazi ne						
Acade mic docum ent	Implementation, evaluation and optimization of cost-effective solutions for waste and wastewater valorisation by Carlos Amaury José Moraes	Master thesis	SIMBIENTE	2016		
Speciali zed magazi ne	"Proyecto INCOVER: Las aguas residuales producen bioproductos y bioenergía".	RETEMA,num 196, January- February 2017	UPC	01/02/2017	2017	http://incover- incove <u>%E2%</u>
Press- release	INCOVER: Valoriser le potentiel des eaux usées	International News	OIEau	01/02/2017	2017	<u>https://ww</u> Nouvelles-n
Press- release	INCOVER: Valoriser le potentiel des eaux usées	Information Eaux	OlEau	01/03/2017	2017	https://www.oi
Newsle tter	ict4water newsletter - New cluster member: INCOVER project	ict4water newsletter	All	01/04/2017	2017	http://incover-
Speciali zed magazi ne	University of Valladolid explores new ways to add value to biogas	FuturENVIRO	UVA	06/04/2017	2017	http://futuren explores-ne
Press release	" A cientista que põe bactérias a fabricar plástico biodegradável"	Express Journal	IBET	18/06/2017	2017	project.eu/sites 20interview ⁴
Newsle tter	Incover: Eco-tecnologias inovadoras para recuperação de recursos de efluentes	IBET facts&figures	IBET	01/07/2017	2017	project.eu/site _and_
Speciali zed magazi ne	Transformer les eaux usées en ressource	HYDROPLUS	OIEau	01/09/2017	2017	project.eu/sites
Newsle tter	IEEE-Powered IoT Implementation and User- Adoption for Win-Win Value Extraction	IEEE IoT Newsletter	FINT	01/11/2017	2017	https://www.th les/docs/loT%
Press- release	INCOVER: Innovation at the service of wastewater recovery	International News	OlEau	01/02/2018	2018	https://www.
Press- release	INCOVER Innovative eco-technologies for resource recovery	AIMEN's Annual Report	AIMEN	20/04/2018	2018	<u>http:</u> prensa/pu
Speciali zed magazi ne	Water Industry Awards winners	WWT Online	ISLE	22/05/2018	2018	<u>http://wwto</u> av

-project.eu/news/press-appearanceer-project-spanish-magazine-680%9Cretema%E2%80%9D ww.oieau.fr/eaudoc/notice/Lesn%C2%B0-27-F%C3%A9vrier-2017 ieau.fr/eaudoc/publications/informa <u>tion-eaux</u> project.eu/news/incover-has-joinedict4water-cluster nviro.es/en/university-of-valladolidew-ways-to-add-value-to-biogas/ http://incovers/default/files/delivrables/Expresso% v%20Maria%20Reis_20170617.pdf http://incovers/default/files/delivrables/ibet_facts _figures_august_2017_0.pdf http://incovers/default/files/delivrables/Article_HY DROPLUS 200917.pdf neinternetofthings.eu/sites/default/fi 620adoption%20and%20SMEs-f.pdf v.oieau.org/pub/InternationalNews-2018/32/ ://www.aimen.es/sala-deublicaciones/informe-anual-2017 online.co.uk/news/water-industry-

wards-winners-revealed



Video	Oral and video interview with Geroge Papageorgiou, a tech reporter from ERT, Greece's national broadcaster for a new TV show (4.55', 31.42' 33.50')	http://webtv.ert.g r/promo/13ion20 18-oikonomia- exo-ap-to-koyti/	FINT	30/05/2018	2018	http://webtv.e
Press- release	Portuguese Thematic Agenda of Research and Innovation for the Circular Economy	Portuguese Thematic Agenda of Research and Innovation for the Circular Economy	SIMBIENTE	31/05/2018	2018	
Speciali zed magazi ne	La UPC construye una planta para producir bioproductos y bioenergía a partir de aguas residuales mediante microalgas	Aguasresiduales.i nfo	AQUALIA, UPC	19/06/2018	2018	https://www.a <u>a-upc-cons</u> bioproductos-y
Speciali zed magazi ne	La UPC construye una planta para producir bioproductos y bioenergía a partir de aguas residuales mediante microalgas	Retema	AQUALIA, UPC	19/06/2018	2018	<u>https://www.</u> una-planta bioene
Speciali zed magazi ne	La UPC pone en marcha una planta de bioproductos y bioenergias mediante microalgas	ESEFICIENCIA	UPC	25/06/2018	2018	project.eu/site CIA_La%20U
Press- release	AGUAS RESIDUALES Y MICROALGAS PARA PRODUCIR BIOPRODUCTOS (Innovadores Pág. 2)	El Mundo, Ed. Catalunya	UPC	26/06/2018	2018	<u>https://a</u> ES/?mod=Tracl nal=1&compar 29964000&sig= <u>5eda0ec</u>
Speciali zed magazi ne	L'Agròpolis de Viladecans, escenari d'una prova pilot per produir bioproductes i bioenergia	sostenible.cat	UPC	27/06/2018	2018	<u>http://sos</u> viladecans-esc bi
Speciali zed magazi ne	L'AIGUA BRUTA TÉ FUTUR	La República	UPC	07/07/2018	2018	<u>https://a</u> <u>ES/?mod=Tracl</u> <u>nal=1&compar</u> <u>30914400&sig</u> : <u>c45bdf18</u>
Press- release	Producir bioenergía a partir de microalgas en aguas residuales	TICbeat.com	UPC	08/07/2018	2018	http://www.tic cir-bioenergi
Speciali zed magazi ne	Producir bioenergia a partir de miroalgas cultivadas en aguas residuales, un pryecto con sello español	Busines Insider	AQUALIA	15/07/2018	2018	<u>https://ww bioenergia-p</u> residuales
Press- release	Peder fro Olgod er med i europaeisk vionder- projekt	JydskeVestkysten	RECIRKU	23/07/2018	2018	https://ww opfine

ert.gr/promo/13ion2018-oikonomiaexo-ap-to-koyti/

nguasresiduales.info/revista/noticias/l struye-una-planta-para-produciry-bioenergia-a-partir-de-aguas-ZdH7H

retema.es/noticia/la-upc-desarrollaa-para-producir-bioproductos-yergia-a-partir-de-agua-9dxBL

<u>http://incover-</u> es/default/files/delivrables/ESEFICIEN JPC%20pone%20en%20marcha.pdf

acceso360.acceso.com/upc/eskingPressViewer&task=default&exter nyNewsId=498658609&newsDate=15 =2055b3afa9953394a82834561a31fff :c55137d6ef9a73b1762c9d7f9e

tenible.cat/article/lagropolis-decenari-duna-prova-pilot-per-produirioproductes-i-bioenergia

acceso360.acceso.com/upc/eskingPressViewer&task=default&exter nyNewsId=502150912&newsDate=15 =ee6ffdebd1a93146bb19b3965f8859 8efe2db45e46801977f5c8eaf21

cbeat.com/innovacion/energia/produ ia-a-partir-de-microalgas-en-aguasresiduales/

ww.businessinsider.es/producirpartir-microalgas-cultivadas-aguass-proyecto-sello-espanol-276035

ww.jv.dk/varde/Hans-fantastiskedelse-staar-nu-foran-et-nytboom/artikel/2629081

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Press- release	La EDAR el Toyo acoge proyectos para reutilizar aguas residuales y obtener biofertilizantes	EuropaPress	AQUALIA	26/07/2018	2018	<u>http://www.e</u> <u>00350/not</u> <u>reutilizar-aguas</u> <u>2</u>
Speciali zed magazi ne	Dos nuevos proyectos de I+D revolucionan el tratamiento de aguas residuales	lagua	AQUALIA	26/07/2018	2018	https://www.ia proyectos-id
Speciali zed magazi ne	La depuradora de El Toyo acoge dos proyectos que aspiran a revolucionar la depuración de aguas residuales	Retema	AQUALIA	26/07/2018	2018	<u>https://www.ro el-toyo-aco</u> <u>revolu</u>
Press- release	Almería, pionera mundial, en lograr en una depuradora energía y algas fertilizantes	Diario de Almeria	AQUALIA	27/07/2018	2018	<u>https://www.c</u> pion <u>fertiliz</u>
Speciali zed magazi ne	Dos proyectos de I+D revolucionan la depuración de aguas residuales en la EDAR El Toyo (Almería)	Futurenviro	AQUALIA	27/07/2018	2018	<u>http://futu</u> <u>revolucionan-</u> <u>en-</u>
Press- release	El Toyo dará agua a la agricultura, campos de golf y urbanizaciones	Ideal	AQUALIA	27/07/2018	2018	https://www.id toyo-dar
Press- release	Almería lidera la depuración verde de aguas residuales	La voz de Almeria	AQUALIA	27/07/2018	2018	https://www.la a/156274/alm
Speciali zed magazi ne	Dos nuevos proyectos de I+D de Aqualia revolucionan el tratamiento de las aguas residuales en Almería	Tecnoaqua	AQUALIA	27/07/2018	2018	https://www.te alia-prove trata
Press- release	Levantan una planta de bioproductos y bioenergía a partir de aguas residuales	Diario de Almeria	AQUALIA, UPC	09/08/2018	2018	https://www.d ria/Levantan reside
Speciali zed magazi ne	El Servicio Municipal de Agua de Almería, ejemplo de gestión del agua en el mundo digital	IAGUA	AQUALIA	26/09/2018	2018	https://www.a el-servicio-mur de-gestion-
Speciali zed magazi ne	El Servicio Municipal de Agua de Almería, ejemplo de gestión del agua en el mundo digital	AGUAS RESIDUALES.INFO	AQUALIA	26/09/2018	2018	https://www.ag el-servicio-mur de-gestion-
Speciali zed magazi ne	El Servicio Municipal de Agua de Almería, ejemplo de gestión del agua en el mundo digital	RETEMA	AQUALIA	26/09/2018	2018	<u>https://ww</u> <u>municipal-de-a</u> <u>eficier</u>

europapress.es/andalucia/almeriaicia-edar-toyo-acoge-proyectoss-residuales-obtener-biofertilizantes-20180726164340.html

agua.es/noticias/aqualia/dos-nuevosl-revolucionan-tratamiento-aguasresiduales

etema.es/noticia/la-depuradora-dege-dos-proyectos-que-aspiran-aicionar-la-depuracion-bceC8

diariodealmeria.es/almeria/Almerianera-mundial-depuradorazantes 0 1267373578.html

urenviro.es/dos-proyectos-de-idla-depuracion-de-aguas-residuales-<u>-la-edar-el-toyo-almeria/</u>

deal.es/almeria/almeria/depuradorara-20180727224849-ntvo.html

avozdealmeria.com/noticia/12/almeri neria-lidera-la-depuracion-verde-deaguas-residuales

ecnoaqua.es/noticias/20180727/aqu ectos-investigacion-desarrolloamiento-aguas-residualesalmeria#.W2wClc4za00

iariodealmeria.es/agriculturadealme n-planta-bioproductos-bioenergiauales_0_1265573542.html

guasresiduales.info/revista/noticias/ nicipal-de-agua-de-almeria-ejemploeficiente-del-agua-en-el--n2h4h

guasresiduales.info/revista/noticias/ nicipal-de-agua-de-almeria-ejemplo--eficiente-del-agua-en-el--n2h4h

ww.retema.es/noticia/el-servicioagua-de-almeria-ejemplo-de-gestionnte-del-agua-en-el--UWZKV

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Speciali zed magazi ne	El Servicio Municipal de Agua de Almería, ejemplo de gestión del agua en el mundo digital	FUTURENVIRO	AQUALIA	28/09/2018	2018	https://futurenviro.es/el-servicio-municipal-de- agua-de-almeria-ejemplo-de-gestion-eficiente-del- agua-en-el-mundo-digital/
Speciali zed magazi ne	Incover: From Wastewater to Valuable Bio- Products	Be sustainable	OIEau	01/10/2018	2018	http://www.besustainablemagazine.com/cms2/inc over-from-wastewater-to-valuable-bio-products/
Speciali zed magazi ne	Put Sewage in your Gas Tank	GWI	AQUALIA	01/10/2018	2018	<u>https://www.globalwaterintel.com/sponsored-</u> <u>content/put-sewage-in-your-gas-tank</u>
Press- release	INCOVER project is awarded with UK water industry prize	AIMEN'S Technology Bulletin	AIMEN	17/10/2018	2018	http://www.aimen.es/sala-de- prensa/publicaciones/boletin-31
Speciali zed magazi ne	Turning the circular economy into reality	WWT Online	ISLE	23/10/2018	2018	https://wwtonline.co.uk/features/turning-the- circular-economy-into- reality?utm_source=WWT+Daily+Newsletter&utm campaign=ecb61ce533- WWTonline_Daily_news_alert_COPY_275&utm_me dium=email&utm_term=0_3464b7a083- ecb61ce533- 101232637&mc_cid=ecb61ce533&mc_eid=c4288f5 <u>321</u>
Press- release	Aqualia muestra enel Salón H2Orizon sus avances entecnología e investigación	DIARIO DE ALMERÍA	AQUALIA	23/09/2018	2018	https://www.diariodealmeria.es/finanzasyagricultur a/Aqualia-Salon-H2Orizon-tecnologia- investigacion_0_1284771747.html
Press- release	Obtenen biogàs de les aigües residuals gràcies a les microalgues	Telenotícies comarques TV3	UPC	10/07/2018	2018	http://www.ccma.cat/tv3/alacarta/telenoticies- comarques/obtenen-biogas-de-les-aigues-residuals- gracies-a-les-microalgues/video/5787794/
Press- release	INCOVER project which enhance FINT's digital technologies for Agriculture is presented in an Agriculture-related special report of the oldest and most credible Greek Business News' provider, Naftemporiki (both in press and e-version).	Naftemporiki	FINT	19/11/2018	2018	https://www.naftemporiki.gr/afieromata/story/141 4596/future-intelligence-ellinikes-kainotomies-gia- tin-eksupni-georgia
Speciali zed magazi ne	Future Earth WEF Nexus Blog post discussion: how IoT can facilitate WEF quantification and transform its role to a distinct KPI for sustainable precision farming and/ or Smart City applications.	FutureEartch	FINT	18/12/2018	2018	http://futureearth.org/blog/2018-dec-18/internet- things-key-enabler-quantifying-water-energy-and- <u>food-nexus</u>
Press- release	El compromiso de 25 años	LA VOZ DE ALMERIA	AQUALIA	25/11/2018	2018	-
Acade mic docum ent	Optimization of the thickening process of microalgae biomass produced in wastewater (Master in Environmental Engineering, UPC)	Master thesis	UPC	12/06/2018	2018	-

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Acade mic docum ent	Estudio de la separación de la biomasa algal en una planta piloto de tratamiento de agua residual (Master in Environmental Engineering, UPC)	Master thesis	UPC	12/06/2018	2018	
Speciali zed magazi ne	Un proyecto pretende impulsar el tratamiento de las aguas residuales hacia la economía circular	IAgua	ALL (CORDIS ?)	08/01/2019	2019	project.eu/sites yecto%20preter to%20de%20las 20la%20econor
Press- release	El proyecto All-Gas despierta el interés comercial de firmas europeas	DIARIO DE CÁDIZ	AQUALIA	01/03/2019	2019	https://www.c <u>All-c</u> chicl
Press- release	El Innovation Workshop II del proyecto Incover difunde los avances tecnológicos que se investigan en la EDAR El Torno	8CADIZ	AQUALIA	27/02/2019	2019	https://80
Press- release	INCOVER - Final stretch of the European INCOVER project	International news	OIEau	01/02/2019	2019	https://www.
Press- release	El agua es esacasa y hay que cuidar hasta la última gota	LA VOZ DE ALMERIA	AQUALIA	22/03/2019	2019	https://www.la cial-dia-mundia escasa-y-hay
Press- release	La gestión eficiente del agua, motor de desarrollo y futuro sostenible	IDEAL	AQUALIA	22/03/2019	2019	https://incover- project.eu/sites
Speciali zed magazi ne	INCOVER - GENINDVINDING AF BIO-PRODUKTER MED VÆRDI	Spildevand Magazine	RECIKRU	14/05/2019	2019	project.eu/sites
Speciali zed magazi ne	Beyond The Upcoming EU Regulation On Water Reuse – What Else Is Needed For Bridging The Gap Between Policy, Perception And Practice?	EU GREEN WEEK WEBSITE	ICLEI	21/05/2019	2019	https://ww events/beyon water-reuse-wl gap-betwee
Press- release	Concluye el proyecto INCOVER en El Toyo para transformar el aguèa residual en energia	Diario de Almeria	AQUALIA	12/04/2019	2019	<u>https://www.di</u> Inc Aqu
Speciali zed magazi ne	Finaliza el proyecto Incover de transformación de agua residual en energía y uso para riego en la EDAR de El Toyo (Almería)	AGUAS RESIDUALES.INFO	AQUALIA	19/07/2019	2019	https://www.ag inaliza-el-proye agua-residu

-<u>https://incover-</u> <u>s/default/files/delivrables/Un%20pro</u> <u>inde%20impulsar%20el%20tratamien</u> <u>is%20aguas%20residuales%20hacia%</u> <u>m%C3%ADa%20circular%20_%20iAg</u> <u>ua.pdf</u> <u>diariodecadiz.es/chiclana/proyecto-</u>

diariodecadiz.es/chiclana/proyecto -Gas-comercial-europeas-:lana 0 1332166997.html

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.oieau.org/pub/InternationalNews-2019/28/#zoom=z

avozdealmeria.com/noticia/231/espe al-del-agua-2019/168920/el-agua-esy-que-cuidar-hasta-la-ultima-gota

-

s/default/files/delivrables/ideal%20s iculo_20190322_incover.pdf

<u>https://incover-</u> es/default/files/delivrables/Spildevan <u>d%232_2019_8.pdf</u>

vw.eugreenweek.eu/en/partnernd-the-upcoming-eu-regulation-on-/hat-else-is-needed-for-bridging-theen-policy-perception-and-practice

liariodealmeria.es/almeria/Proyectoicover-aguas-residualesualia <u>0</u>1372363065.html

guasresiduales.info/revista/noticias/f recto-incover-de-transformacion-deual-en-energia-y-uso-para-PEbNA



8.4 Annex D: Video reports

Channel	Information on the video report	Project partner	Date	Nb of views	Link
ERT2, Greece's national broadcaster	Oral and video interview with Geroge Papageorgiou, a tech reporter from ERT, Greece's national broadcaster for a new TV show (4.55', 31.42' 33.50')	FINT	30/05/2018		<u>http://webtv.ert.gr/promo/13ion2018-</u> oikonomia-exo-ap-to-koyti/
Aytutamiento de Almeria Noticias - Youtube	Presentación de dos proyectos de I+D que Aqualia está desarrollando en la planta de El Toyo	AQUALIA	26/07/2018	57	https://www.youtube.com/watch?v=m1Ejr8OZBI <u>8</u>
IntelAlmeria - Youtube	Presentación de dos proyectos de I+D que Aqualia está desarrollando en la planta de El Toyo	AQUALIA	27/07/2018	132	https://youtu.be/WVxCg9reO20
8tv Chiclana - Youtube	Proyecto INCOVER	AQUALIA	28/10/2016	172	<u>https://www.youtube.com/watch?v=</u> <u>ooEmNlWnM</u>
Telenotícies comarques TV3	Obtenen biogàs de les aigües residuals gràcies a les microalgues	UPC	24/09/2018		<u>http://www.ccma.cat/tv3/alacarta/telenoticies-</u> <u>comarques/obtenen-biogas-de-les-aigues-</u> <u>residuals-gracies-a-les-</u> <u>microalgues/video/5787794/</u>
Video : access 360 :	Video : access 360 : http://tv.acceso.com/viewer/view.php?mda_pk=147421175&tem_pk=449	UPC	01/07/2018		http://tv.acceso.com/viewer/view.php?mda_pk= 147421175&tem_pk=449
AjuntamentViladecans - YouTube	L'Agròpolis com a escenari d'una prova pilot per produir bioproductes i bioenergia	UPC	22/06/2018	112	https://www.youtube.com/watch?v=jSmmnzVnld U&index=6&t=0s&list=PLtwmzlkZ- I3GQ1yjZhV6KZRffsIWImhhZ



8.6 Annex E: List of events where partners participated, between M1 and M38

Type of event	Name of the event	Project partner	Date	Place	
Scientific conference	3rd IWA Specialized Conference "Ecotechnologies for Wastewater Treatment"	AQUALIA	30/07/2016	Cambridge, UK	Sust
Other type of event	Circular Economy Workshop	SIMBIENTE	14/10/2016	O Porriño, Pontevedra (Spain)	LCA a
EU-related event	Kick-Off and Training Meeting of the project SuPER-W - Doctorate Programme "Sustainable Product, Energy and Resource Recovery From Wastewater" [Marie Skodowska-Curie Action]	SIMBIENTE	07/11/2016	Delft, The Netherlands	Resource
Scientific conference	AlgaeEurope 2016	AQUALIA, UVA, IBET	10/12/2016	Madrid, Spain	
Business-oriented event	the Watex Exibition in Tehran	SSP	01/09/2016	Tehran, Iran	
EU-related event	EIP AGRI workshops: 'Data Sharing: ensuring a fair sharing of digitisation benefits in agriculture'"	FINT	04/04/2017	Bratislava, Slovakia	FINT discussed water relevant
EU-related event	EIP AGRI workshops:"Digital Innovation Hubs: mainstreaming digital agriculture	FINT	01/06/2017	Kilkenny, Ireland	FINT discussed water relevant
Other type of event	Circular Economy for Greece	FINT	16/12/2017	Athens, Greece	FINT intr
EU-related event	EC private Workshops in preparation of the study for IoT cross-domain Business Models	FINT	30/01/2017	Brussels, Belgium	FINT was invited validate the rele study. INCOV managing irri other partners
Other type of event	1st Innotalk of Caterda DAM from the Univeristy of Valencia	UPC	01/05/2017	Valencia, Spain	Title: "New
EU-related event	ICT4WATER cluster event	AIMEN	01/12/2017	Brussels, Belgium	
EU-related event	Joint InfoDay on Digital solutions for water and H2020 Societal Challenge	AIMEN	22/11/2017	Santiago de compostela, Spain	
EU-related event	WssTP brokerage event	AIMEN	29/09/2017	Brussels, Belgium	

Information

ainable Conversion Of Wastewater In Bioenergy

nd social life cycle approach to resource recovery

es Recovery and Valorisation and its role for SuPER-W

Poster INCOVER

Poster: INCOVER

and presented INCOVER's smart irrigation controller and data-availability within the context of a Digital Innovation Hub .

and presented INCOVER's smart irrigation controller and data-availability within the context of a Digital Innovation Hub.

roduced INCOVER project to the event's participants

d to attend these two events in order to co-explore and then levant assumptions proposed by PwC, EC contractor for this /ER's story was highly appreciated since it invlolves IoT for igation water but at the same time IoT could also support 's' water-relevant technologies paving the way to a holistic IoT-enabled Water Management approach.

techonologies for resource recovery from wastewater"

INCOVER presentation

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EU-related event	Porto Water Innovation Week 2and EIP water conference.	AQUALIA	26/09/2017	Porto, Portugal	AQUALIA prese
Face-to-face meeting	Encuentro UCA-empresas Gestoras de aguas de Cadiz, organized by La asociacion de abastecimiento de agua y saneamiento de andaluica, ASA andalucia and the University of Cadiz	AQUALIA	22/06/2017	Spain	Presen
Face-to-face meeting	Technical Conference "Tratamiento de aguas residuales en pequeñas aglomeraciones urbanas de Castilla-La Mancha" organized by AGUASRESIDUALES.INFO and the CENTA Foundation, in collaboration with the Junta de Castilla La-Mancha, (Water and Water Infrastructure Agency) and the Tajo and Guadiana Hydrographic Confederations	AQUALIA	29/11/2017	Toledo, Spain	Pre for
Scientific conference	AlgaEurope 2017	AQUALIA, UFZ, IBET	7/12/2017	Berlin, Germany	1) Poster : "Inno wastewater production of po cultures trea Raceways geo project 3) Sustai "Algae bion
Scientific conference	Regatec Congress	AQUALIA, UVA	01/05/2017	Verona, Italy	From wastewat
EU-related event	European Nutrient Event organized by ESPP	AU, AQUALIA, AIMEN	19/10/2017	Basel, Switzerland	
Scientific conference	WETPOL 2017 "7th International Symposium for Wetland Pollutant Dynamics" at Montana State University	DTI, AU	19/08/2017	Montana, USA	Presentation
Business-oriented event	IoT Solutions World Congress	FINT	03/10/2017	Barcelona, Spain	FINT present
Scientific conference	9th European Symposium on Biopolymers (ESBP)	IBET	01/07/2017	Toulouse, France	oral presentatio for polyhydroxy
Scientific conference	4th Water Research Conference	IBET	10/09/2017	Waterloo, Ontario, Canada	poster presenta through polyh
		1	1		

1

ented two presentations where INCOVER information was disseminated.

ntation of wastewater treatment with microalgae

esentation of the INCOVER system developed r the purification of wastewater by microalgae

ovative technologies for a cost-effective biogas upgrading in [•] treatment plants" + Poster : "HRAP retrofitting for the olyhydroxyalkanoates using bacterial photosynthetic mixed ating domestic wastewater and agricultural wastes" 2) ometry and mixing optimization for the H2020 INCOVER inability assessment of novel HRAP technologies in WWT 4) mass production- On the road to market deployment".

ter to biofuel: a novel up-grading technology integrated in WWTPs .

of P removal technologies , Constructed wetland design preconference workshop

ted "The smart irrigation functionality developed within INCOVER project".

on "Development of photosynthetic mixed culture systems yalkanoates production for the valorisation of wastewater and agricultural wastes".

ation: "Valorisation of wastewater and agricultural wastes hydroxyalkanoates production with photosynthetic mixed cultures"

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Scientific conference	Journée Technique Assainissement Intelligent - HYDREOS	OIEau	16/11/2017	Strasbourg, France	
Other type of event	WWWeek : Water to mitigate climate change : beyond the obvious : Energy recovery from wastewater and sludge: how circular economy is part of the solution?	OIEau	27/08/17	Sotckholm, Sweden	INCOVER project
Scientific conference	International health and environment Conference at Beijing Union University	RECIRKU	02/12/2017	Beijing, China	Recycling and from H
Scientific conference	the Bioeconomy Matchmaking "From the molecule to the market"	UFZ	03/2017	Halle, Germany	2 or
Scientific conference	"Forum Italiano sulle Tecnologie Microalgali"	UPC	05/04/2017	Palermo, Italy	" Production of p systems". En
Scientific conference	ICEEMO, "9th International Conference on Environmental Engineering and Management"	UPC	06/09/2017	Bologna, Italy	Title: "Nutrient metabolites pro Enrica
Scientific conference	Meta 13 congreso espanol de tratamiento de aguas	UPC	18/06/2017	Leon, Spain	Bioenergía, bi agrícola tratad
Scientific conference	7th International Conference on Biotechniques for Air Pollution Control and Bioenergy	UVA	19/07/2017	La Coruna, Spain	UVA presente up
Other type of event	European Researchers' Night 2017 in Valladolid	UVA	15/09/2017	Valladolid, Spain	
EU-related event	Water Innovation Europe 2018 : Promoting market- ready water innovations - investors café	AIMEN	13/06/2018	Brussels, Belgium	
Other type of event	Climathon Santiago de Compostela	AIMEN	26/10/2018	Santiago de compostela, Spain	INCC
EU-related event	10th Conference on EU research and innovation framework programme in Spain	AIMEN	20/11/2018	Toledo, Spain	
EU-related event	Water Knowledge Europe (WssTP event)	AIMEN	28/11/2018	Brussels, Belgium	

t was cited as an example of energy recovery solution from wastewater and biomass

Utilization of Valuable Nutrients and Organic Substances uman Wastewater, by Help of Natural Technology

ral presentations (LSCA + yeast-based products)

polymers by cyanobacteria grown in wastewater treatment rica Uggetti, Dulce Arias, María Jesús García Galán, Joan García.

ts limitation and permanent light as strategies to improve oduction in wastewater-borne cyanobacteria". Dulce Arias, a Uggetti, María Jesús García Galán, Joan García.

ioproductos y agua de riego a partir de aguas de drenaje las con microalgas: proyecto semi-industrial demostrativo INCOVER.

ed "Influence of the temperature and alkalinity on biogas ograding in algal-bacterial photobioreactors".

INCOVER project

OVER: Innovation in circular economy for water

poster

INCOVER project

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Other type of event	CONAMA Conference	AIMEN	28-29/11/2018	Madrid, Spain	
EU-related event	ICT4Water cluster session on the ICT2018 event	AIMEN, FINT	5-6/12/2018	Viena, Austria	
Business-oriented event	iWater – International integrated water cycle show	AIMEN, ISLE	13/11/2018	Barcelona, Spain	Platfor http://www. INCOVER projec
EU-related event	FERTINNOWA congress	AQUALIA	03/10/2018	Almeria, Spain	Oral presenta
Scientific conference	Algae Tech Conference 2018	AQUALIA	19/09/2018	Munich, Germany	WAS ⁻
Business-oriented event	H2Orizon	AQUALIA	19/09/2018	Seville, Spain	Or
Face-to-face meeting	Encuentro sobre "Tratamiento de aguas residuales en pequeñas aglomeraciones urbanas de Extremadura"	AQUALIA	12-13/12/2018	Mérida, Spain	"[
Business-oriented event	Danish water forum	AU			
EU-related event	AquaNES Workshop Market Needs & Potential for Natural Water Treatment Systems in Greece & the Eastern Mediterranean	AUTARCON	22/11/2018	Athens, Greece	Presentation IN
Scientific conference	3rd International Conference on Solar Energy Solutions for Electricity and Water Supply in Rural Areas	AUTARCON	01/11/2018	Cairo, Egypt	Solar Driven In Disinfect
Other type of event	3rd European Nutrient Event, ECOMONDO	DTI, ICLEI, RECIRKU	8-9/11/2018	Rimini, Italy	roundtable title bio-based fert Horizon 20
Business-oriented event	Globe Forum 2018, Innovation Expo for Sustainable Business	FINT	14/03/2018	Vancouver, Canada	FINT had f2f me 1:40pm - 3 trasnfreability proje

INCOVER	project
INCOVER	project

INCOVER presentation

rm presentation of INCOVER project at Tech Hub .iwaterbarcelona.com/en/techhub on 13th November + ct is also shortlisted to iWater Awards for Best Innovation

ation: "Producing irrigation water and bioproducts from wastewater"

LARGE RACEWAY DESIGN FOR TE WATER TREATMENT BY ALGAE CULTIVATION H2020 INCOVER PROJECT

ral presentation: "Smart water management"

Depuración sostenible mediante microalgas"

ICOVER project: Inline electrolysis for CW effluent reuse in Spain

nline Electrolysis and its Application in Water Treatment – tion of Drinking and Wastewater + Arsenic removal

ed 'Growing sustainable business opportunities with tilisers' + diapo ENE3 - Overview of nutrient related D20 and Life projects in Europe - Vincent Gente -EASME

eetings and an oral presentation in Disruptor Theater (Mar 16 2018 3:40pm) where it presented its IoT technology and its ty to the CleanTech/ Bioeconomy industry with INCOVER

ect being a well-discussed lighting paradigm of it.

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i de la companya de la company		i	i i		i
Other type of event	1st Farming Conference of SASOEE	FINT	27/03/2018	Athens, Greece	FINT met people and pitched its p
Business-oriented event	83rd Thessaloniki International Fair	FINT	8-18/09/2018	Thessaloniki, Greece,	a panel discussio
Other type of event	Smart Statistics for Smart Cities	FINT	5-6/10/2018	Kalamata, Greece	
Other type of event	Water conference 2018	FINT	21/11/2018	Athens, Greece	
Face-to-face meeting	Marketing INCOVER irrigation controller and FINT's digital technologies to Olive cooperative Kalyves Chalkidikis	FINT	15/06/2018	Thessaloniki, Greece	explaining wl sup
Face-to-face meeting	Marketing INCOVER irrigation controller to Olive cooperative AS Oleneia	FINT	03/10/2018	Kefalovryso-Aitoliko, Greece	explaining wł sup
EU-related event	EIP-AGRI seminar: Multi-level strategies for digitising agriculture and rural areas	FINT	12-13/12/2018	Antwerp, Belgium	FINT's work ar circular- oriente
Scientific conference	EcoSTP 2018	IBET	26/06/2018	Londo, Ontario, Canada	poster preser through polyh
Scientific conference	CHEMPOR 2018	IBET	02/10/2018	Aveiro, Portugal	poster presenta wastes and d
Other type of event	Local Renewables 2018: Urban Transformation to a Circular Economy	ICLEI, UFZ, RECIRKU	24-26/10/2018	Basel, Switzerland, Fribourg	1st part of the IN INCOVER. The w
Other type of event	International WS: A New Successful Economic, Industrial, Financial, Territorial Management Model SDGs & Circular Economy	ISLE	18/07/2018	Bologna, Italy	
Business-oriented event	IWA World Water Congress & Exhibition : Shaping Our Water Future	ISLE	17/09/2018	Tokyo, Japan	Turning
Business-oriented event	WEFTEC 2018 conference	ISLE	29/09/2018	New Orleans USA	Overview of

e from the Greek biggest cooperative in primary production products including the smart irrigation controller developed within INCOVER.

on, FINT's work in INCOVER (smart irrigation controller) was discussed

hy to digitalise Greek Agrifood and how INCOVER project pported the development of a relevant product

hy to digitalise Greek Agrifood and how INCOVER project pported the development of a relevant product

INCOVER orally discussed in relation to the digital and ed infrastructure planning that rural areas need to adjust to.

ntation: "Agricultural wastes and wastewater valorization hydroxyalkanoates production with photosynthetic mixed culture systems"

ation: "Polyhydroxyalkanoates production from agricultural domestic wastewater with phototrophic purple bacteria"

NCOVER session at the conference : general information on waste water utility of the future: A key player of the circular city?

g utilities challenges into low-carbon opportunities

Current, Next-to-Market, and Next Generation Resource Recovery Technologies

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Face-to-face meeting	Board meeting at Family Farmers South West Association , Familielandbruget Sydvest	RECIRKU	01/09/2018	Varde, Denmark	Recycling ar Substances f
Business-oriented event	O Caminho da Inovação '18 - Expo & Networking	SIMBIENTE	26/09/2018	Lisboa, Portugal	LCA and social l
Business-oriented event	TECNET Azores - Innovation Boundaries (Circular Economy Panel)	SIMBIENTE	16/11/2018	Lagoa, Azores, Portugal	Inno
Business-oriented event	AzoresTek – Boundaries of Innovation Business Exposition Lounge	SIMBIENTE	16-17/11/18	Lagoa, Azores, Portugal	INCOVER -
Scientific conference	8. Innovation Congress Chemistry and Biotechnology	UFZ	01/05/2018	Magdeburg, Germany	Poster "Yeast-b
Scientific conference	2 nd BRiA Conference "Biotechnology – Research and Industrial Applications"	UFZ	20/06/2018	Wrocław, Poland	Presentation "P
Scientific conference	8th International Conference on Algal Biomass, Biofuels and Bioproducts	UPC	11/06/2018	Seattle, USA	1) A biorefiner plant: from wa mechanistic m tubular photobio Sou
Scientific conference	26th European Biomass Conference and Exhibition	UPC	14/05/2018	Copenhagen, Denmark	Title: "Numerica
Scientific conference	11th International Society for environmental Biotechnology Conference	UPC	25/06/2018	Crete, Greece	1) Bioproducts photobioreacto du
Scientific conference	Bioresource Techonology for Bioenergy, Bioproducts and Environmental Sustainability	UPC	16-19/09/2018	Sitges, Spain	A biorefinery ap
Scientific conference	Seminar at "Universidad de Antioquia"	UVA	10/08/2018	Antioquia, Colombia	Tecnolog
Scientific conference	WaterEnergyNexus 2018	UVA	14-17/11/2018	Salerno, Italy	Microalgae-base
Scientific conference	1 st International Conference on Water Resources and Sustainability & 3 rd International Conference on Alternative Fuels, Energy and Environment.	UVA	28-31/10/2018	Nanjing/Yixing, China	New trends in and alkalinity or

nd Utilization of Water, Valuable Nutrients and Organic rom Human Wastewater, by Help of Natural Technology

life cycle approach on innovative wastewater technologies

ovative Approaches for a (in fact) Circular World

Innovative Technologies for Resources Recovery from Wastewater

based production of carboxylic acid validated through Life-Cycle Sustainability Assessment"

roduction of organic acids by the yeast Yarrowia lipolytica"

ry approach in a microalgae-based wastewater treatment stewater to bioproducts 2) Calibration and application of nodel for the prediction of microalgae growth in horizontal ioreactor 3)Wastewater Cultivated Microalgae as Bioenergy urce: Anaerobic Codigestion and Methane Yield

l investigation of hydrodynamic conditions in a pilot tubular photobioreactor."

s from wastewater: design and operation of a new hybrid or 2) Removal of pesticides and priority organic pollutants ring microalgae-based wastewater treatment

proach in a microalgae-based wastewater treatment plant: from wastewater to bioproducts

gías para la producción de Metano a partir de Biogas

ed processes as an energy efficient platform for wastewater reclamation and resource recovery

biogas upgrading + poster : "Influence of Liquid/Gas ratio photosynthetic biogas upgrading efficiency in an outdoors tubular photobioreactor".

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Scientific conference	AlgaEurope 2018	UVA, AQUALIA, IBET	4-6/12/2018	Amsterdam, Netherlands	Poster present treatment pla microalgae sy wastewater" + p HRAP RETROFITT
EU-related event	Powerstep final conference: Wastewater treatment plants as resource factories: no longer a dream	AIMEN	16/05/2018	Munich, Germany	Eco-techno
EU-related event	IFAT & RUN4Life: Stakeholder Engagement Evernt	AQUALIA, AIMEN, ISLE, DTI, SSP	17/05/2018	Munich, Germany	
Business-oriented event	World Congress on Industrial Biotechnology	BIOTREND	16/07/2018	Philadelphia US	
Scientific conference	Ecobio 2018 : 4 - 7 March 2018 Dublin, Ireland	IBET	08/03/2018	Dublin, Ireland	poster presenta for polyhydro
Other type of event	8th World Water Forum	OIEAU, SIMBIENTE	18/03/2018	Brasilia	INCOVER project "Africa – Medite Common Strate Circular Econom »by Edouard Be session « Nation and reuse and spea
Face-to-face meeting	Seminario Novedar "Hacia un balance positivo de energía en depuradoras"	UVA	03/04/2018	Madrid ,Spain	"Procesos de
EU-related event	Webinar of Record Biomap project	UVA	21/02/2018	online	
Face-to-face meeting	Workshop on Water quality and Disinfection	AUTARCON	13/03/2019	Arusha, Tanzania	Sustainable
Scientific conference	First European FOG SUMMIT	ICLEI	06/03/2019	Amsterdam, Netherlands	participation in

ntation : "Photosynthetic biogas upgrading in wastewater ants" and presentation "Carbon footprint assessment of ystems for water reuse and biofertilizer production from poster IBET "POLYHYDROXYALKANOATES PRODUCTION IN TED FOR WASTEWATER TREATMENT WITH PHOTOTROPHIC PURPLE BACTERIA "

ologies for Circular Economy - H2020 project INCOVER

Project overview, focus on N, P recovery

Poster

ation: "Utilization of photosynthetic mixed culture systems oxyalkanoates production from agricultural wastes and wastewater"

et was presented at the following sessions 1. « REUSE in the erranean – Europe" axis: Territorial Impact and Search for a eegy », by Eric Tardieu (general director). | 2. Reg.Med.4 « by: Reuse in the Mediterranean and its impact on territories Boinet 3. General director Eric Tardieu will participate in a bonal strategies for the promotion of waste water treatment d its link with water resources management" as a keynote aker + presented on Portuguese water platform

e Microalgas para la mejora de la eficiencia energética de EDARs" and Safe Water Supply Treatment, Quality Monitoring, Metering, Financing n panel on: "Zero Waste by 2020: Resource Recovery for a more Circular City".

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Business-oriented event	WWT wastewater conference	ISLE	29/01/2019	Birmingham, UK	
Face-to-face meeting	KTC intermunicipal network, bringing together several municipalities of Sealand region in Denmark	RECIRKU	14/03/2019	Naestved, Danmark	Udvik Deve
Scientific conference	IX Debate Cycle from the University Lusófona of Porto	SIMBIENTE	11/01/2019	Porto, Portugal	
Business-oriented event	FRESKON, The International Trade Show for Fruits and Vegetables	FINT	11-13/ 4/ 2019	Thessaloniki, Greece	Fu
Other type of event	Workshop : ISO/TC 282/SC 03 "Risk and performance evaluation of water reuse systems" -	AIMEN and UNE (asociacion espanola de normalizacion)	20/05/2019	Lisboa, Portugal	
Other type of event	Marketing INCOVER irrigation controller to farmers and cooperatives in an event co-organised with the local municipalities	FINT	07/02/2019	Elassona, Greece	explaining wl sup
EU-related event	ICT4water cluster annual meeting	AIMEN	11/06/2019	Brussels, Belgium	
EU-related event	Water innovation Europe (WssTP)	AIMEN	12/06/2019	Brussels, Belgium	Presentation em (energy recovery biogas upgrading
Scientific conference	Anaerobic Digestion Conference AD16	AIMEN, UVA, UPC	23/06/2019	Delft, Netherland	Poster : VFA mon control (AIMEN), valorization: Key Biogas upgrading plants: Poster by Co-digestion and Oral by Ivet Ferr
Scientific conference	8th International Symposium for Wetland Systems for Water Pollution Control (WETPOL)	AU, AUTARCON, AIMEN, <mark>RECIRKU,</mark> DTI ?	17/06/2019	Aarhus, Denmark	Combination of reuse in Spain
Scientific conference	IWA Conference on Algal Technologies and Stabilisation Ponds for Wastewater Treatment and Resource Recovery - IWAlgae 2019	AIMEN, IBET, UVA, UPC, AQUALIA	01/07/2019	Valladolid, Spain	INCOVER specific presentations +
EU-related event	INCOVER Presentation in CYCLALG Project	INCOVER Presentation in CYCLALG Project	15/04/2019	Pau, France	

INCOVER presentation

kling af nye recirkulerende spildevandsløsninger elopment of new recycling waste water solutions

Recovering Resources from Wastewater

tureIntelligence-DigitalGreece-FreskonEdition

INCOVER presentation

hy to digitalise Greek Agrifood and how INCOVER project ported the development of a relevant product

nphasizing INCOVER contribution to the water-energy nexus ry techniques: anaerobic co-digestion and photosynthetic ng system)

nitoring using UV/VIS spectroscopy for anaerobic digestion)/ Recent advances in biological biogas upgrading and ynote by Raul Muñoz (UVA)/

ng using algae-bacterial processes in wastewater treatments y UVA /

d pre-treatment improve microalgae anaerobic digestion: rer (UPC)

VFCW and solar driven electro-chlorination for wastewater

ic session with 6 oral presentations + other oral several posters

INCOVER Project

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EU-related event	Convegno IMAP Project (Integration of MicroAlgae Based Processes in Wastewater Treatment)		31/05/2019	Cinisello Balsamo, Italy	Microalgae-base
Business-oriented event	1st Summit of the Organic Fertiliser Industry in Europe (SOFIE)	RECIRKU, RENERGIE, DTI	04/06/2019	Brussels, Belgium	Extracting fertili
Scientific conference	7TH INTERNATIONAL CONFERENCE ON SUSTAINABLE SOLID WASTE MANAGEMENT	IBET	26/06/2019	Heraklion, Crete Island, Greece	oral presentatio ponds for polyhy
Business-oriented event	World Congress on Industrial Biotechnology	BIOTREND	08/07/2019	Des Moines, USA	PHA extraction f
Business-oriented event	CYCLEAU Bordeaux	OlEau	11/04/2019	Bordeaux, France	INCOVER preser

ed wastewater treatment: from wastewater to bioproducts

zer by help of plants and special adsorption materials

on: "Converting HRAP into phototrophic purple bacteria ydroxyalkanoates production from wastewater"

rom mixed microbial cultures

ntation - Innover pour valoriser le potentiel des eaux usées

8.7 Annex F: Project presentation materials

This annex presents the last project presentation materials produced. The materials produced at the beginning of the project (leaflet n°1, poster, roll-up, and standard power point presentation) are not included, because they have already been presented and submitted in the updated version of Deliverable 5.1, at M28.

8.7.1 One-page project description



Considering the current global water scarcity and the expensive operation and maintenance cost of **wastewater treatment**, the **INCOVER** concept has been designed to move wastewater from a waste stream into a source of new added-value bio-products, contributing to **circular economy**.



INCOVER project is developing innovative and sustainable technologies for a resource recovery-based treatment of wastewater. INCOVER technologies are being operated and optimized at three demonstration sites. From municipal, agricultural and industrial wastewater, they will permit to recover energy, nutrients and added-value products. To improve the efficiency of the processes, optical sensing, smart soft sensors and online operation systems are developed.

Case Study - Leipzig, Germany

Treated effluents: C-rich industrial wastes and grey wastewater Technologies: Yeast based organic acid production, Hydrothermal carbonisation (HTC) Bio-products: organic acids, biogas, biochar

Case Study - Chiclana & Almeria, Spain

Treated effluents: urban wastewater and molasses

Technologies: High Rate Algae Ponds, photosynthetic biogas upgrading, evaporative systems, planted filters, solar driven electro-chlorination, smart irrigation system

Bio-products: bioplastics (PHA), biomethane, biofertiliser, irrigation water

Case Study - Barcelona, Spain

Treated effluents: urban wastewater and agricultural runoff Technologies: PhotoBioReactors, photosynthetic biogas upgrading, sludge

treatment wetlands, solar driven ultrafiltration, sol-gel coatings adsorption columns, smart irrigation system **Bio-products:** bioplastics (PHA), biomethane, biofertiliser, phosphorus, irrigation water



In comparison with conventional wastewater treatment plants, INCOVER solutions will allow :

- To reduce the energy demand (at least of 50%)
- To reduce GHG emissions up to 80% using CO₂ sequestrations processes
- To reduce the overall operation and maintenance cost by 50%

The different technologies are being evaluated according to their environmental, social and economic performances (Life Cycle Sustainability Assessment). Based on these results, a Decision Support System (DSS) is being developed to provide assistance to water authorities at comparing various technology alternatives and selecting the best future investments. The market uptake of INCOVER technologies and products are boosted by specific workshops with key stakeholders.

Dates: June 2016 - May 2019

Total funding: 7.2 millions €

Partners: 18 partners from 5 countries





The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 689242. The dissemination of results herein reflects only the author's view and the Commission is not responsible for any use that may be made of the information it contains.



8.7.2 Leaflet n°2 describing the case studies

Taking into account the current global water scarcity and the high cost of wastewater treatment, INCOVER project is developing innovative and sustainable technologies for a resource recovery-based treatment of wastewater.

Case study 3

Leipzig

Case study 1 Barcelona

Case study 2 Chiclana & Almería INCOVER technologies are being operated and optimized at three demonstration sites. The main objective of the project is to reduce the overall operation and maintenance cost of conventionnal wastewater treatment by 50% and alleviate water scarcity. Www.incover-project.eu Incover-contact@oieau.fr

@INCOVERproject

Total funding: 7.2 millions €

Dates: June 2016 - May 2019

Coordination: AIMEN Technology Centre

INCOVER consortium



Office International de l'Eau

Realisation: OIEau - February 2019

Front page photo: From left to right: samples of agricultural wastewater, PBR effluent, settler effluent, and final postreatments effluent © UPC





Innovative Eco-Technologies for Resource Recovery from Wastewater

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The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 689242. The dissemination of results herein reflects only the author's view and the Comission is not responsible for any use that may be made of the information it contains.

Case study 1 - Barcelona, Spain



35 m³ PBR volume

Production of biomass **21 gVS/m²d**

94–99% CH₄ Biomethane composition

At the demonstrative plant in Barcelona, a microalgae based system is tested for wastewater treatment and resource recovery. The plant consists of 3 semi-closed horizontal tubular photobioreactors (PBRs) using agricultural runoff and urban wastewater as feedstock. The operational conditions are adjusted in order to select cyanobacteria, microalgae able to accumulate polyhydroxybutyrates, which can be used for bioplastics production. The biomass is harvested and used for biogas production by means of anaerobic co-digestion (AcoD) with secondary sludge. The biogas is upgraded in an absorption column to increase methane concentration. The digestate from the AcoD is further stabilized and dewatered in a sludge wetland, producing a biofertilizer. On the other hand, wastewater is post-treated in a solar driven ultrafiltration and disinfection system, and in nutrients recovery columns filled with an adsorptive material. Eventually, the reclaimed water is applied in an agricultural field to grow crops by means of a smart irrigation system.

Case study 2 - Chiclana & Almería, Spain

In Almería, wastewater is treated by a 3000m² High Rate Algae Pond (HRAP) and tertiary treatment composed of 250m² planted filter with natural material for enhancing phosphorus recovery. Irrigation water is finally obtained and reused with a solar anodic oxidation disinfection and smart irrigation system. The biomass obtained is anaerobically digested and biomethane is produced by an innovative biogas upgrading system.

In Chiclana, PHA production is through a two-stage anaerobic phototrophic purple bacteria pond (PPBPonds) system, obtaining up to 25 g PHA/m²day. Two 500 m² HRAPs treat wastewater and the algae biomass used is harvested and transformed into biogas through thermal pre-treatment and anaerobic co-digestion. A 250m² evaporative system is used for the digestate stabilization and nutrient recovery, with zero liquid discharge.



Wastewater reused

25g PHA/m²d

Bioplastics production

pplica



Production of biogas **0.85–1.0** m³/kg_{Volatile Solid}



Case study 3 - Leipzig, Germany

At the demo plant in Leipzig, wastewater and bio-wastes from the food industry are treated by a three-step process:

1) Up to 170 kg/m³ Citric Acid (CA) is produced by the non-conventional yeast *Yarrowia lipolytica* under non-sterile condition from waste frying oil as carbon rich source and a kitchen cleaning WW from canteen operating. This **yeast based bioprocess** is performed in a modified conventional 1 m³ container system. The produced CA solutions will be used for cleaning or descaling purposes.

2) The residual yeast biomass from the CA bioprocess in combination with waste frying oil are the substrates for mesophilic anaerobic co-digestion (AcoD) to produce **biogas** in a range of $0.85 - 1.0 \text{ m}^3/\text{kgVolatileSolid}$.

3) In the final step anaerobic digestate is treated by **hydro-thermal carbonization** transforming the AcoD residuals into **valuable carbonized products** (bio-coal, carbon black, bio-fertilizer) applicable both for **fertilizing** and **energy purposes**.

Production of Citric Acid **100–170** kg/m³





8.7.3 Information brochure for wastewater management experts



2nd INNOVATION WORKSHOP

Agenda & Technology summaries

Date: Wednesday 27th February 2019 Time: 8:30AM – 3:30PM Location: Plaza España S/N 11130, Chiclana de la Frontera (Hosted by Chiclana Natural)

Contact:

Babi Uku: babi.uku@isleutilities.com

Elvira Serra: elvira.serra@isleutilities.com



The INCOVER project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 689242



Meeting Agenda

PICK UP & TRAVEL	. TO CHICLANA	
08:30 - 9.00	Pick up from Jerez	 Pick up locations by coach: Jerez train station Tryp Hotel Other(s) TBC
WELCOME		
10:00	Welcome INCOVER update	Blanca Antizar Isle, UK (Facilitator, INCOVER Innovation Manager) Juan Antonio Alvarez AIMEN, Spain (INCOVER Coordinator)
CASE STUDY 1		
10:15	Case study 1 Presentation	Ruben Montero Universitat Politècnica de Catalunya, Spain
10:25	Sludge Treatment Wetlands	Peder Gregersen Center for Recirkulering, Denmark
10:40	Sol-gel coated adsorption column	Carlos Arias University of Aarhus, Denmark Frances Blaikie Denmark & Teknologisk Institut, Denmark
10:55	Break	
CASE STUDY 2		
11:20	Case study 2 Presentation	Enrique Lara Aqualia, Spain
11:30	High Rate Alga Ponds (HRAPs)	Enrique Lara Aqualia, Spain
11:45	Biogas upgrading	Raquel Lebrero Universidad de Valladolid, Spain
12:00	Phototrophic Purple Bacteria Ponds (PPBPonds) + PHA extraction	Joana Fradinho Instituto de biologia experimental e tecnologica, Portugal
OPTICAL SENSING	& HTC	
12:15	Optical Sensing	Francisco Lorenzo AIMEN, Spain
12:30	Hydrothermal Carbonisation (HTC)	Rainer Zenthöfer Artec Biotechnologie, Germany
12:45	Lunch	
SITE VISIT		
13:30	Travel to El Torno WWTP	5 - 10 mins to site (transport provided)
14:00	Site visit	El Torno WWTP, Chiclana
15:30	Meeting close - Return to Jerez	Drop-off up locations by coach: • Jerez train station • Tryp Hotel





Case Study 1 - Presenting technologies



Case study 1 overview – Barcelona, Spain

• Sludge Treatment Wetland

Peder Gregersen (Center for Recirkulering, Denmark)

The Sludge Treatment Wetland (STW) is being demonstrated to evaluate the sanitation aspects and potential recovery of nutrients, including P and K, from the humified sludge. The operational principle of the STW calls for the distribution of sludge on the surface of the bed, planted with common reed (*Phragmites australis*). During the start-up period, the loading increases gradually from a few kilogram dry matter/m² up to 35 kg dry matter/m² in the first year. As the plants developed, in the second growing season, the loading is increased to full capacity of 60 kg dry matter/m². The start-up and steady operation at full capacity is being monitored and the water drained from the sludge (if not all evapotranspired) be pumped through wells containing P-absorbent material coated with sol-gel coating to increase the competence of the material.

• Sol-gel coated adsorption column

Carlos Arias (University of Aarhus, Denmark) - Frances Blaik (Denmark & Teknologisk Institut)

A simple idea with massive scalable application opportunities. An environmentally innocuous and degradable material that can be used as an in-line filter that captures phosphorous from waste water streams, reducing the phosphorous content of the water from 10-15 mg/L to below 1 mg/L. In agricultural and municipal wastewater stream flows at ca. 6 m^3 /day loaded with 8 mg/L phosphorous, 300 kg of material has the capacity to capture 7.2 kg of phosphorous in 3 months, which is comparable to solely chemical phosphorous removal methods, with an additional benefit of maintaining the phosphorous in a form that can be accessed by plants in a root contact release process.





Case Study 2 - Presenting technologies



Case study 2 overview - El Torno WWTP, Chiclana, Spain *site visit location*



Case study 2 overview - El Toyo WWTP, Almeria, Spain

High Rate Algae Ponds

Enrique Lara (Aqualia)

Wastewater is treated by two 500 m² High Rate Algae Ponds (HRAPs) at the El Torno WWTP in Chiclana. The algae biomass used is then harvested and transformed into biogas through thermal pre-treatment and anaerobic co-digestion. The digestate is processed through an evaporative system for stabilisation, carbon and nutrient recovery whilst the biogas is upgraded through an innovative upgrading system to produce biomethane. At the El Toyo WWTP in Almería, a demo full-scale 3000 m² HRAP is installed to obtain irrigation quality water. This HRAP system treats pre-treated wastewater and is the first full-scale HRAP of its size in the world treating wastewater directly without any anaerobic or primary clarifiers. Wastewater is simply pre-treated by a grit and grease removal, while a symbiotic culture of





algae-bacteria is responsible for high removal of the organic matter (>95% as BOD5), N (>70%) and P (>85%). The HRAPs are mixed by a paddle wheel or alternatively by a submersible mixer system patented by Aqualia, the LEAR® (Low Energy Algae Reactor), which is able to reduce mixing energy by 80%. After harvesting by flotation, the effluent is treated using planted filters with natural material for enhancing P and N recovery and solar anodic oxidation and smart Irrigation are used for disinfection and water reuse respectively.

Biogas upgrading

Raquel Lebrero (Universidad de Valladolid, Spain)

Photosynthetic biogas upgrading is based on the combined action of alkaliphic microalgae and bacteria prior transfer of the main contaminants of biogas into the cultivation broth (CO₂ and H₂S). Solar energy drives the photosynthetic assimilation of the CO₂ present in biogas into algal biomass, with the concomitant production of an O2 that supports the in-situ oxidation of H₂S to SO₄²⁻. This technology was evaluated with real biogas (270-460 L/h, 60-70%CH₄) in a 32m² HRAP at the Chiclana site using domestic wastewater (at 3.5 and 8 days of retention time) and centrate (73 days of retention time), with H₂S removal efficiencies of 86-100% and CO₂ removal efficiencies of 55-90%. In addition, a control strategy to maintain a consistent biomethane quality was optimised and implemented in Chiclana.

Phototrophic Purple Bacteria Pond & PHA extraction

Joana Fradinho (IBET, Portugal)

PHA production occurs through a two-stage anaerobic-phototrophic purple bacteria pond (PPBPond) system. In the first stage, a 20 m³ anaerobic UASB reactor is used to treat anaerobically a mixture of wastewater and molasses while the second anaerobic stage take places in two 32 m² PPBPonds that resulted from retrofitting HRAPs for PHA production with phototrophic purple bacteria. PHA production is based on the use of wastewater as a renewable feedstock using the carbon contained in the wastewater as a low-cost substrate for PHA accumulation in mixed bacterial communities that do not have associated costs with maintaining aseptic conditions. The PHA accumulating strategy applied allows simultaneous PHA accumulation and P recovery, while providing a consistent and low-cost (very low external aeration needed) wastewater treatment. PHA-containing biomass will be harvested, and through a series of mild treatments using environmentally friendly solutions, the PHA is extracted and purified to different purity grades. The innovative downstream PHA extraction and purification is based on a robust and effective organic solvent-free process.





Case study 3 – Integrated INCOVER solution (Optical sensing) and HTC

Optical sensing

Francisco Lorenzo (AIMEN, Spain)

Tailored optical sensing, based on low-cost multiwavelength photodiodes and active illumination are being developed and validated for the quantification of PHA and organic compounds. This monitoring hardware feeds an online operation system based on machine learning algorithms that improves and sustains the efficiency of the bioprocesses.



Hydrothermal Carbonisation

Rainer Zenthöfer (Artec, Germany)

HTC is a process which can convert any kind of biomass into valuable carbonized products from peat to carbon black, depending on time, temperature and pressure. The HTC technology implemented for INCOVER is a 50 L process volume installation, to produce bio-coal up to 24 MJ/kg of calorific value. The 'ideal' input ratio between dry and liquid matter content is 20/80, which also corresponds to the HTC result. 50L process volume results in 10L HTC carbons. The bio-products which can be obtained: - HTC peat, after 0.5 hour; - HTC biochar: -> for energetic purposes (after 2 - 6 hours; after 2 hours a calorific value of 18 to 20 MJ/kg can be reached, after 4 hours, 20 to 22 MJ/kg). -> or a perfect fertilizer (after 2 - 4 hours) offering a 5-year nutrient supply and irrigation water savings of up to 50%. - HTC biochar, offering qualities like carbon black (after 8 hours); - HTC biochar offering qualities like activated coal (after 10 - 12 hours).





Summary of all INCOVER Technologies

		APPLIES TO		
TECHNOLOGY	DEVELOPER	Case study 1	Case study 2	Case study 3
Photobioreactor (PBR)	Universitat Politècnica de Catalunya, Spain	•		
Sludge Treatment Wetlands	Center for Recirkulering, Denmark	•		
Sol-gel Coated Adsorption Columns	Aarhus University, Denmark Denmark & Teknologisk Institut, Denmark	•		
Solar Driven Ultrafiltration	SolarSpring, Germany	•		
Smart irrigation	Future Intelligence - Greece	•	•	
Phototrophic Purple Bacteria Pond (PPBPonds)	Instituto de biologia experimental e technologica (IBET), Portugal		•	
PHA extraction	Biotrend - Portugal	•	•	
High rate algae pond (HRAP)	AQUALIA - Spain		•	
Biogas Upgrading	Universidad de Valladolid, Spain	•	•	
Evaporative System & Planted Filter	Center for Recirkulering, Denmark		•	
Solar Power Anodic Oxidation	Autarcon, Germany		•	
Yeast-based Organic Acid Production	Helmholtz-Zentrum Fuer Umweltforschung, Germany			•
Hydrothermal carbonisation (HTC)	Artec Biotechnologie, Germany			●
Optical Sensing Monitoring	Centro Tecnologico AIMEN, Spain	•	•	•
Decision support system (DDS)	Helmholtz-Zentrum Fuer Umweltforschung, Germany & Simbiente - Portugal	•	•	•

