Ref. Ares(2025)9506974 - 05/11/2025

Accelerating circular bio-based solutions integration in European rural areas

Regional Bioeconomy Platform Success Stories Identification (1st update)

Responsible Author: Eleni Intzidi, Clio Christopoulou and Maria Plota (ICO)

Grant Agreement No.	101060166
Project Acronym	BioRural
Project Title	Accelerating circular bio-based solutions integration in European rural areas
Type of action	CSA - Coordination and Support Actions
Horizon Europe Call Topic	HORIZON-CL6-2021-CIRCBIO-01-08: Mainstreaming inclusive small-scale bio-based solutions in European rural areas
Start – ending date	1 September 2022 – 31 August 2025
Project Website	https://biorural.eu/
Work Package	WP2: European Rural Bioeconomy Network and success stories
WP Lead Beneficiary	AVEBIOM (Short name)
Relevant Task(s)	T2.4 Identification of success stories in each RBP
Deliverable type | Dissemination level	R – Report | PU: Public
Due Date of Deliverable	31 August 2025
Actual Submission Date	26 August 2025
Responsible Author	Eleni Intzidi, Clio Christopoulou and Maria Plota (ICO)
Contributors	All partners
Reviewer(s)	André Pires (CBE)

Document History

Date	Version	Changes	Contributor(s)
09/08/2025	V0.1	First Version	Eleni Intzidi, Clio Christopoulou and Maria Plota (ICO)
20/08/2025	V0.2	Second Version	André Pires (CBE)
25/08/2025	V0.3	Third Version	Eleni Intzidi, Clio Christopoulou and Maria Plota (ICO)

Disclaimer
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them

Funded by the European Union

© BioRural Consortium, 2025

BioRural Consortium			
Participant Nr.	**Participant organisation name**	**Short name**	**Country**
1	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	CERTH	EL
2	DELPHY BV	DELPHY	NL
3	ASSOCIATION DU POLE DE COMPETIVITE VALORIAL	VALORIAL	FR
4	NATUREPLAST SAS	NATUREPLAST SAS	FR
5	IZES GGMBH	IZES	DE
6	AARHUS UNIVERSITET	AU	DK
7	INSTYTUT UPRAWY NAWOZENIA I GLEBOZNAWSTWA, PANSTWOWY INSTYTUT BADAWCZY	IUNG-PIB	PL
8	VYTAUTO DIDZIOJO UNIVERSITETAS	Vytauto	LT
9	LATVIJAS BIOZINĀTŅU UN TEHNOLOĢIJU UNIVERSITĀTE	LLU	LV
10	ASOCIACION ESPANOLA DE LA VALORIZACION ENERGETICA DE LA BIOMASA	AVEBIOM	ES
11	UNIVERSIDADE DE COIMBRA	UC	PT
12	CENTRO DA BIOMASSA PARA A ENERGIA	CBE	PT
13	AIEL ASSOCIAZIONE ITALIANA ENERGIE AGROFORESTALI	AIEL	IT
14	REFRAME FOOD ASTIKI MI KERDOSKOPIKI ETAIRIA	RFF	EL
15	INCOMMON NON-PROFIT CIVIL LAW COMPANY	ICO	EL
16	UNIVERZA V LJUBLJANI	UL	SI
17	ALGEN, CENTER ZA ALGNE TEHNOLOGIJE, DOO	ALGEN	SI
18	ASOCIATIA GREEN ENERGY	GEA	RO
19	ZDRUZENIE PLATFORMA ZA ZELEN RAZVOJ SKOPJE	GGP	MK

Executive Summary

Deliverable 2.7: Regional Bioeconomy Platform Success Stories Identification (1st update) concerns the updated version of D2.6, falls under Task 2.4: Identification of Success Stories in each Regional Bioeconomy Platform (RBP) and contains additional success stories as analysed and reported by the four BioRural RBPs.

The report presents the guidelines that were developed and shared by incommon for the proper Task implementation and uniform reporting of the success stories by all partners and the success stories that were identified per RBP and bioeconomy theme, together with short analysis of key features that contributed to the success of these endeavors.

Deliverable 2.7 may serve as an inventory of rural circular bioeconomy best practices, to inspire and support the uptake of relevant initiatives. To this end, the identified success stories have been also uploaded on the BioRural toolkit and are now part of the ERBN, BioRural's rural bioeconomy network, contributing to and furthering the goals of the project.

Table of Contents

List of Figures

List of Tables

1 Introduction

For the purposes of Task 2.4: Identification of Success Stories in each Regional Bioeconomy Platform (RBP), BioRural partners need to identify bio-based solutions across Europe and across the five bioeconomy themes that constitute 'success stories'.

The KPI is to identify at least 20 success stories in total, 5 per RBP covering all themes of the bioeconomy, i.e. 1 success story / bioeconomy theme / RBP. New success stories will be continuously invited to increase the pool of best practice examples.

In the framework of the first deliverable of Task 2.4 (Deliverable 2.6), 20 success stories were identified, meeting the first target of the Task, but the achievement of identifying 1 success story / bioeconomy theme / RBP was pending.

The current report (Deliverable 2.7) constitutes the updated version of Deliverable 2.6 and presents the second batch of the success stories identified per RBP, together with the final results achieved with the completion of Task 2.4 activities.

In order to facilitate the process, the consortium, led by incommon (task leader), followed the guidelines that had already been developed in the beginning of the Task, concerning the criteria of what constitutes a success story based on the 8 success stories of the project and for the identification of these additional success stories. The Task was successfully completed and all the KPIs were achieved, as will be presented in the following sections.

1.1 Methodology

The methodology for completing the task successfully included the following steps:

1. Update Guidelines for the completion of the task, including the targets to be met and the timeline to follow
2. Monitor progress via a shared folder created on Google Drive where partners upload their templates and update an excel spreadsheet for tracking progress
3. Upload identified success stories on the BioRural Toolkit

1.2 Criteria for Success Stories

The bio-based solutions need to fulfill certain criteria, in order to constitute 'success stories'. These criteria have been identified at Task 2.3, which analysed the innovation processes of the 8 success stories that were initially part of the project, and were presented in Deliverable 2.5 prepared by Valorial.

The elements from Deliverable 2.5 upon which the criteria for success, applicable to this task (Task 2.4), have been based are summarised below:

- The transition to a circular bioeconomy in Europe is reliant on regional expertise that is balanced between traditional knowledge and innovative attempts.
- There is close collaboration with community stakeholders.
- The transition to sustainable rural development and its scaling up, in terms of circular and biobased initiatives, requires research and the testing of pilot schemes.
- Initiatives that flourish tend to be faithfully linked to their value chain and the handling of raw materials.
- Local resource management plays an integral part in the design of bioeconomy initiatives, as initial ideas are grounded and developed in line with regional needs and opportunities.

The above points are categorised in the graph below, retrieved from Deliverable 2.5.

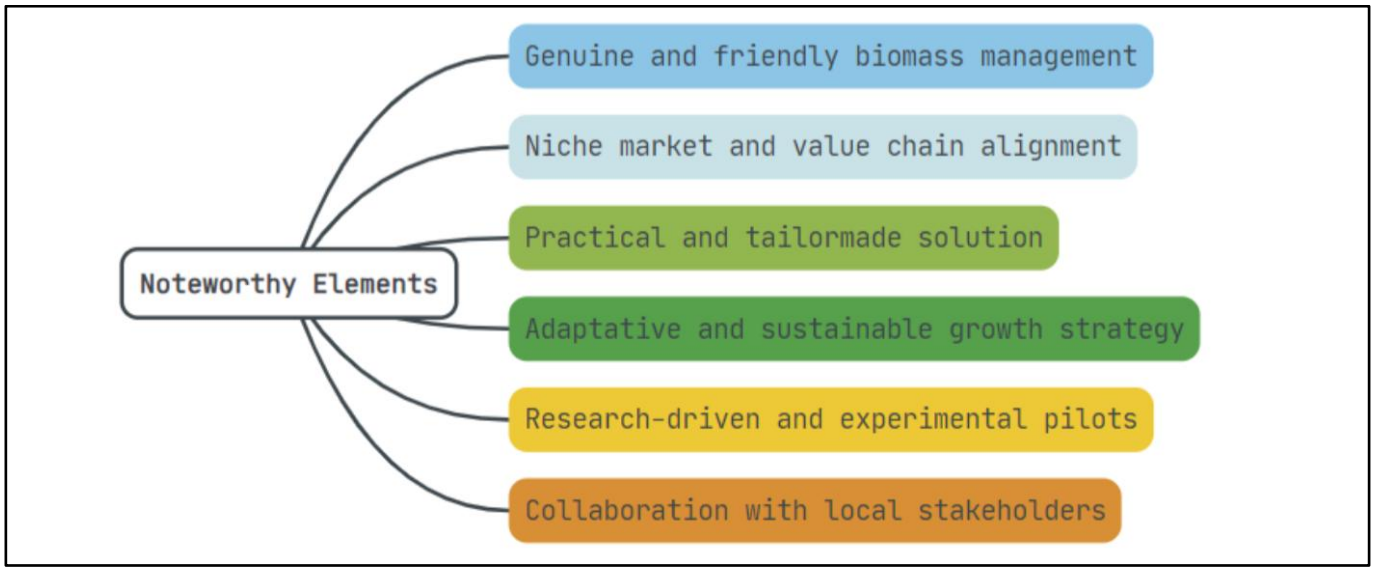


Figure 1: Success stories noteworthy elements - BIORURAL

Based on these elements, the criteria for success for Task 2.4 were identified. The criteria will guide the identification of bio-based solutions and their evaluation as to whether they constitute success stories.

Primarily, the identified solutions need to be **rural, small-scale, circular** and **innovative**, as this profile is a prerequisite for the success stories of BioRural in general. Following this, they need to exhibit the following attributes:

- **Local-ness** of resources has been shown to be an important aspect, along with biomass management practices that are sustainable and genuine, enhancing overall **environmental sustainability**
- The **team** and the **network** behind the story play a crucial role in the success of the initiative, especially having an interdisciplinary background and skills as well as a **local stakeholder ecosystem**
- The **effectiveness** of the solution in answering the problem it seeks to solve tested through research, experimentation and **piloting**
- Its **relevance** and **applicability** to its context are significant in making a story successful, i.e. being aligned with relevant regional needs and opportunities.
- All success stories seem to have the capacity to **scale** and/or **replicate**, albeit at different levels depending on the specificities of each case
- **Financial sustainability** is necessarily an indicator of success
- Adding a more social dimension, which some success stories do possess, promoting **social cohesion,** is yet another aspect of success, whereby the community is benefited in some form or other.

2 Guidelines for identifying and reporting success stories

This section includes the guidelines developed by incommon for the Task, for the smooth implementation of the activities. The guidelines were shared with RBP leaders and BioRural partners during M16 and included the following:

2.1 Process & Timeline for reporting on success stories

A Google Drive folder was set up for each RBP, including five templates, one for each bioeconomy theme.

Partners could start from whichever theme was more convenient to them, depending on the success story that they were more familiar with. The same process would be followed to gather the second batch of success stories for Deliverable 2.7.

RBP leaders were encouraged to use the google sheet that had been created at the beginning of the project where all partners were invited to register any potential success stories they came across, exactly for the purposes of this Task. The file already included 25 potential success stories, from several RBPs and themes, so it was considered a good place to start.

The progress on reporting was monitored on a regular basis, and reminders were sent accordingly to RBPs, following the timeline below, which was shared via the guidelines:

Activity	15 DEC 23	15 JAN 23	15 FEB 24	15 MAR 24	15 APRIL 24	31 MAY 24
Partners are familiar with Template	M16					
At least 1 success story / RBP		M17				
At least 2 success stories / RBP			M18			
At least 3 success stories / RBP				M19		
At least 4 success stories / RBP					M20	
At least 5 success stories / RBP						M21

Table 1: Timeline for reporting on first batch for D2.6

Activity	31 AUG 24	15 OCT 24	15 DEC 24	15 FEB 25	31 MAR 25
At least 1 success story / RBP	M24				
At least 2 success stories / RBP		M26			
At least 3 success stories / RBP			M28		
4 success stories / RBP				M30	
5 success stories / RBP					M31

Table 2: Timeline for reporting on second batch for D2.7

It was clearly stated that it was the responsibility of the RBP leaders to submit these templates on time.

2.2 Explanatory Tables

The tables of the Reporting Template, which partners needed to fill out for every success story they identified, were presented in the guidelines and they were filled out with the explanations for what kind of information was requested in every row.

It was noted that all text boxes were there to be filled out and that they could be filled out freely. As it was explained, partners could either fill in the tables with more information than requested or leave empty rows that were considered as not relevant to a particular success story, according to the specific aspects of each success story that was identified.

General Information	
Success Story Title	commercial name of bio-based solution
Subtitle - tagline	usually this is explanatory / descriptive of the main activity
Bioeconomy theme	you can choose one or more applicable themes
Core Activities	the main activities that the success story performs, could be one or more
Full Address	So that we can pinpoint them on the toolkit map
No of employees	including both full time and part time
Funding sources	including self-sustainable, national funding, private funding, loans, etc

The Success Story Profile	
Short description of bio-based solution	2-3 sentences briefly giving an overview of the success story
Detailed Description	This is the space to write the narrative behind the story. Indicatively, it should include the problems that the solution seeks to solve, what it actually does, the way they embrace/integrate **circularity and innovation***, the unique selling point, the social/ environment /economic impact, etc
The team behind the story	Not the names of the people but their capacities / qualities / backgrounds - essentially we want to know what kind of people are necessary for this kind of solution to be successful
Target audience / Key client / Key partners	Who is the market for the product / service / industry? Key clients refers to the actual clients and it can either be a client category or specific client(s) if this is more relevant. Key partners refers to any necessary partners for the initiative to exist.
Vision and Future plans	Where do they want to see themselves in a few years from now, what are their future plans, scale up, replication, automation, etc

***this is an integral part of BioRural - so, as we are looking only for cases that are both circular and innovative, we need to emphasise and describe these aspects.**

	Milestones Timeline	
	Date or Year	**Milestone**
1		The team/innovators behind the success story will have to choose the 6 main things that happened to bring them where they are today, the turning points.
2		These can be things that happened internally - for instance, person A and B met and this was the beginning of it all
3		It can be external things that happened to the team - such as receiving a funding, or buying a machine, or finding land, etc
4		Or it can be things that are completely external to the team - such as the price of gas rising, a 'natural' disaster, a new law, etc
5		
6		

Measuring Success

Key Indicator	Rating	Explanation [explain your rating, describe activities that relate to indicator]
local-ness	[1-5]	How local is it in terms of its resources? Is there input/resource availability locally? Is the product/input managed sustainably?
team and network	[1-5]	Is there a strong team behind the story? Do they possess an interdisciplinary background and skills? Is there a local ecosystem of stakeholders relevant to the initiative?
effectiveness - relevance - applicability	[1-5]	how well does it answer the problem(s) it seeks to solve? Is it indeed necessary? How realistic is its application? Does it provide something useful / necessary to society/economy/environment?
Testing & piloting - scalability & replicability	[1-5]	Was there a research, experimentation and piloting stage? Was that important to the success of the initiative? Is there more testing going on at later stages? Now? Is it realistically scalable and/or replicable? How easy is it to replicate in other areas of rural Europe?
financial sustainability	[1-5]	This can probably only really be answered by the people of the story.
social cohesion	[1-5]	Does it bring any positive value for the community, in any form? Does it create problems for the community?

Based on these Guidelines, as well as the updated directions provided by incommon, after the submission of D2.6, RBP leaders coordinated the identification and evaluation of success stories in their respective RBPs and with their member-partners, and reported on them using the above Reporting Template.

The following sections present all 20 identified success stories, as these were reported by the partners of the project.

3 Identified Success Stories: North-West RBP

The section presents the identified success stories of the North West RBP, including the Netherlands, France, Germany and Denmark and represented in the project by DELPHY, VALORIAL, NP, IZES and AU. The process was successfully completed with the identification of 7 success stories, including success stories falling under "Foresty", "Aquatic and Water Systems" and "Bioenergy", i.e. those themes that were pending, in order for NW Region to meet the KPI: 1 success story per bioeconomy theme.

3.1 Bioeconomy Theme: Forestry

3.1.1 Bio-based circular economy as a regional value chain

3.1.1.1 Success story report

General Information	
Success Story Title	Bio-based circular economy as a regional value chain
Subtitle - tagline	- from trees to construction timber and firewood or compost -
Bioeconomy theme	Forestry Bioenergy, biomaterials, bioproducts
Core Activities	• Implementation of forestry services (e.g. tree felling, thinning, landscape maintenance) • Production and sale of firewood and wood chips as a renewable energy source • Operation of a sawmill and timber trade (production of construction timber, sawn timber and valuable timber) • Production of compost and bark mulch from wood and greenery waste • Establishment and management of energy wood plantations (short rotation plantations)
Full Address	Brunnenstraße 6, 66625 Nohfelden-Walhausen, Deutschland
No of employees	15 (10 FTE)
Funding sources	• Proceeds from the sale of regional wood products (firewood, wood chips, bark mulch, etc.) • Income from forestry services for private and public clients (forestry companies, municipalities, federal state, private forest owners) • Sale of sawn timber and construction timber via their own specialist timber market and online store (expansion of the business model to include sawmill products)

The Success Story Profile	
Short description of bio-based solution	Saarholz is a forestry and timber company in the Saarland – region (Germany) that supports local bioeconomy through the sustainable mobilisation of wood as a raw material. The company combines forestry services with the conversion of wood into energy sources (e.g. wood chips or veneer wood) and high-quality wood products. By using renewable raw materials from the region and a consistent circular economy, Saarholz contributes to climate protection, regional value creation and ecological building and heating.
Detailed Description	Saarholz has succeeded in establishing an innovative business model in the forestry sector by utilizing all components of wood in a closed value chain. Founded in 2015, the company initially started out selling firewood and wood for wood-burning stoves. Today, Saarholz covers the entire range of forestry work: from forest management (e.g., maintenance work, special felling) to wood processing.

The Success Story Profile	
	A key feature of the innovation is the circular economy. Waste wood and greenery waste are processed into wood chips for heating, bark mulch, or compost and marketed. High-quality trunk and sawn timber from regional forestry is processed in the company's own sawmill and sold as construction timber, fibreboards, or wood products to craftsmen and end customers. This concept reduces waste, shortens transport routes, and creates regional added value, as the products are made from local wood. At the same time, Saarholz actively plants energy woods (short rotation plantations) on suitable land in order to continuously renew the wood resource and contribute to climate protection by binding carbon dioxide. Saarholz is also breaking new ground in terms of organization. The company focuses on digitalization and direct sales through its own online shops. Customers can order firewood, wood chips, or construction timber online and have it delivered. The expansion into online retail and the acquisition of a sawmill in 2024 underscore the company's innovative character. Saarholz combines traditional forestry expertise with modern corporate management. The acquisition of the sawmill in Lamspringe (Lower Saxony) has significantly expanded the production of sawn timber and strengthened the regional timber cycle beyond the state borders. This vertical integration, from cultivation and harvesting to the end product, is unusual in the industry and demonstrates the scalability of the concept. This holistic approach serves as a model for the bioeconomy in rural areas by showing how a local company can achieve growth through circular economy and innovation.
The team behind the story	The driving force behind Saarholz is Mattis Oestreich, who founded the company in 2015 together with Michael Koch in the district of St. Wendel. Oestreich has been the sole managing director of Saarholz since 2018. With a wealth of experience and a passion for forestry, he pursues his vision of making optimal use of wood as a sustainable raw material. A native of Saarland, he founded Saarholz with the aim of offering modern forestry services with ecological standards. He manages the operational business and, with entrepreneurial vision, has been instrumental in driving the company's further development, such as the acquisition of the sawmill. Together with his former co-founder Michael Koch, who contributed his forestry expertise and business management skills until his departure, Oestreich has built up a strong team of qualified employees. Today, this team is able to successfully serve both traditional forestry work and innovative business areas such as online timber trading and sawmill logistics.
Target audience / Key client / Key partners	Saarholz serves a wide range of customers and works with various partners to offer its wood products and services: **Target groups:** Private households (for firewood, wood for heating, garden wood, and compost), farmers, foresters, and forest owners who need maintenance work or wood marketing, municipal clients for landscape maintenance, tree safety, and wood processing companies or craft customers, e.g., carpenters and joiners looking for regional construction and valuable wood. Energy suppliers and combined heat and power plants can also be among the customers when it comes to wood chips as fuel. Owner of Highways and other streets with roadside greeneries. Overall, Saarholz appeals to both end consumers and business customers who value regionally produced, sustainable wood products. **Key partners:** The company cooperates closely with forestry authorities and administrations in Saarland and Rhineland-Palatinate to ensure sustainable forest management and takes on contracts in public forests. It also has a partnership with local authorities and the Naturlandstiftung (Nature Foundation) for reforestation and maintenance projects (e.g., planting energy wood). Other important partners include local farmers, on whose land energy wood plantations can be established, as well as machinery

The Success Story Profile	
	and logistics partners in the Hannover region, where the new sawmill is supplied and serviced. Through its cooperation with a regional network, from freight forwarders to carpentry businesses that operate workshops in the same building, Saarholz is strongly rooted in the local economy. These networks help the company to respond flexibly to demand and continuously supply high-quality wood from the region.
Vision and Future plans	Saarholz has a clear vision of making the timber sector in Saarland and beyond more sustainable and regional. In the coming years, the company plans to: ● Further expand the production of renewable wood fuels in order to offer even more households a climate-friendly heating alternative. To this end, capacities in the firewood and wood chip sector are to be increased and, if necessary, supplemented by new products such as wood pellets. ● Intensify the management of short rotation plantations (energy forests) and plant further areas in the region. In the long term, Saarholz aims to cover a significant portion of its raw material requirements with energy wood grown in-house. ● Strengthen wood processing and marketing at the new Wolfersweiler location. A storage and distribution site was opened there in 2024 to make the range of construction and valuable wood available locally. In the future, this specialist wood market is to be further developed, e.g. through demonstrations, consulting services for sustainable construction with wood, and the expansion of the online shop to include additional regional wood products. ● Following the successful integration of the sawmill in Lower Saxony (Lamspring), the team is examining the extent to which similar cooperations or acquisitions in other regions make sense. However, the aim is to grow organically and establish the Saarholz model as best practice in rural areas. ● Promote local jobs and training. Saarholz wants to continue to be a reliable employer in structurally weak rural areas and offer training places in the forestry and wood sector. Knowledge transfer and cooperation with educational institutions (e.g., excursions, internships) are also intended to raise awareness of sustainable forestry. ● In the long term, the Saarholz team dreams of a world where no potential remains untapped and no valuable resources are wasted. Everything that the forest can provide should flow back into the cycle in line with the circular economy. This vision drives Saarholz to continuously work on innovative solutions to make the forestry and timber industry more climate-friendly and socially responsible.

	Milestones Timeline	
	Date / Year	**Milestone**
1	2015	Foundation of Saarholz GbR in Nohfelden-Walhausen. Start of trading in firewood and wood chips.
2	2017	Expansion of the business to include forestry services (e.g., thinning, special tree felling) and first major landscape maintenance contracts in Saarland.
3	2019	Development of the online portal brennholz-saarland.de for regional firewood sales. Establishment of a collection point in Walhausen for end customers.
4	2023	Entry into the timber trade with construction timber and high-quality timber; preparation for the opening of a new branch. In addition, implementation of the online shop saarholz-shop.de for sawn timber and wood products.

Milestones Timeline		
	Date / Year	**Milestone**
5	2024	Acquisition of the HPB sawmill in Lamspringe (Lower Saxony) on January 1, 2024, to secure the supply chain and increase production capacity. In March 2024, opening of the new Saarholz location in Nohfelden-Wolfersweiler as a warehouse, showroom, and pickup center for firewood and sawn timber.
6	2025	Expansion of energy wood plantations and first harvest from their own energy forest expected. Saarholz also receives the German RAL quality mark for forest and landscape management for the certified quality of its forestry work.

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	4.5	The wood raw materials come from Saarland, the direct border region, and neighboring federal states. Short transport routes minimize emissions and strengthen the local economy. Processing takes place predominantly in the region, and the planting of energy crops ensures that the value chain remains rooted in the region in the long term. Saarholz thus actively contributes to the preservation of rural areas.
team and network	5	A small team of founders has grown into a competent workforce that stands out for its expertise and commitment. Saarholz cooperates with numerous local and nationwide partners, from forestry authorities and farmers to craft businesses, and has thus built up a diverse network.
effectiveness-relevance-applicability	5	Saarholz's solutions address key challenges of our time: climate protection and sustainable resource use. By replacing fossil fuels and providing regional construction timber, Saarholz makes an effective contribution to reducing greenhouse gas emissions and promoting climate-friendly construction. Many rural regions can adapt the model, which demonstrates its high transferability. In addition, Saarholz increases biodiversity and forest health through targeted maintenance measures, which underscores its ecological relevance.
Testing & piloting-scalability & replicability	5	Within just a few years, Saarholz has proven that its business model is scalable. What started as a local firewood business has grown into an interregional company with multiple locations and business areas. The standardization of processes and the modular structure of the product range (from raw wood to end product) allow for uncomplicated expansion. The takeover of the sawmill and the opening of an additional location were integrated smoothly, demonstrating that the concept also works in new regions. Saarholz thus serves as a blueprint for similar initiatives elsewhere. The combination of forestry services, energy wood, and timber trading can be implemented in any region with abundant forests.
financial sustainability	5	The company is broadly positioned and diversified, which ensures solid profitability. Thanks to its regional focus, Saarholz saves on transport and intermediate trading costs, enabling it to offer competitive prices. Reinvestment in its own production resources (machinery, sawmill) is evidence of solid growth achieved through its own efforts. Just ten years after its founding, Saarholz can point to continuous sales growth and enjoys a high degree of financial stability.
social cohesion	5	As an employer in rural areas, Saarholz creates skilled jobs locally and attracts young professionals to the region. The company is committed to safe working conditions (e.g., providing protective equipment for all workers) and promotes the further training of its employees. By helping rural communities to maintain forests and use energy wood, Saarholz strengthens regional self-sufficiency. In addition, Saarholz also

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		cooperates with regional initiatives and is available to schools and educational institutions as an extracurricular learning location, for example.

Relevant links

1. Saarholz – Brennholz Saarland | Forstarbeiten im Saarland (YouTube, ca. 2 min) – A brief insight into the work and philosophy of Saarholz, shown through impressions of forestry work and wood processing. View at: https://www.youtube.com/watch?v=4Isz8OIKzDw&t=121s

3.1.1.2 Conclusion

Saarholz constitutes a success story that falls under not only the forestry sector, but also under "biomaterials & bioproducts" and bioenergy themes, thanks to the wide variety of the company's activities that highly incorporate circular bioeconomy principles. Starting from the utilisation of wood as a renewable resource to produce bioenergy feedstocks, Saarholz effectively evolved to a sustainable multidimensional endeavor, providing a diverse range of products and services and, at the same time, contributing to the promotion of circularity and local development. Adoption of a closed-circle production line that valorises forest management and wood processing by-products, strong networking and collaboration with local stakeholders, supporting local supply chains and investment in new technologies and operational schemes are some of the key elements that make Saarholz a sustainable and resilient success story.

3.2 Bioeconomy Theme: Aquatic and Water Systems

3.2.1 Zeeuwse Zilt

3.2.1.1 Success story report

General Information	
Success Story Title	Zeeuwse Zilt
Subtitle - tagline	Zeeuws Zilt specialises in the sustainable cultivation and innovative processing of salty sea vegetables.
Bioeconomy theme	Aquatic and Water Systems
Core Activities	Zeeuws Zilt is a dynamic agricultural family business based in Wolphaartsdijk, Zeeland, dedicated to the sustainable cultivation, processing and marketing of salty sea vegetables such as glasswort and sea lavender. These crops are grown on former seabed using the salty water from Lake Veere, which contributes to their characteristic salty taste. In addition to cultivation, Zeeuws Zilt supplies seeds for seed multiplication, allowing customers to grow fresh samphire elsewhere. The company also develops culinary products such as samphire balsamic vinegar, samphire mustard and pasta enriched with samphire, often in collaboration with local producers.
Full Address	Muidenweg 10 4471 NM Wolphaartsdijk www.zeeuwszilt.nl
No of employees	2 owners
Funding sources	Own resources

The Success Story Profile	
Short description of bio-based solution	Zeeuws Zilt is an innovative family business from Wolphaartsdijk, Zeeland, which has been dedicated to the sustainable cultivation of samphire and other saline vegetables since 2006. The company was created in response to the salinisation of the Veerse Meer and has developed into a pioneer in both culinary and biobased applications of samphire.
Detailed Description	Zeeuws Zilt evolved from the family farm De Heerlijkheid van Wolphaartsdijk, which has been operating around the Veerse Meer since 1969. With an arable farm of 65 hectares, on which potatoes, sugar beet, wheat and grass seed are grown, among others, the Janse family decided to start growing samphire in 2006. This decision was prompted by the salinisation of the Veerse Meer, caused by the construction of the inlet "De Katse Heule" and the raising of the winter level, which made the surrounding land saltier and lower-lying plots wetter. Growing samphire proved to be a successful adaptation to the changing conditions. The company was one of the first in the world to develop a machine harvesting system for samphire, making it possible to harvest fresh daily for customers in wholesale, catering, farm shops and direct sales. Besides fresh sales, Zeeuws Zilt has focused on developing various products with samphire as an ingredient. Examples include samphire paste, samphire salt, samphire incorporated in peanut butter and caramel. Zeeuws Zilt demonstrates its commitment to sustainability not only through its cultivation of saline crops but also by integrating renewable energy into its operations. The company has installed solar panels on its barn, utilizing solar energy to reduce its reliance on conventional power sources. This initiative not only decreases their carbon footprint but also aligns with their focus on sustainable and resilient agricultural practices.
The team behind the story	Zeeuws Zilt is a Wolphaartsdijk-based family business run by brothers Hubrecht and Maarten Janse. Since 2006, they have been involved in developing saline agriculture in response to the salinisation of the Veerse Meer. In 2009, they took over the parental farm and have since developed and marketed the cultivation of samphire and other saline vegetables under the name Zeeuws Zilt. With their combined expertise in agriculture and entrepreneurship, Hubrecht and Maarten have built Zeeuws Zilt into a leading company in the cultivation and processing of saline vegetables, with a focus on sustainability and innovation.
Target audience / Key client / Key partners	It serves different target groups and operates from three strong pillars that together form the foundation of their operations: fresh produce, seeds, and dried ingredients. The first pillar focuses on selling fresh salty vegetables such as samphire, sea lavender, sea kale and sea fennel. These products are delivered directly to consumers at their doorstep, as well as to a growing number of restaurants and farm shops. The second pillar comprises the production and sale of seeds such as samphire and sea lavender. With this, Zeeuws Zilt targets international growers working on saline agriculture. Thanks to their experience and knowledge, Zeeuws Zilt also acts as an expertise partner for sustainable agricultural innovation. The third pillar involves drying and processing saline crops, after which they are delivered to companies that process them into composite products. Think of sauces, salt mixtures, pastes, caramel or even peanut butter with a salty twist. These buyers are often artisan producers looking for special, natural flavourings with a sustainable story.
Vision and Future plans	Hubrecht and Maarten look ambitiously to the future and are seen as a model farm in the field of saline agriculture on a global scale. The company's vision is clear: they aim to

The Success Story Profile	
	remain leaders in the sustainable cultivation and processing of saline crops. In doing so, there is a strong focus on further professionalisation and mechanisation of the cultivation process, which currently still requires a lot of manual labour. An important spearhead in this development is the optimisation of sowing techniques, including the use of 'seed priming'. With this, Zeeuws Zilt wants to work towards a situation where you can sow today, and harvest as early as six weeks later. This would not only make cultivation more predictable, but also more efficient and scalable. Work is also underway to improve harvest forecasting to allow more targeted planning and anticipation of market demand. By being able to accurately predict when and how much can be harvested, Zeeuws Zilt can respond quickly and flexibly to customer needs, for example for fresh deliveries or for processing by external processors. With this progressive vision, Zeeuws Zilt aims not only to continue to grow, but also to inspire other growers worldwide to seize the opportunities of saline agriculture as a sustainable response to climate change and salinisation.

Milestones Timeline		
	Date / Year	**Milestone**
1	2006	Start growing samphire
2	2009	Mechanical harvester in operation
3	2014	First-time machine seeding
4	2015	New plot bought specifically for growing samphire
5	2020	Introduction of tracked harvester
6	2023-2024	Project indoor growing of saline vegetables under LED lighting
7	2025	Fertilising samphire by drone

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	The company is firmly rooted in the Zeeland landscape and deliberately operates with a strong focus on the region. Both fresh salty vegetables - such as samphire, sea lavender and sea fennel - are produced, processed and marketed entirely locally. From cultivation to the final product, everything stays close to home, ensuring transparency, short chains and a minimal ecological footprint. The seeds of sea lavender and samphire supplied to growers within the European Union and the UK, contributing to the growth of saline agriculture on an international scale. Dried samphire, used as a seasoning and vegetable salt in a variety of products, also finds its way within Europe, but always has its origins in Zeeland. This combination of local anchoring and European cooperation makes Zeeuws Zilt a unique example of how to be internationally meaningful as a regional business.
team and network	5	Their expertise in growing saline crops, such as samphire and sea lavender, has earned Zeeuws Zilt a reputation both nationally and internationally. People know how to find the company well, which has led to international collaborations, especially within the European Union and the UK. This network of growers, researchers and other companies committed to sustainable agriculture strengthens Zeeuws Zilt's position on the world map of saline cultivation and biobased product development.

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		Zeeuws Zilt is not only a pioneer in the region, but has positioned itself globally. This network of connections enables them to share knowledge, implement innovations and continuously develop.
effectiveness-relevance-applicability	4.5	The challenges of Lake Veere becoming saltier was not seen as a threat, but an opportunity. Instead of resisting the salinisation of the water, the company embraced this situation by growing saline crops. This demonstrates an effective and applicable solution to salinisation, with Zeeuws Zilt not only responding to the problem, but also creating clear added value for the region and the agricultural sector. Zeeuws Zilt's approach is relevant because it ties in with the wider challenges of climate change and its impact on agricultural land. Saline cultivation offers a solution not only for saline soils, but also for the circular economy, as saline crops can be processed into various products.
Testing & piloting-scalability & replicability	5	Growing samphire is approached with a trial-and-error approach, as there are only a handful of people worldwide who have experience with saline cultivation. This means they have to discover a lot on their own, without much external guidance. As for scalability and replicability, samphire is not strictly soil-bound or dependent on saline water in the soil. By supplying salt water, it can be grown in a variety of locations, even in areas where traditional crops do not grow. This makes samphire cultivation replicable and scalable, which can make it a solution for regions with salinisation or water shortages.
financial sustainability	5	The company operates mainly on its own resources and does not rely on external financiers. This approach gives the company the flexibility to make decisions independently without the pressure of external investors or debt.
social cohesion	5	Zeeuws Zilt has not only contributed to the local economy through sustainable cultivation of samphire, but also strengthens the bond between the people of Zeeland and their natural environment. By marketing products grown locally, Zeeuws Zilt has helped raise the region's profile as a place of sustainable and innovative agricultural entrepreneurship. In addition, Zeeuws Zilt contributes to social connection by offering excursions that teach visitors more about saline farming. This creates awareness about the region and offers educational value.

3.2.1.2 Conclusion

Zeeuwse Zilt showcases the importance of transitioning to a circular bioeconomy with relevance to addressing challenges like resource scarcity and degradation of ecosystems, as well as for adapting to continuously changing climate and environmental conditions. Additional aspects of Zeeuwse Zilt activities, including integration of circular practices (utilisation of renewable energy) in the production line and leveraging multi-disciplinary collaborations to enhance R&D, and promotion of educational activities related to saline farming, further enhance the value of this initiative as a good circular bioeconomy paradigm.

3.3 Bioeconomy Theme: Biomaterials and Bioproducts

3.3.1 Straw-based: Eco-friendly and affordable housing in the Netherlands (Strobox)

3.3.1.1 Success story report

General Information	
Success Story Title	Straw-based: Eco-friendly and affordable housing in the Netherlands

General Information	
Subtitle - tagline	Strobox as a sturdy and carbon-neutral frame for the Dutch housing sector
Bioeconomy theme	Affordable and climate neutral housing, sourced from local plant based materials
Core Activities	• Design and construction of affordable and ecological housing. • Building modular wood and straw panels. • Giving courses on how to build a house using Strobox panels. • Preparing people with a distance to the labor market how to participate in the work force through building with Strobox.
Full Address	Hanzeweg 19, 7418 AV Deventer The Netherlands
No of employees	20 (10 FTE)
Funding sources	Sale of Dutch-built Strobox panels. Designing and building housing using Strobox panels.

The Success Story Profile	
Short description of bio-based solution	Strobox, a bio-based solution revolutionizing construction with its circular and CO2-neutral approach. Unlike traditional building methods that contribute to pollution, Strobox utilizes Dutch straw and Finnish wood to construct modular panels on Dutch soil. Strobox offers cost-efficient solutions, making eco-friendly construction accessible to all.
Detailed Description*	Strobox is a bio-based building solution crafted in the Netherlands, revolutionizing the construction industry with its innovative approach to sustainability and efficiency. Unlike traditional construction methods, Strobox utilizes natural materials such as straw, which are renewable, abundant, and have minimal environmental impact. These materials are sourced locally, reducing transportation emissions and supporting local economies. One of the key features of Strobox is its circular design, aligning with principles of the circular economy. Materials used in Strobox constructions are chosen for their ability to either be returned to nature at the end of their lifecycle or to be reused in subsequent constructions. For instance, screw foundations are employed instead of conventional concrete ones, minimizing the use of non-renewable resources and reducing carbon footprint. Strobox is a versatile modular product, allowing for virtually any architectural design to be realized. Each structure is customizable to fit the unique needs and preferences of its occupants. Moreover, Strobox prioritizes energy efficiency and thermal comfort. The natural insulation properties of straw ensure optimal temperature regulation year-round, reducing reliance on artificial heating and cooling systems and lowering energy consumption. Furthermore, Strobox promotes transparency and knowledge-sharing within the construction industry. Through initiatives such as self-build events and collaboration with educational institutions, Strobox aims to empower both professionals and DIY enthusiasts with the skills and knowledge needed to adopt sustainable building practices. Overall, Strobox represents a holistic approach to sustainable construction, offering a blend of environmental consciousness, economic viability, and architectural flexibility. By spearheading the adoption of bio-based materials and circular design principles, Strobox is

The Success Story Profile	
	paving the way towards a greener, affordable and more resiliently built housing sector in the Netherlands.
The team behind the story	The team is built up by Roelof Vossebeld and Daan Molkenboer **Roelof Vossebeld:** Roelof Vossebeld, raised in the countryside of Twente. Started working at a timber yard/construction company at an early age, adhering to conventional construction principles. Roelof pursued an education in Social Pedagogical Assistance in Enschede and Nijmegen. Providing social aid to groups of people facing complex challenges. He eventually combined his passion for technology with his Social Pedagogical background, and transitioned from furniture design production to being a recognized instructor in woodworking. As Roelof delved into ecological construction, he saw opportunities in aligning the Dutch wet climate and a low ecological footprint to avoid past technical issues in the construction sector. His goal is to standardize and scale up ecological construction to make it accessible to more people, while also developing workspaces for future builders. In collaboration with Facet Werkt, they are shaping training programs to achieve these objectives. **Daan Molkenboer:** Daan Molkenboer worked as a product developer for years after graduating his education in mechanical engineering. Out of idealism and the desire to be his own boss, he started an ecological construction company over 12 years ago. He specialized in timber frame construction and efficient wood-burning clay stoves. Fascinated by straw houses for their incredibly low environmental impact and excellent living conditions, Daan noticed their underutilization due to a lack of expertise among contractors. Nowadays, alongside being an ecological builder, he also teaches physics. Teaching complements his passion for working with people, which at Strobox is as equally important as the ecological footprint. Within Strobox Daan's role involves preparing and optimizing the product and production process. The dream of Daan and Roelof is to have a big ecological impact on the Dutch construction sector and have their Stroboxes made by individuals who struggle to find safe, nurturing learning environments elsewhere.
Target audience / Key client / Key partners	**Target audience**: Private individuals and local construction companies. **Key partne**r: Facet werkt. Providing a workforce of individuals with a distance to the labor market in helping build Strobox panels and housing.
Vision and Future plans	Scaling up of ecological construction to build as many houses as possible using straw based technology. Educating more individuals with a distance to the labor market how to be a functional member in the workforce.

	Milestones Timeline	
	Date / Year	**Milestone**
1	2016	Founding of the company Strobox
2	2017	Realization of first prototype project

3	2019	Realization of first housing project
4	2024	Realization of constructing 30 houses

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	4.5	Strobox panels are sourced from local Dutch straw and Finnish wood (derived from planted forests) and are built in a Dutch workshop. Ensuring short supply chains.
team and network	5	Two ecological carpenters supported by 20 local carpenters (10 FTE) Strobox prioritizes transparency and actively promotes knowledge-sharing throughout the construction sector. By organizing self-build events and partnering with educational institutions, Strobox empowers professionals and DIY enthusiasts alike, equipping them with the necessary skills and expertise to embrace sustainable building methods.
effectiveness-relevance - applicability	5	Strobox built houses are carbon-neutral, circular, cost-efficient, highly insulated and very sturdy.
Testing & piloting - scalability & replicability	5	Because of the standardized production chain and the modular nature of Strobox, it is an easily reproducible and scalable production process.
financial sustainability	5	Strobox has a very cost-efficient production process with relatively short supply chains. An average sized house takes about 4-6 weeks to build and about 1-4 weeks to construct on site. The amount of houses built nearly doubles on a yearly basis.
social cohesion	5	Combining people with a distance to the labor market, preparing them for future integration into the workforce, and local carpenters, to produce Strobox panels and housing. Strobox is a part of the Dutch association of social enterprise and within this association Strobox is an aspiring member of the code for social entrepreneurship. The Dutch association of social enterprise is the main quality label for enterprises incorporating a high degree of social cohesion into their business model.

Relevant links

1. https://www.strobox.nl/watiseenstrobox
2. https://www.strobox.nl/projecten

3.3.1.2 Conclusion

Strobox serves as an exceptional paradigm of circular bioeconomy, highlighting the potential of bio-based solutions to bring multi-level benefits on a local and regional scale. This endeavour promotes an eco-friendly alternative to conventional construction materials and techniques, reducing the environmental impact of the construction sector, via several pathways, including short supply chains of materials, energy efficiency of the buildings and circular dismantling at the end of their life. Additionally, Strobox values the social potential of bioeconomy, thus, promoting the adoption of sustainable building practices through education and training activities, as well as supporting inclusion and employment of vulnerable community groups.

3.3.2 Cradle Crops

3.3.2.1 Success story report

General Information	
Success Story Title	Cradle Crops

General Information	
Subtitle - tagline	Cradle Crops is pioneering the cultivation of Miscanthus Giganteus and other fibre- and biobased crops in the Netherlands and Belgium.
Bioeconomy theme	Biomaterials
Core Activities	Cradle Crops is a Dutch company specialising in the cultivation and promotion of Miscanthus Giganteus (elephant grass) since 2010. Their core activities include the supply of high-quality rhizomes (rootstocks) from their own planting in Zeeuws-Vlaanderen, as well as a planting service with specialised RTK-GPS planting machines. In addition, Cradle Crops offers cultivation guidance and advice to growers, supports harvesting and sales of Miscanthus in various forms (such as litter or bales).
Full Address	Bernhardstraat 80 4554 BD Westdorpe Nederland
No of employees	1.2FTE
Funding sources	Own resources

The Success Story Profile	
Short description of bio-based solution	Cradle Crops is an innovative company focused on growing and processing biobased materials, with a particular focus on miscanthus. The company was first introduced to miscanthus in 2008, and they started growing it in 2009. They distinguish themselves by developing a local value chain model where they own both the cultivation and processing of miscanthus.
Detailed Description*	Cradle Crops was born out of a search for sustainable and innovative biobased materials. In 2008, the company first came across miscanthus, a crop initially seen as a possible alternative to flax, another raw material used for biobased products. Flax was locally processed into fibers for light boards, and the idea of using miscanthus as a substitute sparked Cradle Crops' journey into experimenting with biobased materials. By 2009, the company began cultivating miscanthus and expanded into growing other biobased crops. As an arable farmer, the founder recognized opportunities in differentiating himself from other farmers by developing a new revenue model. Cradle Crops produces raw material itself and has developed unique machinery and production processes in collaboration with local people to further process and market the crops. This hands-on approach—from cultivation to marketing—makes Cradle Crops unique in the market, allowing them to maximize and control the value of miscanthus while contributing to a more sustainable future. A key feature of Cradle Crops is its commitment to circular economic principles. The company transforms the biomass harvested from miscanthus into valuable products used in various industries, including paper production, where it serves as a sustainable alternative to wood pulp. Cradle Crops collaborates with companies like PaperWise, which uses miscanthus to produce paper and board, closing the loop in the production cycle and reducing the demand for virgin wood. Moreover, Cradle Crops focuses on optimizing land use. Miscanthus cultivation is low in land-use intensity as it requires minimal inputs, such as fertilizers and pesticides, and thrives on marginal lands unsuitable for conventional crops. This makes it an ideal candidate for sustainable land use, avoiding competition with food production and even rehabilitating less fertile soils. The perennial nature of miscanthus also reduces soil erosion and promotes biodiversity, contributing to long-term soil health. Cradle Crops is

The Success Story Profile	
	not just focused on agriculture; it is also committed to developing a broader range of biobased products, positioning itself as a key player in the transition to a circular economy and sustainable agriculture. By integrating circular economy practices and minimizing land-use intensity, Cradle Crops is setting a benchmark for sustainable agricultural innovation that provides solutions for both local industries and global environmental challenges.
The team behind the story	The team behind Cradle Crops is driven by the vision of its founder, Filip, who is an arable farmer himself and was looking for a new product and an efficient chain. Filip was looking for a way to differentiate himself in agriculture and developed a new chain for miscanthus, placing great emphasis on minimizing links in the process. This has led to a strong, direct relationship with the market. Filip has excellent communication skills and knows how to attract the right partners and customers through his reliable and tactical approach. His knowledge of the commodity he wants to market is an important asset in his work, as he not only develops the cultivation of miscanthus himself, but also has a good understanding of the market and its applications. Filip is dedicated to the company and invests both time and resources in further developing the project, which ensures synergy between his work and market developments. Filip is additionally grateful for the market players he has come across who have helped realize his vision. This network and cooperation with other stakeholders have contributed to the success of Cradle Crops and ensure that the company can continue to establish itself as a reliable player in the biobased sector.
Target audience / Key client / Key partners	Cradle Crops' largest market is Wepa Netherlands, a producer of hygiene paper. Wepa has embraced miscanthus fibre as a local substitute for other raw materials, such as eucalyptus sourced from South America and South Africa. These eucalyptus fibres are often used in the paper industry, but miscanthus offers a more sustainable alternative that can be grown locally and recycled multiple times. By using these high-quality fibres from miscanthus, Wepa can make its production chain more sustainable and reduce dependence on imported raw materials. In addition, Cradle Crops has other markets in its sights, such as applications in litter, mulching and the construction industry. This offers alternative ways of utilizing miscanthus, allowing the company to serve a wide range of applications and further diversify its markets.
Vision and Future plans	Cradle Crops has an ambitious vision for the future, in which the company aims to significantly expand its cultivation area. Currently, miscanthus is grown on 150 hectares in the Netherlands, but the aim is to expand this to 1,000 hectares. This expansion targets the European market, with the company aiming to keep cultivation local, ideally within a radius of no more than 400 km from the factory. The idea is to reduce dependence on imported raw materials by offering locally produced miscanthus fibres, further reducing the carbon footprint of their products.To realize these ambitions, Cradle Crops is upgrading storage facilities and developing applied machinery that can make cultivation and harvesting more efficient. This is crucial, as there is only one month a year in which miscanthus can be harvested. The company must therefore be able to act quickly and effectively to make the most of that limited harvesting period. With these plans, Cradle Crops aims not only to further strengthen its market position, but also to contribute to making the European biobased sector more sustainable by supplying local raw materials and further professionalizing the cultivation of miscanthus.

	Milestones Timeline	
	Date / Year	**Milestone**

1	2008	Through a pitch introduced to alternative fibres
2	2009	Start of miscanthus cultivation
3	2010 – today	Further development of planting machines, rhizome harvesting machines and miscanthus harvesting machines.
4	2012	Contact wit WEPA Nederland

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	Cradle Crops is committed to local production and sustainability. The company focuses on growing miscanthus within a maximum radius of 400 km from their processing facilities. This choice is mainly driven by the desire of their largest customer, WEPA Netherlands, which wants to source their raw materials locally to minimise the ecological impact of transport while contributing to making the region more sustainable. By growing miscanthus locally, Cradle Crops plays an important role in strengthening the local economy and supporting the circular economy. The company contributes to making the region more sustainable and ensures a short chain from production to processing, reducing dependence on imported raw materials such as eucalyptus, which come from South America and South Africa. In this way, the crop becomes not only a sustainable choice, but also a local product that strengthens the region and reduces its carbon footprint.
team and network	4	The team behind Cradle Crops is characterised by a culture of openness and honesty, with collaboration and transparency at its core. Over the past 15 years, Filip, the founder, has been extremely happy with the people he has met in this process. These long-term relationships are based not only on business interests, but also on mutual respect. This creates a solid and confidential basis for cooperation, which is very important in the biobased sector. The team at Cradle Crops has built close relationships with their partners and customers, with cooperation and the sharing of knowledge and experience being key. This network plays a crucial role in Cradle Crops' continued growth and success, as the company continues to develop as a pioneer in the biobased sector.
effectiveness-relevance - applicability	5	Cradle Crops is an effective player in the biobased sector, growing miscanthus as a sustainable alternative to traditional raw materials, such as eucalyptus, in the paper industry. They offer a local and ecologically beneficial alternative, reducing the carbon footprint of their products. The relevance of Cradle Crops is clear in the context of the growing demand for sustainable products. Miscanthus is suitable not only for paper production, but also for litter, mulching and building materials, making it a versatile solution for different markets. In terms of applicability, Cradle Crops has built a local value chain from cultivation to processing, making their product widely applicable. By working with partners such as WEPA Netherlands, they can quickly respond to demand and apply their product in different sectors.
Testing & piloting - scalability & replicability	4	Cradle Crops has proven the scalability of their model. The cultivation of miscanthus can be expanded on a larger scale, allowing the company to increase production capacity and further serve the market in the future. The company already has plans to significantly expand their cultivation area, from 150 hectares to 1,000 hectares, confirming the potential for scaling up. However, the replicability of the Cradle Crops model is more complex. While it is possible to apply the scale model elsewhere, it is not easy to set up the exact same

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		Cradle Crops operation. The market is not currently capable of rapid large-scale growth, as demand for miscanthus and biobased products develops gradually. The process of setting up, testing and perfecting cultivation requires a lot of specific knowledge and local adaptation, which complicates the replicability process. Cradle Crops recognises that this growth and expansion will not happen quickly. The transition to large-scale cultivation and processing requires time, investment and a carefully thought-out strategy. The company continues to work on innovation and optimisation of their processes, knowing that only in the long term will the market be able to fully adapt to the scale they are aiming for.
financial sustainability	5	The company operates mainly on its own resources and does not rely on external financiers. This approach gives the company the flexibility to make decisions independently without the pressure of external investors or debt.
social cohesion	3.5	The company is mindful of the environment and the impact of their activities on the local community. When growing miscanthus, they deliberately avoid intensive land use, contributing to biodiversity and protecting surface water. This approach is essential for maintaining a healthy and vital habitat for both nature and local people. One of the products - litter - is sold locally to farmers and municipalities as mulch for flower beds, they contribute to a healthier environment where no chemicals are used. This strengthens social cohesion as Cradle Crops not only produces locally, but also connects locally with the community. WEPA's end product, which is made from miscanthus fibres, may eventually be available locally, further strengthening the economic and social connection to the region. Cradle Crops thus contributes to a sustainable future, where the interests of both nature and the community are central.

3.3.2.2 Conclusion

Cradle Crops is a success story that highlights the importance of assessing market needs and investing in offering diversified products and services for rural bio-based solutions to be resilient and sustainable. Through the cultivation of bio-based raw materials and the establishment of short supply chains, together with the development of robust collaborations, this solution achieved the uptake of sustainable raw materials within local circular bioeconomy activities, contributing to the sustainability of relevant businesses.

3.3.3 CSBT Environnement - Scallop shell recycling plant for the production of marine calcium carbonate in Normandy

3.3.3.1 Success story report

General Information	
Success Story Title	CSBT Environnement – Scallop shell recycling plant for the production of marine calcium carbonate in Normandy
Subtitle - tagline	
Bioeconomy theme	Biomaterials & Bioproducts
Core Activities	The site's activity consists of receiving scallop shells and processing them through a pre-cleaning, washing, crushing, and micronization procedure. This process results in finished products in the form of micronized shell powder, ready for valorization.
Full Address	Zone Industrielle des Longchamps 14 400 Saint Martin-des-Entrées
No of employees	5
Funding sources	Public funding, Crowdfunding, Banks, Private Investors.

General Information	
	The project represents an investment of €33 million over a period of four to five years.

The Success Story Profile	
Short description of bio-based solution	The project is part of an effort to reduce waste sent to landfill and/or incineration by valorizing scallop shells as high value-added, bio-based materials. The industrial process developed by CSBT Environnement is innovative. It transforms the shells into bio-based marine calcium carbonate in the form of micronized powder. The particle size will be tailored to customer needs, ranging from 100 to as fine as 5 microns, with D98 quality if required. This process meets the demands of various industries while aligning with the principles of circular economy and both local and national resource valorization.
Detailed Description*	During the shell season (from October to May), CSBT Environnement initially plans to collect around 60 to 70 tonnes of shells daily. The 5,000 m² plant will be capable of producing up to 30,000 tonnes of micronized powder within three years. CSBT Environnement is providing the fishing industry with an innovative industrial treatment solution to meet its obligation to manage waste. This initiative will lead to the development of a new national industry — a first in Europe. The goal is to offer an alternative to calcium carbonate derived from mining by valorizing, in a circular way, a naturally available resource along the French coastline. Today, shells are treated as waste and sent to landfills or incineration plants. Composed of over 99% calcium carbonate, scallop shells represent a true reservoir of raw material. Calcium carbonate is currently used in many sectors: • **Pharmaceuticals**: The project ensures a secure supply of high-quality calcium carbonate, essential for this strategic sector. • **Cosmetics**: Used in products like lipstick, mattifying and opacifying creams. • **Agriculture and livestock**: Cows consume between 50 and 200 g of calcium carbonate daily to strengthen their bones and support milk production. • **Construction**: As a component in cement and concrete. • **Plastics industry**: In PVC, tiles, and more.
The team behind the story	**Christian Chantreuil**: former Director of the Eiffage Group's Basse Normandie road business and now Chairman of CSBT Environnement. **Stéphane Sabathier**: former Port Director and company CEO, and today Founding Partner of CSBT Environnement. **Gilles Bégué-Turon**: a former director in the financial markets business and now Managing Director of CSBT Environnement.
Target audience / Key client / Key partners	**Target audience – Key clien**t: Applications: Pharmaceuticals, Agriculture and Livestock, Cosmetics, Plastics, Building and Public Works **Key partners**: Investors : ADEME Investissement, EIFFAGE, FASTEA CAPITAL **Scallop collection**:

The Success Story Profile	
	Shell collection will be carried out directly from waste producers such as fish processors, fish markets, fishmongers, restaurants, and large retailers. Partnerships are currently being developed.
Vision and Future plans	In the long term, CSBT Environnement aims to transform 30,000 tonnes of scallop shells each year into bio-based calcium carbonate in the form of ultra-fine powder. The broader goal is also to valorize other types of shells — such as cockles, clams, carpet shells, queen scallops, oysters, mussels, whelks, and surf clams — by developing tailored, efficient, and economically viable treatment and processing solutions.

	Milestones Timeline	
	Date / Year	**Milestone**
1	12/2024	**Capital Increase:** With the participation of **FASTEA CAPITAL**, **ADEME Investissement**, and the **Eiffage Group** **Land Acquisition:** For the construction of the production facility
2	01/2025	**Grant Approvals:** • Winner of the **France 2030 Plan**: *"I build my first factory"* (National) and *"New economic sector"* (Regional) • Supported by the **Calvados Department** • Backed by the **Bayeux Community of Communes** → **35% of the project is financed by the French government**, the maximum possible level of public support in France. **Bank Loans Secured**
3	06/2025	**Start of Construction** & Completion of testing for industrial process machinery
4	11/2025	End of Construction Works
5	12/2025	Delivery of Equipment
6	03/2026	First Production Run

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	Construction of the factory began in June 2025 in Saint-Martin-des-Entrées, Normandy. Equipment installation is scheduled for December 2025, with production expected to start by the end of March 2026.
team and network	5	• **An experienced team:** Composed of seasoned professionals with strong backgrounds in managing complex industrial projects, the maritime sector, and expertise in financial engineering, investment structuring, and budget management. • **Diversified financial support:** Backed by multiple public and private partners, ensuring the economic viability of the project.
effectiveness-relevance - applicability	5	The CSBT Environnement project addresses the environmental challenge of managing scallop shell waste. It took nearly six years to structure the project, secure funding and obtain the necessary permits. The operational phase—including construction of the factory, final testing of the process before ordering equipment, establishment of the collection network, and outreach to potential clients—officially began on January 1, 2025.

Measuring Success		
Key Indicator	**Rating**	**Explanation**
Testing & piloting - scalability & replicability	5	The factory's production ramp-up will be gradual: • **Year 1:** 10,000 tonnes produced; 37% of human and machine capacity will be utilized to fine-tune the industrial process and supply chain. • **Year 2:** 18,000 tonnes produced. • **Years 3 and 4:** Full-scale ramp-up to reach 30,000 tonnes. This factory model is replicable in other regions of France and abroad, whether for scallop shells or other types of shells, with adjustments to the cleaning stage of the industrial process.
financial sustainability	5	CSBT Environnement's shareholder base is solid and diversified, comprising an institutional investor, a private group and a participatory investment fund. The company is financed by a combination of government and local authority grants and bank loans.
social cohesion	5	Enhancing the value of a little-exploited resource: scallops are currently little-used (they are treated as waste in landfills or incineration plants). To date, the only industrial-scale processing plant is in Japan. CSBT Environnement's project is based on local sourcing, with clear traceability and the "biosourced" label. Environmental benefits: this process avoids the need for mining, thus reducing environmental impact. Job creation in Normandy: over time, the project will generate 87 direct and indirect jobs, particularly in the field of vocational integration. Positions include machine operators, technicians and sales staff. Recruitment is underway for a site and a quality manager.

3.3.3.2 Conclusion

CSBT Environnement stands out as a success story within the "Bioproducts & Biomaterials" category, offering an innovative way to substitute calcium carbonate derived from mining, through the circular management of scallop shell waste. This initiative showcases opportunities connected with the yet untapped potential of residual biomass and relevant benefits. CSBT Environnement provides for an innovative solution that leverages short supply chains, valorises waste - thus contributing to environmental protection and empowerment of local economic activities - and minimises primary resource consumption.

3.4 Bioeconomy Theme: Bioenergy

3.4.1 Beet4Chemistry

3.4.1.1 Success story report

General Information	
Success Story Title	Beet4Chemistry
Subtitle - tagline	Direct processing of wet biomass (<25% DS) to biofuels and chemicals; fermentable sugars as base products for a variety of biobased chemicals
Bioeconomy theme	Bioenergy (Biorefinery) Biomaterials & Bioproducts
Core Activities	Technology developer and concept owner
Full Address	Choorhoekseweg 8b 4424 NW WEMELDINGE

General Information	
	The Netherlands
No of employees	0 (shareholders and business partners – total 10 persons)
Funding sources	Own capital and subsidies

The Success Story Profile	
Short description of bio-based solution	Dutch Sustainable Development (DSD), part of Innovative Sustainable Technologies BV (IST), has been working since 2011 (<2015 specific as pre-treatment installation for biogas plants) on the development of the Betaprocess, a process to open up wet biomass (<25% dry matter), making the ingredients freely available for other processes. At normal pressure and relatively low temperature (30° C), sugar molecules are converted into molecules suitable for chemistry and biofuel purposes. This is achieved in three process steps, which together form Direct Processing with Betaprocess (DP+Beta): 1. Pre-treatment(reception, destoning, washing, cutting, Betaprocess); 2. Fermentation (at 30-32° C); 3. Distillation (requires a lot of energy, which is largely recovered!). The remaining digestate from the process is utilized in local biogas plants, ensuring complete circular utilization of all biomass components.
Detailed Description	IST/DSD have been working on this DP+Beta concept since 2015, together with Wageningen University & Research (WUR). It includes three process steps: 1) Pre-treatment (reception, destoning, washing, cutting, Betaprocess), 2) Fermentation and 3) Distillation. The concept has proven itself during recent test phases, is robust and reliable. Various types of biomass have been tested during these test phases. For the time being sugar beet is the most attractive and efficient for delivering a profitable business case. However, biorefinery to 'convert' sugar beets into bio-raw materials that can be used in chemistry is a complex process. Via the so-called DP+Beta, the molecules can be opened from wet biomass (<25% dry matter), making the ingredients available (liquefaction) for subsequent processing processes. In this DP+Beta process, the bio-raw material is pushed into a vacuum vessel, where the cell walls burst and all sugars (and other components) are released for further processing, e.g. fermentation or via separation into a filtrate fraction with fermentable sugars and a fibre fraction. During this process all product streams are optimally used, no waste, DP+Beta is a complete Cradle-to-Cradle concept. Large companies from the chemical- and biofuel industry as well as sugar beet processors/suppliers are interested in this process and would like to participate in its implementation. A demo factory should therefore be built as the next step. The plan is to realize this in the Axelse Vlakte (municipality of Terneuzen), the Netherlands. The various process steps can then be completed in that demo factory. The demo factory teaches how to configure the process of a first factory (FOAK). In the demo factory, the concept design is made applicable for the FOAK and all imperfections and design errors are filtered out, as well as the most energy-efficient installations are selected. The fact that this is an innovative process has been recognized by both the Dutch process industry (ISPT) and the chemical sector (VNCI) and the Government (TKI energy & industry) by awarding the “Industry Innovators Award 2024”. This award is given to the most innovative, ground-breaking technology that will play an important role in the climate and (raw) material transition. The benefits of DP+Beta are: - Low-energy process(less energy) - Low temperature and normal pressure - Process happens in a split second

The Success Story Profile	
	- Does not waste sugars (all sugars are used, resulting in 10% higher output) - CAPEX significantly lower - OPEX is also less due to fewer process steps - Not very sensitive to scale, relatively small-scale profitable biorefinery - Small-scale results in short transport lines, especially when using sugar beets - Concept produces more income for the farmer and therefore a more vital countryside - Not rocket science, but fool proof - Low CO2 footprint (minimum 84% reduction compared to fossil reference – CE Delft) - Environmentally friendly - No nitrogen emissions - Completely circular with digestate utilization in local biogas plants - Longer campaign duration
The team behind the story	1. Eduard van Antwerpen, CEO, >25 years' experience in agri-processing development, water-tech solutions, operations and construction; 2. Hans van Klink, Director Project Development, >35 years' experience in business development, management and project finance; 3. Cees van Loon, R&D Director, >40 years' experience in agricultural tech development.
Target audience / Key client / Key partners	Beet4Chemistry connects agriculture with chemistry through small-scale biorefinery. By making this combination possible at a relatively short distance, the products (agriculture) and the chemicals (ethanol and customer) are connected. This ensures that a vital countryside (local farmers) continues to exist (employment, youth) and that the processing industry remains close to both the source and the customer, so that the region remains viable. An anchoring of chemistry in the region provides a stable economic basis. Key clients are: large chemical companies such as DOW, SASOL Chemicals, Corbion. Our key partners are: Putsch – washing and slicing equipment (Germany), Della Toffola/Barison – Betaprocess, fermentation and distillation installations (Italy), KWS – developer of sugarseed varieties (Germany), SPIE engineering – technology and project development (Netherlands).
Vision and Future plans	While the chemical industry will remain predominantly reliant on petrochemical-based feedstock in the next decades, the use of renewable feedstocks is fairly limited across both chemical and energy sectors. Due to heavy dependence on fossil hydrocarbons, high oil and gas prices, and ambitions to reduce CO2 emissions, industries are moving towards greater use of biobased input materials. With DP+BETA, IST/DSD can efficiently produce fermentable sugars to be used as feedstock across multiple bioeconomy applications. The bioethanol produced serves diverse market needs, including both sustainable fuel applications and high-value chemical production. While bioethanol finds important applications in the transportation fuel sector as a renewable energy source, it demonstrates particularly high added value in chemical applications. In the chemical sector, bioethanol can be used to produce acetaldehyde, ethylene, butadiene and acetic acid, among others. Furthermore, bioethanol plays an important role as input material for plastic recycling (ethylene). This dual-market approach maximizes the potential of bioethanol as a renewable carbon source across energy and chemical industries. With regard to CO2 emissions, bioethanol applications deliver substantial environmental benefits across both fuel and chemical sectors, with chemical production from bioethanol being almost CO2 neutral. The growing demand for bioethanol in transportation fuels and

The Success Story Profile	
	chemical production demonstrates the need for increased production volumes to significantly replace fossil-based alternatives in multiple industries. As stated in reports from several institutions (such as NOVA, WUR, Copernicus, etc.) sugar beet are in our hemisphere, one of the most attractive sources for green carbon as replacer from fossil carbon

	Milestones Timeline	
	Date / Year	**Milestone**
1	<2015	Development on lab scale
2	2015-2018	Chembeet project: testing in pilot factory (2x 1,5m3 fermenter) and optimize process
3	2018-2022	In Nije DEI project: upscale pilot factory to 10 – 15 m3 fermenter
4	2019-2022	Biethanol project: convert (hemi-)cellulose into sugars
5	2021-2022	Biethanol 2.0 project: conceptual engineering FOAK with input of 2.000 ton sugar beets daily
6	2022-2023	Beet4BioCrude project: separation trials (after the pre-treatment with Betaprocess)

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	Our concept is a small scale biorefinery: DP+BETA can be constructed as relatively small scale factories (Local4Local). Upscaling has no significant effect on the cost price per ton of fermentable sugars/bioethanol. Small scale factories result in lower transport costs (environmental impact) for sugar beets from farmer to the factory. But also construct these factories in the area nearby the off-takers.
team and network	3	Our team consists of experienced people. Currently no people are on the payroll, but they are available when trials are executed. Due to our long experience (>25 years) of the stakeholders and connected team, a large network in the relevant sectors (agriculture, agrifood, chemical industry, etc.), national and international Governments and other relevant stakeholders is available.
effectiveness-relevance-applicability	4	DP+BETA optimizes the existing and proven production processes by replacing a part of the production process with a component that optimizes the bioethanol production at a lower cost and a higher yield and thereby more profitable. Although DP+BETA finds its use originally in the production of bioethanol, other biobased chemical products can be produced with the fermentable sugars or other product streams. By using only the pre-treatment section fermentable sugars are produced as raw material for the biochemical industry such as lactic acid, citric acid, etc. Furthermore, besides the use of sugar beet other root crops (chicory, cassava, yacon, etc.) and other biomass with high water content such as tomatoes, aubergines, onions, etc. can be treated via the pre-treatment section, this will lead to a substantial market outlet on the longer term. As part of the bioethanol value chain, the Carbon Intensity Index (“CII”) of DP+BETA is significantly lower compared to alternatives, such as corn, cereals and cane sugar. Greenhouse gas emissions (g CO2eq/MJ) for this technology are 23 grams in case of sugar beets and corn kernels and 25 grams if we use only sugar beets. In a study of CE Delft the CO2 reduction of the complete project is 211kt CO2eq/j (84% lower compared to fossil alternatives), this can be lower in case renewable energy is used as

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		feedstock for the energy of the plant, this is not yet taken into account in the calculations. In addition to the replacement of fossil raw materials in chemistry with bio-ethanol from sugar beet, the cultivation of sugar beet has other advantages. Crops such as sugar beet provide many benefits, especially in the field of CO2 absorption. The sugar beet is a great CO2 absorber and perfect oxygen producer. In addition to absorbing 37.5 tons of CO2 (info CIBE), the same hectare of sugar beet produces 27.3 tons of oxygen. The economic activities of the Demo/R&D plant and the FOAK are completely circular (Cradle to Cradle) from start to finish and also very locally (Local4Local) oriented: feedstocks come from nearby and the use of the end products is essentially local, especially in the case of bioethanol. Therefore the main feature of the FOAK and next factories are Local4Local. The above development strengthens the economy of the agricultural sector: income security for farmers through years of supply guarantee at a contractually determined price. The small scale of such a biorefinery unit strengthens the rural economy and creates green jobs. Based on EU sugar policy sugar consumption will decrease to reduce obesity risks. If, in addition to the current 70,000 hectares of sugar beets for the production of white sugar, another 80,000 hectares of sugar beets (in the past sugar beet cultivation in the Netherlands was 150.000 HA) are grown for fermentable sugars and bio-ethanol, the Netherlands will achieve the COP21 targets of 16.3 Mton CO2 reduction in greenhouse gas emissions. This is similar in the whole EU, since 30-40 years the acreage with sugar beets has also reduced by half. EU farmers organisations are very keen on our development and as soon as the demo plant is active and shows the process in real-life new opportunities as market outlets for the coming years are occurring.
Testing & piloting-scalability & replicability	4	Since 2015 this development has made the following progress: ● 2015 – 2018, Chembeet project, pilot factory at Acrres (WUR) location, Lelystad, develop and show the potential of the complete process flow (from biomass to ethanol) in 2 x 1,5 m3 fermenters; ● 2018 – 2022, In NIJE Dei project, scale up to 10 – 15 m3 fermenters to show that larger scale processing is possible. ● 2019 – 2022 Biethanol project, to convert (hemi-)cellulose into sugars, after which the sugars are used in the fermentation to produce advanced ethanol. ● 2021 – 2022 Biethanol 2.0 is the project in which the conceptual engineering is prepared for the First Of A Kind (FOAK) factory of 2.000 ton sugar beet input per day. Together with corn kernels this will lead to a year-round ethanol production factory. ● 2022 – 2023 Beet4BioCrude project to scale up separation trials after the pre-treatment with Betaprocess. The objective is to separate the biomass bray into a filtrate with a high sugar content and a fiber fraction with the (hemi-)cellulose part of the biomass. ● 2024 – 2026 Beet4Chemistry establishment of the Demo plant and start testing and preparation trials needed for the engineering of the FOAK, capacity of this plant is based on the capacity of the Betaprocess which can process max. 8 ton feedstock per hour. The demo plant is a batch wise processing unit for testing several streams and methods for the production of fermentable sugars.

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		• 2025 - ..... establishment of the FOAK (in operations 2028), continuous process based on sugar beet and corn kernels. This factory will serve as a demonstration model for potential customers.
financial sustainability	4	The transition from fossil to green chemical cluster is accompanied by loss of fossil jobs and turnover. Researching bio-based raw materials that can replace fossilraw materials is a prerequisite for the creation of sustainable and future-proof jobs and activities. This cuts both ways: on the one hand, the chemical industry is becoming greener and therefore more future-proof. In addition, a new sales market is being created for the sugar beet industry, which is looking for new prospects for the future due to declining sugar consumption. IST/DSD operates the demo factory, conducting tests with various types of biomass and configuring the correct technical details for the further development of the engineering of the FOAK. Input is sugar beet and other wet biomass flows. The purchase of sugar beet is done via a business partner (long term contracts) and other biomass via external suppliers. When the product is received, it is cleaned and a tare stream is created. This is deposited to the neighbour, but is a relatively small flow during the Demo phase, but considerably more after the FOAK starts operations. Also fermentable sugars become available from the various streams to be processed. The fermentable sugars are used to make a product that can serve as a raw material for the production of lactic acid, among other products. Part of these sugars are used for the production of EtOH and are sold to the chemical industry. In the case of EtOH production, CO2 is produced that can be sold for various purposes. The residual product after EtOH production is called digestate and is sold as raw material to a digester for the production of biogas. When the FOAK has been realized by IST/DSD, the EtOH production will be 70 million litres per year. The customer here is the chemical industry. The used price level is €750 per tonne (PLATTS price information June 2023). The total turnover for all products will be approximately €64 million, of which bio-ethanol, with a turnover of €45 million, is the largest product. CO2 is also produced. This is sold to the soft drink industry or used for green hydrogen production or for supply to horticultural greenhouses. The price level is €90 per tonne. With a production of 54,000 mton, the turnover is approximately € 4.8m. The IRR and EBITDA of this factory are respectively 15% and 18%. The prices included are snapshots based on PLATTS (June 2023). These fluctuate throughout the year, depending on the period of the year (harvest season, disappointing harvest, etc.). The basis of this project is an investment of €8-10 million to realize the demo factory in the coming years. This will be followed by an investment of approximately €80-100 million for the aforementioned FOAK. Both subsidies and investors are currently being attracted to obtain this financing.
social cohesion		The population of Zeeuws-Vlaanderen will decrease in the coming decades, the population is aging and the number of jobs is declining. This makes the area very vulnerable to the social consequences of the climate transition; the risk of a negative spiral of job loss and depopulation is real. It is therefore very urgent that the region creates new, sustainable jobs. Realization of a sustainable relationship between the agricultural sector and the chemical industry present in the area is a precondition for this. Beet4Chemistry connects agriculture with chemistry through small-scale biorefinery. By making this combination possible at a relatively short distance, the products (agriculture) and the chemicals (ethanol and customer) are connected. This ensures

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		that a vital countryside continues to exist (employment, youth) and that the processing industry remains close to both the source and the customer,so that the region remains viable. An anchoring of chemistry in the region provides a stable economic basis. The entire materials and raw materials industry is now based on fossil fuels and fossil carbon. The sugar molecule that becomes easily available via DP+Beta can make a substantial contribution to greening, especially in these sectors. Sugar beet is seen as the most important source of green carbon in the future. The entire ground-breaking DP+Beta is a series of technologies that ensure that this is a completely new innovative process. The DP+Beta process liquefies sugar beets, making all ingredients freely available in a homogeneous paste of the entire beet (75% water). Compared to existing technologies, DP+Beta distinguishes itself in that the sugars from sugar-containing products become immediately and cost-efficiently available for further processing. The viability of agricultural businesses and therefore the quality of life in the countryside is improved by this development. A new and extensive sales market is being created for sugar beet production. This ensures the maintenance or even creation of jobs in rural areas, both directly and indirectly. Partly because of the income security that farmers receive through a long-term supply guarantee of sugar beet at a fixed price. IST/DSD has made agreements with a business partner for the long-term supply of sugar beets to FOAK.

3.4.1.2 Conclusion

Beet4Chemistry constitutes a successful circular bioeconomy paradigm that turns biomass into a wide range of added-value products, from bioenergy to biomaterials that may serve as sustainable feed for several industries currently relying on non-renewable primary resources. Putting emphasis on the development of a cradle-to-cradle and low-emissions technology and treatment process, Beet4Chemistry provides for a circular solution that highlights the cascading potential of biomass. The effectiveness of this bio-based solution when applied on a small scale is another feature of high importance, empowering local development via innovative technologies.

3.4.2 Sollys : Concentrated solar energy

3.4.2.1 Success story report

General Information	
Success Story Title	Sollys: Concentrated solar energy
Subtitle - tagline	Sollys: high-temperature renewable heat production and storage
Bioeconomy theme	Bioenergy
Core Activities	HEAT accounts for a preponderant share of our final energy consumption, particularly in the food industry (>70%), while only a tiny portion of this is decarbonised (<10%). It has therefore developed solid expertise in concentrated solar thermal power (CSP) and offers this solution as a credible alternative to fossil fuel boilers (gas, oil) to combat climate change. Its aim is to establish itself as a key player in the energy transition.
Full Address	Centre Whoorks Rennes - Gare, 28 boulevard du Colombier BP 60533 35005 Rennes
No of employees	3
Funding sources	Private- Public Sollys has raised an initial €200,000 to finance R&D on the prototype, in collaboration with the Toulouse chemical engineering laboratory, affiliated to the CNRS. The patent is due

General Information	
	to be filed by the end of 2024. The programme is funded 50% by the company's own funds and 50% by regional aid.

The Success Story Profile	
Short description of bio-based solution	The principle behind Concentrated Solar Power (CSP) is to use mirrors to concentrate the sun's rays over a small area, thereby raising the temperature to high levels. This process heats a fluid circulating in a tube, producing steam or other hot fluids, which are then used to generate electricity or supply process heat. CSP offers a renewable, low-carbon source of energy.
Detailed Description	Sollys is responding to an urgent need to decarbonise heat, which accounts for more than half of the world's energy use but is currently very poorly decarbonised (at only 10%). There is therefore an urgent need to decarbonise this portion of energy. In practical terms, Sollys is proposing to provide heat as a service to manufacturers, particularly those in the food industry, who need it for their processes (sterilisation, pasteurisation, drying, distillation, etc.). Currently, 90% of this heat is generated by gas, fuel oil or coal. Sollys offers a solution in the form of Concentrated Solar Power (CSP) using mirrors to concentrate the sun's rays over a small area. This concentration increases the temperature to over 100°C. By circulating a fluid through a tube located in this concentrated area, the tube is heated to several hundred degrees, allowing water to be vaporised. Steam is commonly used in the food industry to transport heat, similar to a domestic central heating network. It is also possible to heat other fluids such as hot air or oils, as required. Sollys' innovation lies in its thermal storage system, guaranteeing continuous and reliable availability of concentrated solar energy.
The team behind the story	Sollys is a young innovative company founded by three experts who are combining their skills to revolutionise the energy sector: **The R&D Engineer:** With a dual background in mathematical and physical modelling as well as materials and structures, he began his career in an engineering office. His role at Sollys is to focus on R&D, providing advanced technical solutions to optimize the company's efficiency and innovation. **The Sales Director:** A former expert in energy invoicing for companies, he has observed the significant impact of energy costs on productivity. At Sollys, he is dedicated to offering customers decarbonised and stable energy, exploiting the inexhaustible and free primary resource that is the sun. He highlights Sollys' ability to stabilise energy prices over 20 years, helping companies to free themselves from supply problems and fluctuating costs. His challenge is to convince customers of the vision of decarbonisation and energy security. **The Operational Engineer:** With experience in operational positions in direct contact with customers, he brings to the team his skills in managing relations with suppliers and subcontractors and also does commercial prospecting.
Target audience / Key client / Key partners	All structures using process temperatures between 100 and 400°C are targeted. The agro-industry is the core target but the chemical and paper industries also represent potential target clients.
Vision and Future plans	The company is currently continuing its prototyping phase in collaboration with the LGC laboratory in Toulouse, which should be completed in November. It will then enter a

The Success Story Profile	
	phase of commercial traction, with the negotiation of feasibility studies with several manufacturers in the agri-food and chemical sectors, representing its first source of income. Following this, the company plans to raise funds and sign long-term energy purchase agreements at a guaranteed price (PPA contracts) with the first prospects to have validated their feasibility study. These contracts will be the company's main source of income.

Milestones Timeline		
	Date / Year	**Milestone**
1	Autumn 2020	Recruitment of the first full-time employee
2	August 2021	Recruitment of the second full-time employee
3	January 2022	Recruitment of the third full-time employee
4	March 2022 (4 month)	Integration of the Institut Polytechnique de Paris "X-Up, Deeptech incubator" Laureate : "X-Grant" price from Institut Polytechnique de Paris
5	March-April 2022	The outbreak of war in Ukraine in March-April 2022, following Russia's invasion, led to a one-off rise in gas prices. This situation has led to significant expressions of interest from major gas consumers in France.
6	April 13th 2023	Laureate: "Emergys Bretagne" Price
7	2024	Laureate: "Réseau Entreprendre Bretagne" and " Réseau initiative Rennes"
8	September 2023 – September 2025	Joining the French Tech Rennes-Saint-Malo "Le Poool" incubator

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	4	• **Local resources:** Sollys mainly uses mirrors and metal structures for its Concentrated Solar Power (CSP) installations, resources that are widely available locally. • **Availability of Inputs:** Components required for CSP installations, such as mirrors and support structures, can be sourced locally, reducing dependence on imports. • **Sustainable management**: Sollys offers a sustainable energy solution, exploiting an inexhaustible and free source of energy (the sun). In addition, Sollys' CSP technology reduces the use of fossil fuels, contributing to a more sustainable management of energy resources. Sollys scored 4 out of 5 in the "Locality" category. The resources and inputs required for the CSP technology are mostly available locally, and Sollys' approach promotes sustainable management using solar energy. Some specialist inputs may still require non-local sourcing, justifying a score slightly below perfection.
team and network	5	• **Strong team:** Sollys is supported by a strong founding team comprising an R&D engineer specialising in modelling, mathematics, physics, materials and structures, a sales manager experienced in energy billing, and an operations engineer with skills in supplier relationship management and business development. • **Interdisciplinary skills:** The team has varied and complementary skills, covering R&D, commercial aspects, and operations, enabling a holistic approach to the development and implementation of CSP solutions.

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		• **Local ecosystem:** Sollys collaborates with local partners such as the CNRS- affiliated chemical engineering laboratory in Toulouse, and benefits from regional funding. This local ecosystem of stakeholders strengthens Sollys' ability to innovate and grow. Sollys scored 5 out of 5 in the "Network and Team" category. The founding team is not only strong and experienced, but also has crucial interdisciplinary skills. In addition, the existence of a local ecosystem of partners and supporters further strengthens their position and potential for success.
effectiveness-relevance-applicability	3	• Sollys provides an effective response to the urgent need to decarbonise process heat, a sector that accounts for more than half of the world's energy use but is very poorly decarbonised (only 10%). Their CSP solution enables fossil fuels to be replaced by a renewable energy source. • **Necessity**: The decarbonisation of energy is crucial to reducing greenhouse gas emissions and combating climate change. Sollys offers a necessary solution to achieve these environmental goals while stabilising energy costs for businesses. • **Realistic Applicability:** CSP technology is well established and Sollys has already demonstrated its feasibility with partnerships and prototypes under development. The regional commitment and funding obtained show that the application of their solution is realistic and supported. • **Benefit to Society, the Economy and the Environment:** Sollys is making a significant contribution by offering a clean and sustainable energy alternative, helping industries to reduce their carbon footprint while saving on energy costs in the long term. This benefits the economy, society and the environment. Sollys received a score of 3 out of 5 in the "Effectiveness - Relevance - Applicability" category. Their CSP solution is not only necessary and realistic, it also brings significant benefits to society, the economy and the environment by directly addressing the need for energy decarbonisation.
Testing & piloting-scalability & replicability	4	• Research, Experimentation and Piloting stage: Sollys has carried out extensive research and is currently working on the development of prototypes in collaboration with the chemical engineering laboratory in Toulouse, affiliated to the CNRS. This R&D process is essential to ensure the viability and effectiveness of their CSP technology. • Impact of Pilot Tests: Tests and prototypes play a crucial role in Sollys' success by validating concepts and allowing adjustments before large-scale implementation. The first fund-raising of €200,000 to finance these R&D efforts demonstrates the importance of this phase. • Ongoing and future testing: Further testing is planned at later stages, including a patent filing scheduled for late 2024. This indicates continued progress and a commitment to improving and validating the technology. • Scalability and Replicability: CSP technology is realistically scalable and can be adapted to different sizes and industrial needs. In addition, it is replicable in other rural areas of Europe where there is sufficient sunlight, which would allow the solution to be scaled up in a practical and cost-effective way.

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		Sollys obtained a score of 4 out of 5 in the "Tests and Pilots - Scalability and Replicability" category. Research, experimentation and pilot tests have been well carried out and continue to play an important role in the development of the technology. Scalability and replicability are also well present, although challenges may still arise when expanding into different regions, which justifies a lower score than the maximum.
financial sustainability	3	Before the fund-raising, the company's financial viability is assessed at 3/5, thanks to the consolidation of its equity capital, successful love money, as well as an honorary loan from Innovation Initiative and a BPI loan from Réseau Entreprise Bretagne. Once the funds have been raised, the company expects to be 5/5 viable, given the amounts expected and the interest shown by investment funds specialising in energy infrastructure, ready to support its concentrated solar thermal power plant projects.
social cohesion	4	• **Positive Value for the Community:** Sollys brings significant value to the community by offering a renewable and decarbonised source of energy. By reducing reliance on fossil fuels, Sollys helps to improve air quality and combat climate change, benefiting public health and the environment. • **Education and Awareness:** Sollys has the potential to raise awareness and educate the community about the benefits of renewable energy and the need for decarbonisation. This can encourage environmental awareness and wider adoption of sustainable practices. • **Absence of Community Problems:** Sollys' CSP technology does not cause any significant nuisance to the community. Unlike fossil energy sources, it does not generate air or noise pollution, and the use of solar energy does not require limited local resources. • **Future recruitment:** Sollys will be strengthening its team of engineers with highly specialised profiles in fields such as physical simulation and modelling, fluid mechanics, heat exchange and tribology. The company makes a significant positive contribution to the community, both environmentally and economically, without creating significant problems. Its favourable impact on the quality of life and the local economy, as well as its educational potential, further reinforce this positive assessment.

Relevant links

1. https://sollys.energy/

Photos




3.4.2.2 Conclusion

Solly's serves as a good paradigm falling under the "Bioenergy" sector, showcasing the importance of leveraging bioeconomy towards the development of technologies and applications able to solve real-world problems. Identification of specific challenges related with current economic activities, such as heat consumption by the food industry and relatedt environmental impacts, and development of tailored solutions, with emphasis on research and development, based on interdisciplinary collaboration, are key factors that make this endeavor successful.

4 Identified Success Stories: North-East RBP

The section presents the identified success stories of the North-East RBP, including Poland, Lithuania and Latvia and represented in the project by VDU, LBTU and IUNG. The North-East RBP had already reached the KPI: 1 success story per bioeconomy theme during Deliverable 2.6. In the framework of Deliverable 2.7, the North-East RBP managed to identify 3 more success stories.

4.1 Bioeconomy Theme: Food & Agriculture

4.1.1 Microbe Plus

4.1.1.1 Success story report

General Information	
Success Story Title	Microbe Plus
Subtitle - tagline	Biological solutions provided by nature
Bioeconomy theme	Food and Agriculture
Core Activities	Developing microbial-based solutions to protect, stimulate crop growth, and enhance yield.
Full Address	MICROBE PLUS Sp. z o.o., Mościckiego 1, 24-110 Puławy
No of employees	4
Funding sources	EU, public, private

The Success Story Profile	
Short description of bio-based solution	**Microbe Plus provides game-changing biological solutions that fortifies crops against pathogens and enhances stress tolerance, ultimately ensuring the production of high-quality yields. Microbe Plus supports the transition to a greener agriculture, climate-resilient agriculture and food-secure future.** Microbe+ biologicals consist of carefully selected beneficial microorganisms that improve crops and soil health, as well as nutrient uptake. These beneficial microbes are chosen for their ability to colonize plants and create a symbiotic relationship that benefits both the plant and the microbe. These multi-strain biological products have been shown to help plants reduce both biotic and abiotic stress, providing farmers with a powerful tool to increase productivity and profitability. By utilizing natural microorganisms rather than synthetic chemicals, these solutions also contribute to a more sustainable farming system while reducing negative impact on the environment.
Detailed Description	By applying our biologicals we aim to boost crop growth, shield against stress, and lead to high-quality yield. By slashing synthetic agrochemicals up to 50% we are making tangible reductions in CO2 emissions per hectare. Our biologicals are designed to work on multiple crops (+18 crops) including cereals, canola, sugar beet, potatoes, soybean, vegetables and fruits. Microbe+ biologicals are made up of a carefully selected blend of bacteria that work together to create a healthy microbiome. Microbe+ studied the interactions between different microorganisms and their effects on crops and by identifying the most effective combinations of microorganisms, developed products that promote plant growth and protect against pathogens. Microbes that produce specific metabolites, enzymes, and phytohormones were selected and enhanced through clever fermentation techniques. By encouraging these microbes to work together, a high concentration of metabolites and other compounds is created that are favorable for crop growth and protection. To optimize their biological products, Microbe+ utilized cutting-edge biological characterization and biochemical profiling of metabolites. The efficacy of products has been extensively tested on multiple crops and a broad spectrum of diseases. Achieving a high yield is simply not possible without supporting plants in the earliest stages of their growth. Carefully optimizing dosage and timing of application ensures

The Success Story Profile	
	optimal plant development from the beginning of the growing season and helps to obtain the highest production and best quality crop during harvest. Ultimately, this results in maximizing marketable yields. Microbe+ offers: 1. effective pathogen control – Microbe+ biologicals can help control plant diseases caused by pathogens such as fungi, bacteria, and viruses. Microbe+ products contain beneficial microorganisms or natural compounds that can suppress or prevent the growth of pathogenic organisms. 2. plant immunity –Microbe+ biologicals can help enhance the plant's natural defenses against pests and diseases by stimulating the plant's immune system, making it more resistant to pathogens. By improving plant immunity, farmers can reduce the need for chemical pesticides and improve the overall health and productivity of their crops. 3. residue reduction – Microbe+ biologicals leaving no harmful residues on crops, soil, and water. This is because they are derived from natural sources and have a low toxicity profile. Farmers can produce safer and healthier food for consumers free from pesticides.
The team behind the story	Microbe Plus is a biotechnology startup operating in the Agri-Tech sector, created by a team of scientists and practitioners well-experienced in a number of successfully implemented solutions for agriculture.
Target audience / Key client / Key partners	Farmers, food producers
Vision and Future plans	The company is dedicated to developing innovative toolbox products such as biocontrols and biostimulators and forming strategic partnerships to expand their possibilities.

	Milestones Timeline	
	Date / Year	**Milestone**
1	04-2021	Receiving a R&D grant – PARP
2	08-2022	Establishing a partnership and joint development agreement with Südzucker AG & REM Analytics
3	11-2022	Validation of Microbe+ technology with global partner in Europe, USA and Costa Rica
4	03- 2023	Successful scaling up of manufacturing of biologicals
5	12-2024	Vinning a 6th edition of the ING Grant Program

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	**Global Perspective:** Emphasizing worldwide validation and deployment ensures adaptability across diverse agricultural environments and practices. **Local Engagement:** Collaborating with local farmers and food producers helps tailor biological solutions to regional challenges, enhancing product effectiveness and adoption.
team and network	4.5	**Diverse Expertise:** A multidisciplinary team with diverse backgrounds plays a key role in tackling the complex challenges of crop protection. By integrating different perspectives and skills, the team drives innovation and enhances R&D success. Our advantage is the vision, passion and strong team which define our targets to help

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		farmers, agriculture and future generations accomplish better yield in the rapidly changing climate. **Accelerated Progress:** Bringing in experts with crop protection experience speeds up research and development, enabling a quicker transition from concept to market-ready solutions. Need to build a sales team and look for distributors.
effectiveness-relevance-applicability	5	**Shifting Perceptions:** Overcoming initial doubts from companies and farmers about reducing synthetic chemicals highlights the success of the company's commitment to low-impact, sustainable solutions. **Regulatory Alignment:** The company's focus on eco-friendly products aligns with evolving regulatory trends that prioritize sustainability and greener agricultural practices. We are validating our biologicals through governmental and private contractors who are carrying test fields for us for regulatory purposes. Everything is performed according to international standards (EPPO, OECD).
Testing & piloting-scalability & replicability	4	**International Trials:** Securing funding and partnerships for trials across various regions and crops is crucial for validating the technology's effectiveness on a global scale. We have demonstrated that farmers can significantly reduce their reliance on chemical pesticides and synthetic fertilizers without sacrificing yield (trials performed in Poland, Germany, France, USA, Costa Rica, Saudi Arabia). **Technology Scalability:** Sufficient resources ensure thorough validation, proving the technology's adaptability to diverse agricultural environments.
financial sustainability	4.5	**Financial sustainability** poses a significant challenge, particularly for young companies entering highly regulated industries. Microbe Plus as a startup received funding from the European Union for the projects entitled: "Integrated and Biological Farming Strategies for Boosting Bioactive Compounds" and "Innovative Biological Solution for Strengthening Plant Defense Systems". The company has so far succeeded in securing financing for its operations and is now looking to expand its activities on a larger scale.
social cohesion	5	MicrobePlus is a strong advocate of the transformation of the agri-food sector to provide healthy and affordable food for the growing population. Their work is also aimed at raising awareness about the importance of healthy food production, healthy diet, and reducing the environmental impact of food production.

Relevant links

1. https://youtu.be/wOAHU4wTu4M

4.1.1.2 Conclusion

Microbe+ is a bio-based success story aiming to provide consumers with healthy, nutritious food while reducing food waste. By integrating entrepreneurial growth, science-driven innovation, and value-adding capital this endeavor is capable of creating impactful change towards sustainable agriculture. All these elements are essential for success.

4.1.2 Ribes Technologies

4.1.2.1 Success story report

General Information	
Success Story Title	Ribes Technologies
Subtitle - tagline	innovative solutions for automation of berry crop

General Information	
Bioeconomy theme	Agriculture & Food
Core Activities	Development of hardware and software for sustainable farming
Full Address	24-150 DRZEWCE-KOLONIA 107/B LUBELSKIE
No of employees	4
Funding sources	Private, EU

The Success Story Profile	
Short description of bio-based solution	With electric vehicles and systems based on artificial intelligence, the company enables precise monitoring and application of plant protection products. This translates into greater efficiency and a sustainable approach to agriculture. This solution is the answer to real problems and needs to be identified by farmers. It aims to reduce the costs of plant protection products used in orchards, as well as to help fulfil the EU requirements for reduction of PPP use by 50% by the year 2030.
Detailed Description	Ribes Technologies has developed four products: A key component is the vision module, which identifies pests in the plantations. Its cameras and light sources of the right colour illuminate the fruit bushes. The vision module recognises where the pests are and the sprayer precisely sprays the chemical only where necessary. The technology developed by Ribes Technologies significantly reduces the use of chemicals, which has been confirmed by laboratory results. The level of pesticide residues in fruit from plantations using this technology was proved to be much lower as well. The sprayer is an innovative solution as well. It allows for using two different products at the same time (during one pass of the machinery). The machinery is mounted on an autonomous electric vehicle “Isidore” that moves along a set route on the field. A digital pest trap uses market pheromones, it is fully automated and powered by a photovoltaic panel. It has a built-in camera that monitors the situation in the plantation. Using this tool, allows us to predict when the spraying robot should go into the field. This eliminates the need for daily monitoring of the plantation with a vision module.
The team behind the story	Łukasz Kopiński, PhD, the owner of the Ribes Technologies company, runs a 40-hectare currant plantation. He draws his innovative ideas from both his practical experience as a farmer and his academic career as a teacher and researcher at the University of Life Sciences in Lublin. He was involved in the drafting of the legislative provisions for the European Green Deal and the ‘Field to Fork strategy and the ‘EU Biodiversity Strategy to 2030’. As he points out, the future of berry farming depends on the implementation of precision farming, which is crucial for its sustainable productivity and growth. Łukasz Kopiński came up with the idea for Ribes Technologies as a response to the real needs of farmers that he experienced himself. The company was established as part of the School of Pioneers programme organised by the Polish Development Fund Group.
Target audience / Key client / Key partners	Berry producers, farmers
Vision and Future plans	Ribes Technologies addresses specific problems identified by farmers, adjusting their offer to individual needs: its products can be used as a complete solution or as separate modules, e.g. the vision and spraying modules can be adjusted to other vehicles already used on a farm, without the need to purchase all the components. The company wants to

The Success Story Profile	
	contribute to sustainable farming for the benefit of both farmers and consumers – the use of this solution will significantly decrease the contents of chemical residues in harvested fruits. The next step is to develop technologies for certification of fruit based on the content of such residues, raising consumer awareness regarding the use of plant protection products and supporting production of better food quality and healthy diet. The consumer will have access to information on whether the fruits have been sprayed, how many times and when.

	Milestones Timeline	
	Date / Year	**Milestone**
1	2020	creating an idea while participating in PFR School of Pioneers
2	2021	First project - AGRO-TECH STARTUP
3	2022	Second project to continue work on the robot: Fruit and Vegetable Producers' Group, RIBES-POL Sp. z o.o.
4	2024	Participated in Innovations Hub Foundation 2024 edition
5	2024	Ribes Technologies in the Top 10 of start-ups awarded in the 6. Edition of the ING Grant Programme

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	[5]	The solution addresses the needs of orchard owners, especially berry plantations which are numerous in the region.
team and network	[5]	A multidisciplinary team with varied backgrounds and experiences was crucial for development of the robot. Involvement of a number of experts from various fields of science, starting from programming, automation, physics, and plant cultivation and protection was a challenge.
effectiveness-relevance-applicability	[5]	The product was proven effective in reducing the use of chemical input in agricultural production as well as reducing the amount of PPP residues in the final product (laboratory tests). The solutions can be easily adapted to the farmers' needs thanks to modularity - the sprayer can be mounted on the existing machinery, other modules can be added depending on specific needs.
Testing & piloting-scalability & replicability	4]	The product has been subjected to a series of tests which it has completed with great success. It is not yet the final product and scaling is still ahead of us. Scaling and replication will be possible once funding is secured.
financial sustainability	[4]	Providing and securing financing for small start-ups is a huge challenge. The financial liquidity of such ventures is a fundamental factor. There is an interested company to scale up the production of the robot/or its specific modules, business negotiations are in progress.
social cohesion	[4]	The company's activities focus on optimising the management of natural resources, improving the quality of agricultural products and minimising the negative impact on the environment. This solution focuses on the quality of fruit produced, raising social awareness on the quality of food as well as environmental consciousness.

4.1.2.2 Conclusion

Ribes Technology showcases the opportunities rising towards the development of circular biobased solutions, when state-of-the art technological advancement and the uptake of Artificial Intelligence are taken advantage of. This success story consists of the identification of specific agricultural challenges and the development of tailored

innovative solutions, contributing to effective farming practices and minimisation of crop protection products, that are often harmful to the environment and to human health.

4.1.3 PLANTEO -INNOVATIVE SOLUTIONS FOR THE PRODUCTION OF ORGANIC FERTILIZERS

4.1.3.1 Success story report

General Information	
Success Story Title	PLANTEO -INNOVATIVE SOLUTIONS FOR THE PRODUCTION OF ORGANIC FERTILIZERS
Subtitle - tagline	Organic fertilizers linked to the production of green energy
Bioeconomy theme	Food/agriculture systems
Core Activities	Production of universal organic fertilisers for plants.
Full Address	Zielone Suszarnie Sp. z o.o. ul. Solec 18 lok. U31 00-410 Warszawa
No of employees	3
Funding sources	Public, private (revenue)

The Success Story Profile	
Short description of bio-based solution	PLANTEO is a line of organic universal fertilizers for plants offered by Zielone Suszarnie (Green Dryers) company. The product line includes both: high-speed liquid fertilizer and granular fertilizer of a prolonged action. Organic fertilizers PLANTEO have optimum chemical composition adapted to the needs of different plant species. The composition of minerals is balanced in such a way as to ensure the proper development of the plant, regardless of individual preferences.
Detailed Description	Zielone Suszarnie Sp. z o.o. is a company that has specialised in the production of natural organic fertilisers since 2011. Operating on the basis of renewable energy sources, the company focuses on ecological production, creating fertilisers from 100% plant-based ingredients. Planteo brand products target different market segments, covering fertilisers for ornamental plants, vegetables, fruit and lawns. The company is distinguished by its approach to creating fertilisers through the fermentation process of plant biomass, which ensures their high quality and positive impact on the soil and plants. Zielone Suszarnie cooperates with scientific research units, which allows it to constantly improve and upgrade its offer. The company's actions are in line with its environmental mission, and Planteo fertilisers are characterised by a lack of hormones and chemicals, making them safe for people, animals and the entire ecosystem. Zielone Suszarnie strives to build long-lasting relationships with its customers, due to the constant study of their needs and expectations.They specialise in agricultural crops (substrate for biogas plants), animal husbandry and also provide services to support agriculture. Their product range includes pellet production lines with different capacities. Their goal is to create wholesome and 100% naturally stimulating organic fertilizers and reach out to conscious farmers and consumers who care about organic products and farming that supports natural processes. The company owns three biogas plants (capacity of: 0.8MW and two with 1MW). They manage digestate which is a by-product of biogas production to produce 3 forms of fertiliser: liquid, dried and pelletised). They use the heat and energy from biogas plants to power 2 drying lines with a low-temperature system (up to 90oC). The digestate itself or after filtration is a liquid organic fertilizer. The solid fraction separated from the digestate is subjected to drying and pelleting giving the possibility to produce fertilizer in the form of dried or pellet. The resulting fertilizers have a very high content of organic matter (more than 80%), numerous macro- and micronutrients, natural microbiome and phytohormones.

Milestones Timeline		
	Date / Year	**Milestone**
1	29.09.2011	Company Zielone Suszarnie Sp. z o.o. founded.
2	2017	Collaboration with Jupiter Solar – strategic partner
3	2017	Preferential loan from the National Fund for Environmental Protection and Water Management 4828000 PLN

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	Zielone Suszarnie Sp. z o.o. can be characterised by the company's deep integration into the local agricultural ecosystem and its strong emphasis on regional collaboration. The company works closely with local farmers and food producers, tailoring its offer to their specific needs through ongoing dialogue and constant study of customer expectations. The raw material for the biogas plants is supplied by local biomass producers, which reinforces the circularity and sustainability of the production process. The company relies entirely on plant-based inputs and renewable energy, thus supporting local circular economies and reducing environmental impact. Its close cooperation with scientific institutions and long-term customer relationships further ensure that its solutions remain relevant and responsive to local conditions
team and network	5	Zielone Suszarnie Sp. z o.o. has a strong foundation of expertise, collaboration, and innovation. The company's team combines knowledge in renewable energy, sustainable agriculture, and organic fertilizer production, enabling the development of high-quality, plant-based products. Active cooperation with scientific research units, allows it to constantly improve and upgrade its offer based on the latest technological and agronomic advancements. This collaboration enhances product effectiveness and ensures compliance with evolving regulatory standards. The company has built a network of partners, including local farmers, biomass suppliers, and industry stakeholders, which supports knowledge exchange and fosters innovation, resilience, and scalability.
effectiveness-relevance-applicability	5	Effectiveness - Zielone Suszarnie effectively transforms plant-based biomass into high-quality organic fertilizers through a tested and integrated biogas and drying system. The use of 100% renewable energy ensures low CO_2 emissions, while the process yields fertilizers rich in organic matter (over 80%), nutrients, natural microbiomes, and phytohormones. The three available forms—liquid, dried, and pellet—support various agricultural needs, with proven agronomic value and consistent quality. The production process is already approved by the Polish Ministry of Agriculture, confirming its compliance with safety and quality standards. Relevance – products are made entirely from 100% plant biomass and meet all EU organic farming regulations, making them ideal for environmentally conscious farmers and urban green initiatives. Products and activities of the company directly support EU Green Deal goals, including circular economy, sustainable agriculture, and climate mitigation. Applicability - the system is easily replicable in both rural and peri-urban areas. It can be scaled up through additional biogas modules or replicated in similar agri-food contexts. The dual distribution strategy—targeting both organic farmers and conscious consumers—demonstrates market readiness and adaptability. The project's reliance on proven technologies and approvals makes it ready for broader deployment across the EU and beyond.

Measuring Success		
Key Indicator	**Rating**	**Explanation**
Testing & piloting-scalability & replicability	5	Production model integrates three biogas plants (0.8 MW and 2 × 1 MW) with full circular use of plant-based biomass. The process includes digestate management, heat and energy recovery, and low-temperature drying (≤ 90˚C) to produce three forms of certified organic fertilizers (liquid, dried, pellet). Testing and piloting are conducted on existing infrastructure, allowing for real-world validation of feedstock flexibility, energy efficiency, and product quality. The modular design ensures easy scalability, while the use of widely available agricultural and food waste enables replicability across rural and urban regions.
financial sustainability	5	Financial sustainability of the company is well-supported by a diversified funding structure. The company benefits from multiple revenue streams, including the sale of its organic fertiliser products and pellets, operational aid for promoting energy production from renewable energy sources (RES). Public funding and subsidies for RES further strengthen its financial foundation, reducing operational risks and supporting long-term investment in sustainable technologies. The strategic partnership with Jupiter Solar enhances energy production capacity and stability. This combination of commercial income, public support, and strategic collaboration can ensure continued financial viability.
social cohesion	5	The company's activities are characterized by strong commitment to community engagement, collaboration, and sustainable development. They actively cooperate with local farmers, food producers, and biomass suppliers, fostering inclusive and mutually beneficial relationships within the regional agricultural ecosystem. By tailoring its product offer to the needs of local stakeholders and maintaining ongoing dialogue with customers, the company promotes trust, transparency, and shared value creation. Its environmentally responsible approach focused on organic fertilizer also supports broader public health and environmental goals, reinforcing its role as a socially responsible actor. The use of local resources supports rural development and job creation.

4.1.3.2 Conclusion

PLANTEO highlights the benefits coming from circular management of residual biomass both with regards to economic growth and environmental protection. Through valorisation of digestate occurring from bioenergy production, PLANTEO produces eco-friendly fertilisers, decoupling farming from the use of harmful chemicals, while offering high quality products of natural origin. Continuous development of the offered solutions, together with networking and collaborations with a wide range of local actors empower the sustainability of this success story.

5 Identified Success Stories: South-West RBP

The section presents the identified success stories of the South-West RBP, including Spain, Portugal and Italy and represented in the project by AVEBIOM, UC, CBE and AIEL. The South-West RBP had already reached the KPI:1 success story per bioeconomy theme in the framework of Deliverable 2.6. During the research for Deliverable 2.7, they identified 5 more success stories.

5.1 Bioeconomy Theme: Food & Agriculture

5.1.1 Enabling a new value chain for olive pomace by producing high added value iron nanoparticles and a new solid valuable fraction

5.1.1.1 Success story report

General Information	
Success Story Title	Enabling a new value chain for olive pomace by producing high added value iron nanoparticles and a new solid valuable fraction
Subtitle - tagline	CALPECH has developed a solution to reduce the polyphenolic load of alpechin from olive pomace, and to produce high valuable encapsulated zero-valent iron nanoparticles (CE-nZVI), solid pomace compatible with animal feed and biogas production.
Bioeconomy theme	Food and Agriculture Biomaterials and Bioproducts
Core Activities	- Technology development from TRL 3 to TRL 8 - Patented innovation - Implementation of the first industrial pilot at a Olive Pomace oil cooperative - Collaboration with olive oil sector to find potential customers - Development of industry-sized plant on own property (widening business from tech-provider to olive mill pomace processing) - Opening market for nano-particles
Full Address	Poligono Canastell, Carrer Fusteria, 22, 03690 San Vicente del Raspeig, Alicante
No of employees	9 employees
Funding sources	The development of the technology received multiple funding streams during R&D and pilot phases.

The Success Story Profile	
Short description of bio-based solution	Calpech SL was officially founded in 2021, but its roots go back much further, to research carried out at the University of Alicante from 2010. Professor Andrés Fullana, an expert in environmental technologies, had long worked on ways to reduce pollution and reuse waste. In 2016, he led a project to create encapsulated zero-valent iron nanoparticles (CE-nZVI) which can clean soil and water, break down pesticides, and improve biogas production. And at same time, they can resolve an issue with circularity, as they can be made from olive mill wastewater obtained from the olive oil extraction process. This vegetable water, known as alpechin, is a liquid that is hard to treat due to its high phenol content. One of Fullana's researchers, Yuriy Budyk, helped scale the process from lab to pilot scale. When a patent was published in 2020, Prof. Fullana, researcher Blanca Calderón and Dr. Budyl founded Calpech SL to bring this innovation to market. They saw a clear opportunity: that alpechins could be treated locally by olive mills, olive pomace oil extractors or in

The Success Story Profile	
	intermediate local hubs, to make valuable iron nanoparticles for multiple uses, some as direct as biogas plants, where these additives can lead to 90% reduction of hydrogen sulphide (SH_2) in biogas, increase of biogas production of +20% and contribute to stabilisation of the process. In 2022, Calpech partnered with Troil Vegas Altas, a cooperative in Extremadura, to run a pilot near the source of alpechin. The project proved it was possible to make CE-nZVI sustainably and at scale. In 2023, Calpech launched its first product: Ce-in Biogas, a nanoparticle additive that improves methane production and removes harmful gases in digesters. Calpech soon gained recognition. Awards like the FOLIVE Innova Prize and support from investors helped fund a new industrial plant in Alicante, opened in 2025. Now, the company is expanding into new markets like water treatment and agriculture—turning waste into value, science into solutions.
Detailed Description	The story of Calpech SL begins years before its official founding in 2021, in the laboratories of the University of Alicante, with Professor Andrés Fullana, a specialist in chemical engineering and environmental technologies. Fullana had long been engaged in research on pollution mitigation, waste valorization, and decontamination processes. But unlike many academics focused solely on publishing results, Fullana consistently pushed toward technological transfer, seeking not only knowledge but also usable innovation. His work was grounded in a practical vision of science, one that translated environmental challenges into solutions that could leave the laboratory and enter the market. A key turning point came in 2016, when Fullana led a major applied research project supported by the NEXA program of the Valencian Innovation Agency. This project focused on the development of encapsulated zero-valent iron nanoparticles (CE-nZVI), which could be used in multiple environmental applications—such as soil remediation, pesticide breakdown, wastewater treatment, and even enhancing anaerobic digestion in biogas plants. The encapsulation technology not only made the nanoparticles more stable and effective, but also allowed them to be produced using agri-food waste, like olive mill wastewater called “alpechin”. This alignment between cutting-edge science and circular economy principles laid the foundation for what would later become Calpech’s core business. During these years, Fullana’s lab attracted talented young researchers, including Yuriy Budyk, who would later become a key figure in Calpech’s founding. Budyk joined the team first as a PhD student. His work was essential in scaling the production of CE-nZVI from laboratory synthesis to a semi-industrial process. More than just a scientist, Budyk showed an entrepreneurial instinct—keen on taking the research beyond academia. When the University of Alicante filed and published the patent for the nanoparticle production process in 2020, it became clear that there was an opportunity not only for licensing but for creating a business around this innovation. Budyk advocated for the latter. Together with Fullana and researcher Blanca Calderón, he co-founded Calpech with the aim of transforming this patent into a commercial reality. The market niche and the need was evident for the founders of Calpech SL. This process uses “alpechin” , a vegetable water with high phenolic loads, which is difficult to treat. Alpechin is not usually produced in Spain, since it is a by-product of three-phases olive oil extraction, and Spain mills mainly use the two-phases process from the 90s, since it has higher yield in olive oil. But “alpechin” is part of the final by-product of two-phases, the alpeorujo, a mixture of “alpechin” (liquid phenolic waters) and orujo (solid mass olive flesh, olive stone, pealings). Therefore olive mills usually decide to send the paste-like alpeorujo to large industries called “extractors”, which dry it and obtain olive pomace oil.

The Success Story Profile	
	Olive mills however could consider to gain extra added incomes if performing themselves a physical extraction, with a well known process, similar to the former three-phases system. When applied to the alpeorujo this "reprocess" obtains olive pomace oil, orujo (colid) and alpechin. Thus, solving the market for alpechin, would allow to create a new path for the cascade utilisation of olive oli by-products. Encouraged by this market vision, Calpech SL started its first moves to find a client currently having to deal with "alpechin" management. A milestone came in 2022, when Calpech partnered with Troil Vegas Altas, an olive oil cooperative in Extremadura having already a three-phase alpeorujo "reprocessing" line, which obtained alpechin as a by-product. This collaboration allowed Calpech SL to pilot the production of iron nanoparticles directly at the source of olive waste, closing the loop between agricultural residue and high-value nanomaterial. The pilot validated the feasibility of producing CE-nZVI at scale while remaining sustainable and cost-effective. Based on this success, Calpech SL launched its first commercial product in early 2023: Ce-in Biogas, an additive designed to improve biogas production. By introducing these nanoparticles into anaerobic digesters, the system not only increased methane yield but also removed harmful hydrogen sulfide (H_2S), improving efficiency and reducing corrosion in industrial equipment. The product quickly attracted attention from the biogas sector, offering a low-cost, eco-friendly solution to persistent performance issues. From its inception, Calpech SL actively participated in startup competitions and innovation programs, gaining both visibility and credibility. The company received awards such as the FOLIVE Innova Prize, the FUNDEUN-UA award for applied technology, and later, recognition from the MIT Enterprise Forum Madrid. These accolades helped secure funding from programs like NEOTEC and, in 2024, attracted €600,000 in private investment from BeAble Capital. Such recognitions not only strengthened Calpech SL financial base but also validated its business model in the eyes of investors and industry partners, opening doors for scaling operations. By early 2025, the company had moved into a new phase. With public and private backing, Calpech inaugurated its own nanoparticle production plant in the Canastell industrial park, in San Vicente del Raspeig. This facility marked a shift from pilot projects to industrial capability, positioning Calpech to serve larger clients and expand into new markets. While biogas treatment remains its flagship application, the company keeps actively developing nanoparticle-based solutions for water treatment, contaminated soil recovery, and sustainable agriculture. Each of these markets represented both a societal challenge and a business opportunity. Today, Calpech SL is the outcome of two converging visions: Fullana's commitment to applied environmental science and Budyk's move into entrepreneurship. What began as a university research line evolved into a high-impact company bridging science, sustainability, and industrial relevance. Calpech SL story demonstrates how deep-tech innovation—when backed by strategic talent and purpose—can offer real answers to environmental challenges, while building competitive business value in global markets.
The team behind the story	The team started with Dr. Andres Fullana, Professor in the University of Alicante. He and his team participated in the development of the process and the patent to produce the encapsulated zero-valent iron nanoparticles (CE-nZVl). The team at Calpech SL starts from novel researchers with entrepreneurial mind Yuriy Budik. More researchers and technicians join to build a group of 8 young entrepreneurs currently leading Calpech SL.
Target audience / Key client / Key partners	Clients are mainly olive mills. They currently have to find a use for the olive pomace, leading to costs or to a marginal benefit. Olive mills of a certain size, or a cooperative of olive mills can adopt the technological solution.

The Success Story Profile	
	A waste management company, biogas plants, could as well offer to invest and establish treatment centres, to manage the olive pomace or the alpechin (vegetable water) produced in an area. As well, a large olive mill or olive pomace extractors may be eager to invest in this new value chain.
Vision and Future plans	CALPECH has established a pilot in an aggregator of olive mills, thus demonstrating viability of the business model where a third company purchases the technology and enters in the treatment of alpechin and production of iron nano particles. As well CALPECH has established its own upscaled production unit to become a producer using the olive pomace waste water (alpechin) from olive mills. The future consists in expanding both market niches, whilst ensuring the demand of nano particles within the biogas sector, and with new market niches.

Milestones Timeline		
	Date / Year	**Milestone**
1	2010	Andrés Fullana performs multiple research projects on treatments to diverse waste products leading to several patents
2	2016	National R&D and transfer project for use of iron zerovalent encapsulated nanoparticles (CE-nZVI) to be applied to biogas purification and soil decontamination. Yuriy Budyk starts working as novel researcher.
3	2020	Patent ES P202030780 on the Process to obtain iron zerovalent encapsulated nanoparticles (CE-nZVI)
4	2021	Foundation of Calpech SL as a start up of Alicante University
5	2023	Agreement for industrial pilot plant at olive oil cooperative Troil Vegas Altas
6	2024	Access to funding and commissioning (2025) of an industrial processing unit in for production of CE-nZVI
2021-2025		Winner of multiple awards: 2021 ● Patent granted: "Iron nanoparticles production process" (Spain) ● Startup showcase: Selected for New Economy Week (Barcelona) ● Impulso award by the University of Alicante 2022 ● FOLIVE Innova Award – Olive Oil Industry Innovation (Seville) ● FUNDEUN-UA Award – Best Applied Science & Technology Project ● Santander X Award Spain Finalist ● Repsol Foundation Finalist ● Indemand Award by Instituto de Fomento de Murcia ● Fundeum award 2023 ● Product Launch: Commercial biogas additive ● MIT Enterprise Forum Madrid: Winner – "Most Sustainable & Scalable Company" ● NEOTEC Grant: €325,000 for R&D scale-up ● National Patent Award: Best Patent by a Young Inventor – Blanca Calderón ● Finalist of AI Andalus Innovation (Sevilla) 2024

	• Torres Quevedo Grant: €90,000 for hiring PhD to R&D products • Agro Información Awards: Winner – "Best Emerging AgriTech Company" • BeAble Capital Investment: €600,000 deep-tech VC round • MadBlue Summit Madrid award. • Startup Olé Miami award. • Growth award by la Cámara de Comercio de Cáceres • 2º Price Agroinnova of Mercalicante. • .IVACE+I Grant: €98,780 for R&D in water technology • Connecting Energy Acceleration program award by Naturgy 2025 • 2º Price "Prix Argent Innovation" of Bio360 exhibition (Nantes). • Avelino Corma Awards: Winner – Innovative Chemical Company • Mention of honour in the Rural Bioeconomy Awards 2025 organised by AVEBIOM through thERBN project • Finalist in Inpulso Agro in Emprende XXI awards by Caixabank • Santander X Startup in University of Alicante winner

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	4	The process works on small scales, from kilograms to tons. However, to be viable it requires a certain scale. Therefore small it is not appropriate for individual olive mills, except for those of a certain size. However, it is quite appropriate for the management locally of the olive oil pomace from several mills in an area.
team and network	4	The team started with R&D senior and novel personnel of the University of Alicante. At the moment when the patent is published, the conditions to start Calpech SL are eased thanks to the novel team that had been engaged in the previous R&D projects. From then on, a motivated team of young entrepreneurs supported by senior researchers become a perfect team to exploit the knowledge and patent and bring Calpech SL towards real sustainable operation.
effectiveness-relevance-applicability	5	The technology to produce encapsulated zero-valent iron nanoparticles (CE-nZVI) uses alpechin (vegetable water with a high load of poly-phenols). The process is able to reduce the load effectively, producing the CE-nZVI fraction. The by-products are a liquid fraction that can be fed to biogas plant digesters. In case of the olive pomace from which the vegetable water (alpechin) has been separated, the solid fraction becomes suitable for composting, animal feeding or biogas production. Therefore the technique enables an alternative route for the olive pomace management in Spain and Europe, as it converts the problem (wet olive pomace) into multiple fractions all of them with direct applicability.
Testing & piloting-scalability & replicability	5	The system has been tested initially in Lab-scale (2016-2020), and from 2023 a unit is operational at an olive mill aggregator of cooperatives, able to treat 3 m^3 per day of alpechin. The system has been upscaled at the facilities of Calpech in Alicante to be able to handle up to 21 m^3/day of alpechin. This illustrates the minimum scales, which can be upscaled for zonal treatment plants.
financial sustainability	5	The production of CE-nZVI from alpechin profitability is based in the revenues from: (1) providers of alpechin, at zero cost or with a small fee; (2) the sale of CE-nZVI; (3) the easy transfer of water for co-digestion in biogas plants. The ROI for a medium sized unit is estimated from 3 to 6 years, considering the final use of CE-nZVI as additive for biogas plants. However the ROI can be improved by expanding to niches

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		where CE-nZVI have higher value, or by integrating the treatment plants for alpechin in the olive pomace physical oil extraction industries / cooperatives.
social cohesion	4	The current model for management of olive pomace implies that olive mills have to transfer the olive pomace to large industries (olive pomace oil extractors). The model enabled by Calpech allows for smaller scales. This creates opportunities for local jobs and local use. Furthermore the cooperation of olive mills is envisaged as a key for higher profitability, contributing to more cooperation. Furthermore the transport distances for olive pomace and long term accumulations are reduced, thus contributing to more social wealth of the production areas.

Additional information

- Deep knowledge science based of the enabling technology
- Pilot testing in cooperation with key market actors
- Reliable technology design for pilot and industrial scales
- Support and collaboration with incubating and accelerating programs for start-ups
- Development of a business plan with clear and achievable markets
- Market oriented mindset
- Gathering private financing to upscale company activity

Relevant links

1. Calpech

   https://www.calpech.com/

2. Introduction to Calpech company and technology (English)

   https://www.youtube.com/watch?v=FmJxOnTHR2w

3. Short documentary about Calpech SL (Spanish)

   https://www.youtube.com/watch?v=b7P4iK2NS78

4. Corporative video (Spanish)

   https://www.youtube.com/watch?v=QOt_eWVk-A8

Photos

Calpech

Calpech Logo

Samples of encapsulated zero-valent iron nanoparticles (CE-nZVI).

Founders: Andres Fullana, Blanca Calderon and Yuriy Budyk (from left to right)

Facilities

Product

Product in truck for delivery

Laboratory

Equipment in lab

5.1.1.2 Conclusion

Calpech focuses on the valorisation of olive pomace alpechin, a by-product that is challenging to manage, towards the production of innovative products, including encapsulated zero-valent iron nanoparticles (CE-nZVI). This success story showcases a new pathway of olive pomace circular management resulting in an innovative product that boosts the effectiveness of biogas production, thus also promoting the transition to cleaner forms of energy. Continuous research and development to expand the range of products coming from a residual stream, together with the suitability of the offered solution to be implemented on a small scale, benefiting local farmers and olive producers, lay among key advantages of Calpech.

5.2 Protiberia insect farming for circularity of agri-food byproducts in local farms for protein

5.2.1 Success story report

General Information	
Success Story Title	Protiberia insect farming for circularity of agri-food byproducts in local farms for protein
Subtitle - tagline	Protiberia has succeeded to start the production of Tenebrio molitor (mealworm) larvae in Spain and to design a farmer-friendly integration system to facilitate the start of operation of decentralised insect farms in rural areas.
Bioeconomy theme	Food and Agriculture Biomaterials and Bioproducts
Core Activities	- Technology development from TRL 3 to TRL 8 - Implementation of the first production unit under Protiberia - Design of the farmer-friendly integration system - Participation in awards and accelerating initiatives - Collaboration with mushroom producing sector
Full Address	Calle Mayor 88, Villamalea (02270), Albacete, Castilla-La Mancha, Spain
No of employees	16 employees
Funding sources	The development of the technology received multiple funding streams during R&D and pilot phases.

The Success Story Profile	
Short description of bio-based solution	Protiberia, founded in 2022 in Castilla-La Mancha, Spain, has become a benchmark in circular agriculture by farming Tenebrio molitor (mealworm) larvae for sustainable protein production. The first market niche to establish the company has been the production of larvae for use as fishing bait and as feed in the poultry industry. The company has established a first production farm, and has designed a vertical innovative system to expand its activity. Its standout innovation lies in the decentralized “Protigranja” model, which is currently under implantation. The company breeds eggs and neonates in-house and supplies them—along with technical support and equipment—to local farmers, who are only responsible for the fattening phase. Once the larvae reach maturity, Protiberia collects, processes, and markets them into high-value products such as protein meal, insect fat, chitin, and a nutrient-rich organic fertilizer known as frass. By combining scalable insect farming with farmer-friendly integration services, Protiberia empowers rural entrepreneurs to turn underutilized spaces into productive insect farms. The typical return of investment is estimated in 6 year. Through research partnerships,

The Success Story Profile	
	digital monitoring tools, and ongoing innovation, Protiberia is shaping a future where insects are key players in the circular economy Protiberia already demonstrates circularity by feeding larvae with agri-food byproducts like wheat bran, fruit pulp, and vegetable waste. But the company is going further by incorporating harder-to-recycle residues into insect diets—especially spent mushroom substrate (SMS), a byproduct of mushroom farming. Located in one of Spain's main mushroom-producing regions, Protiberia has shown that up to 40% SMS can be used in larval feed without negatively impacting growth, lowering input costs while solving an environmental problem. The company's forward-thinking model has earned national and European recognition. It won first place in the 2024 EXPANSIÓN Foodtech Start-Up Awards and second place in the Southwest edition of the European Circular Bioeconomy Challenge. CEO Ana González has also been recognized by EIT Food's "Empowering Women in Agrifood" program.
Detailed Description	In a world where sustainability is the key to the future, insect farms are emerging as an innovative solution for producing ingredients for animal feed, biomaterials, and fertilizers. Among the most commonly used species in these facilities are Tenebrio molitor (mealworm), Hermetia illucens (black soldier fly), and Acheta domesticus (cricket), each with specific applications and high efficiency in protein, lipid, and chitin production. Some of these insects are also approved by European health authorities for human consumption, as scientific studies have confirmed their safety and nutritional value. Insect protein is not only an efficient alternative to traditional proteins (for both animal and human consumption), but it also has a lower environmental impact. Studies show that insect farms require up to 98% less land than traditional livestock farming, consume significantly less water, and emit up to 75% fewer greenhouse gases. Additionally, chitin, obtained from insect exoskeletons, is used in biomedical products such as antimicrobial bandages and food additives. The manure they produce, commonly known as "frass," is a powerful organic fertilizer that enhances both crops and soil properties due to its balanced NPK index, high organic matter content, absence of toxic substances (heavy metals, pesticides, artificial hormones, etc.), and the presence of beneficial microorganisms that act as biostimulants and improve nutrient absorption. With EU regulatory support and a growing market, insect farms are attracting investors, innovators, and entrepreneurs. According to a report by Data Bridge Market Research, the European insect protein market, valued at $235.45 million in 2023, is expected to reach $1.794 billion by 2031, with a compound annual growth rate (CAGR) of 28.9%. Moreover, European projects have estimated that insect proteins could replace up to 20% of animal proteins in human diets and 10% in animal feed. In Spain, the expansion of this industry is also significant, with existing insect production for poultry farms and new promising projects focused on other sectors of animal and human nutrition. Additionally, once the protein is obtained, these facilities can extract other fractions from the remaining parts, such as the chitin exoskeleton, for use in biomaterials. Currently, insect diets in farms mainly consist of food products such as wheat bran, fruit and vegetable waste, byproducts from the brewing industry, and vegetable leaves. However, with the rise of these farms, the demand for these resources could also increase significantly. This raises a crucial question: Could insects play a more active role in managing agri-food byproducts by leveraging their bioconversion potential? Insects have a unique ability to process a wide variety of byproducts that other animals cannot digest. While traditional livestock species such as cattle, sheep, and pigs have dietary limitations, insects can feed on a much broader range of waste. A recent study published in Frontiers in Sustainable Food Systems identified byproducts such as fruit pulp,

The Success Story Profile	
	bread remnants, coffee byproducts, cereal grains, and crop residues as potential ingredients for insect diets. These byproducts represent millions of tons across Europe that, in many cases, are difficult to manage and pose an environmental challenge. Utilizing this capacity could make insects a key tool in closing agri-food production cycles, reducing waste, and creating new resources. This transformation is not only an opportunity for sustainability but also for generating economic value from waste. In the heart of Castilla-La Mancha, Protiberia has established itself as one of Spain's pioneering insect farming companies. Founded in 2022, this young but ambitious company was born with the vision of harnessing Tenebrio molitor's potential to transform the agri-food sector. From the outset, Protiberia recognized the power of these insects as agents of change in the sustainable production of proteins and other valuable compounds. Protiberia offers a range of products, including protein meal for animal feed, fats for the food industry, chitin for pharmaceutical and agronomic applications, and frass as fertilizer and biostimulant. Its commitment to innovation has been recognized with several awards, including first place in the 2024 EXPANSIÓN Start-Up Awards in the Food and Agrotech category, highlighting its contribution to sustainable development and the bioeconomy. Protiberia's commitment does not stop there. Its business strategy focuses on a decentralized model where the company produces eggs and neonates in its own facilities, supplying them to associated farmers who are only responsible for the larvae's fattening phase. Once the larvae reach their maximum size, Protiberia processes and markets them. Additionally, Protiberia integrates advanced technology and collaborates with research centers, keeping it at the forefront of the industry. The company not only aims to transform waste into resources but also to foster a model that positively impacts rural communities. Protiberia's commitment to innovation has been recognized for its innovative proposal of using spent mushroom substrate (SMS) as part of Tenebrio molitor's diet. This substrate, a byproduct of mushroom production, poses an environmental problem if not properly managed. Protiberia has demonstrated that insects can consume up to 40% SMS in their diet without affecting their growth. This innovation not only reduces feeding costs for insect farms but also minimizes the environmental impact of this waste. Located in La Manchuela, one of the leading mushroom-producing areas in Castilla-La Mancha and Spain, Protiberia is uniquely positioned to close the loop between mushroom production and insect farming. This model represents a significant step toward circularity and sustainability in the agri-food sector.
The team behind the story	The project started with the confluence of 4 persons, who became partners for Protiberia. They had complementary experience, from agri-food science, local farming, or international trade. This balance of visions and competences has been a key for decision making from the beginning, to advance towards both, with technical and market vision.
Target audience / Key client / Key partners	Farmers and rural population in rural areas. By integrating with Protiberia in the "Protifarm" system they may start new profitable and secured economic activity, with low investment, as they can use their previous farming facilities. Partners can be cooperatives, farmers groups, as well as industries providers of agri-food by-products as diet for the mealworm.
Vision and Future plans	Protiberia continues exploring new ways to innovate in the field of agri-food circularity. In its effort to integrate spent mushroom substrate into insect production, the company seeks to establish key partnerships with mushroom producers and research centers. These partners will be essential in identifying the optimal dietary composition, ensuring the quality and safety of the obtained protein, and complying with food safety standards.

The Success Story Profile	
	Furthermore, Protiberia is developing technological solutions to manage and dose mushroom substrate in large-scale insect farms. As well digital monitoring and vision tools to monitor growth and perform predictive farming (thus preventing losses and detecting early diseases).

Milestones Timeline		
	Date / Year	**Milestone**
1	2020	The group of 4 partners meet and ideate the possibility to produce insect protein from insect farms, giving a second life for farms with idle installations or ceasing its activity.
2	2021	Starting study for selection of insect, evaluating performance on various agro-food byproducts
3	2022	Creation of Protiberia (Villa Insect S.L., Protiberia), operational licensing to start insect farming, and obtaining first R&D financing
4	2023	Initiated production of Tenebrio eggs and neonates (Protifarms start-up phase) Main awards and acknowledgement to the company and entrepreneurial initiative.
5	2024	Starting acceleration program. Finding financing and partners to implement Protifarm vertical farmer-friendly integration system.
6	2025	Advancing proprietary automation technology (AI, computer vision, IoT) for hatchling management. Starting refurbishing former mushroom farms into insect farms.
2022-2025		• 2022. Won Gira Mujeres Award by Coca-Cola, highlighting entrepreneurial excellence in Agrotech • 2023 Selected for the EWA (Empowering Women in Agrifood) program under EIT Food, validating leadership and gender-inclusive innovation • 2023 Received “Best Agrotech Project” recognition via Mujer Emprende Award • 2023 Won the EXPANSIÓN Start Up Award (Agrifood category), cementing its position in the Agrotech ecosystem (protiberia.com). • 2023 Finalist in the EmprendeXXI awards of Castilla La Mancha • 2024 Runner-up in the European Circular Bioeconomy Challenge (SW region) for using spent mushroom substrate (SMS) in larval feed. • 2025 Special acknowledgement for innovative agri-food companies by the program Agrobank (Caixabank)

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	4	Protiberia is deeply rooted in rural Spain, specifically in Villamalea (Albacete), a major mushroom-producing area. By sourcing agri-food byproducts such as wheat bran and spent mushroom substrate (SMS) from local industries, the company promotes a short, circular value chain. Its decentralized “Protigranja” model empowers nearby farmers to host insect farms, transforming local waste into valuable protein, fertilizer, and biocompounds. This model enhances rural bioeconomy while reducing environmental footprints.
team and network	4	Founded by CEO Ana González and her multidisciplinary team, Protiberia combines agricultural expertise with circular economy vision. From the beginning, they have

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		partnered with farmers, technology providers, and research institutions to co-develop viable insect production models. Their growing network includes academic collaborators and bioeconomy. As well partnerships with mushroom producing sector and local farmers to establish first Protifarms in idle facilities of local farmers.
effectiveness-relevance-applicability	5	Protiberia addresses urgent sustainability challenges: protein demand, waste valorization, and rural revitalization. By upcycling underused biomass into insect protein, fats, and frass, their approach is both ecologically relevant and economically grounded. Its decentralized structure and modular technology make it applicable across Europe, particularly in regions with available agro-industrial byproducts and rural workforce.
Testing & piloting-scalability & replicability	5	Protiberia has performed tests from 2021 and starting pilot plant 2023. Ongoing trials with spent mushroom substrate (SMS) are going on to facilitate use of local available agri-food by-products, reduce costs and become more resilient to prices for insect feeding substrates. As well R&D on own property for automatisation of farming, a key element to establish the decentralised "Protigranja" vertical system, supporting farmers in monitoring mealworm growth.
financial sustainability	5	Protiberia generates income through multiple product lines: protein meal as main product, fats, chitin, and frass (manure form insect). All of them have a market like animal feed, bio-based industries and agriculture respectively. Its decentralized model reduces CapEx for expansion, and is prepared to adapt "Protifarm" into existing facilities of idle farms. By assuring 20% profit margin to farmers, they estimate a return of investment of approximately 6 years.
social cohesion	4	Protiberia fosters rural entrepreneurship by enabling small farmers to join the circular economy through insect farming. Its inclusive model transforms underused farm buildings into productive sites, generating income and know-how locally. By turning waste into economic value, it builds resilience and innovation in rural communities. It also promotes gender equity in agrifood tech, with visible leadership from women in the sector, further enhancing social integration and cohesion.

Additional Information

- The coincidence of 4 entrepreneurs with different visions in a rural area where they live and operate
- Bringing the vision from China, where insect farming is better established and accepted, and mealworm is already in use.
- Perseverant mindset, keeping an objective in mind
- Resilience and flexibility in respect to events. Following a roadmap, but being open to rapidly re-adapt under changing circumstances.
- Economy: make the best use of every single financing, become cautious for over-expenses not leading to results or early returns in these early stages.
- Awards, which have brought branding, acknowledgement, support and further funding for the newly created company.

Relevant links

1. Promo video Protiberia Vision and mision(Spanish)

   https://www.youtube.com/watch?v=GM2O5U16IYw

2. Short TV presentation of Protiberia (Spanish)

   https://www.youtube.com/watch?v=zHvLphR2g8I

3. Interview Protiberia and use of agri-food by-products for the insect farms (ENGLISH)

https://www.youtube.com/watch?v=ArJ8LkYcYnQ

Photos

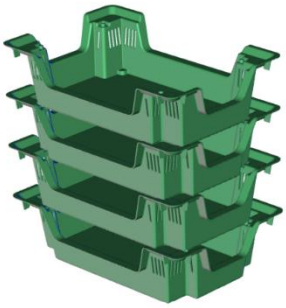
Protiberia Logo

Tenebrio molitor (mealworm)

Tenebrio molitor (mealworm)

Mealworm meal protein

Spent mushroom substrate as alternative feed



Beetle box, commecialised trays to produce insects yourself

5.2.2 Conclusion

Protiberia adopts a holistic approach concerning the development of a circular bioeconomy solution in the sectors of "Food and Agriculture" and "Biomaterials and Bioproducts", aiming to minimise waste, maximise utilisation of the biomass added value to produce sustainable alternatives to primary resources and conventional products, and support local agricultural activities. This success story highlights the importance of identifying challenges and opportunities within targeted environments and markets, systematic research and development and networking.

5.3 Gwiker Earthfood

5.3.1 Success story report

General Information	
Success Story Title	Gwiker Earthfood
Subtitle - tagline	Utilisation of out-of-specification fruits and vegetables for innovative food products production
Bioeconomy theme	Food and Agriculture
Core Activities	Food waste upcycling
Full Address	EN 115 - KM 4,85 Fração D, 2500-064
No of employees	5 (LinkedIn)
Funding sources	Public

The Success Story Profile	
Short description of bio-based solution	Gwiker's approach involves sourcing imperfect or surplus fruits and vegetables—often discarded due to aesthetic standards—and converting them into high-quality, natural food products like granolas and snacks. This strategy not only minimizes food waste but also supports local agriculture and fosters conscious consumption.
Detailed Description	Gwiker is a Portuguese startup that operates at the intersection of circular economy, sustainable agriculture, and food innovation. At the core of its business model lies a transformative approach to tackling one of the food industry's most persistent problems: food waste. Gwiker sources fruits and vegetables that would typically be discarded due to imperfections in shape, size, or surplus quantities—despite being perfectly safe and nutritious. These "imperfect" ingredients are then processed into natural, additive-free food products such as granolas, fruit crisps, and other snacks that retain their nutritional value while gaining extended shelf life. What makes Gwiker's concept particularly innovative is its integration of circular economy principles into the food value chain. Instead of treating food waste as an inevitable loss, Gwiker treats it as a valuable input for new product creation. This contributes not only to a reduction in greenhouse gas emissions associated with waste decomposition, but also to a more resilient and sustainable local food ecosystem. Additionally, the company is committed to local sourcing and short supply chains, which reduce transportation emissions and support regional farmers. Gwiker's model promotes environmental sustainability, combats food insecurity by maximizing resource efficiency, and raises consumer awareness about responsible consumption. It aligns with broader EU strategies for a sustainable bioeconomy and demonstrates how small, agile companies can drive impactful change through innovation, collaboration, and ethical business practices.
The team behind the story	Diogo Maurício, CEO of Gwiker Earthfood, helped to start this project in 2016 with a vision to combat food waste and promote sustainability. Initially, Gwiker focused on cultivating shiitake mushrooms using organic methods. Recognizing the potential of dehydration technology, the company expanded to transform surplus and imperfect fruits and vegetables into natural, additive-free snacks. This approach not only extends the shelf life

The Success Story Profile	
	of produce but also aligns with circular economy principles by reducing waste and supporting local agriculture. Under Diogo's leadership, Gwiker has become a finalist in sustainability awards and continues to innovate in the field of sustainable food production.
Target audience / Key client / Key partners	Audience/Key clients: ● Eco-conscious consumers ● Urban millennials and Gen Z interested in healthy lifestyles ● Zero-waste and sustainable product marketplaces ● Retailers and restaurants focused on sustainable sourcing ● Educational and institutional clients promoting sustainable diets Key partners: ● Local farmers and producers (suppliers of surplus or imperfect produce) ● Packaging suppliers (biodegradable or recyclable) ● Distribution partners (retailers, zero-waste stores, e-commerce platforms) ● Food safety and certification authorities ● Innovation partners and incubators (e.g., EU-funded programs)
Vision and Future plans	Vision: Gwiker is dedicated to sustainability, emphasizing that a significant portion of food waste results from purely aesthetic reasons. They aim to challenge this by demonstrating that imperfections in appearance do not equate to a lack of quality. Their commitment extends to using clean, safe energy with minimal environmental impact Future plans: ● Expanding Product Lines: Developing new, 100% natural snacks and meals that align with their sustainability goals. ● Enhancing Circular Economy Practices: Further integrating circular economy principles into their operations, ensuring that nothing is wasted and everything is transformed. ● Promoting Conscious Consumption: Educating consumers about the value of imperfect produce and the importance of reducing food waste. ● Strengthening Community Engagement: Encouraging individuals to become agents of change in their communities, reinforcing that standing still is not an option.

Milestones Timeline		
	Date / Year	**Milestone**
1	2016	**Founding of Gwiker Earthfood** Established in São Gregório, Caldas da Rainha, Portugal, Gwiker began by cultivating organic shiitake mushrooms on wooden logs, adhering to chemical-free and sustainable farming practices
2	2017–2018	**Introduction of Solar-Powered Dehydration** Gwiker implemented an ecological dehydration process using solar energy to dry mushrooms and fruits, enhancing product shelf life and reducing waste

3	2019–2020	**Expansion into Fruit-Based Snacks** The company diversified its product line by developing 100% natural fruit-based snacks, including crunchy apple and Rocha pear varieties, utilizing surplus and imperfect fruits
4	2021	**Launch of Veggie Bars** Gwiker introduced Veggie Bars, combining vegetables and fruits into nutritious, natural snacks, further promoting healthy eating and sustainability
5	2022	**Partnership with Too Good To Go** Collaborated with the food waste reduction platform Too Good To Go to distribute products nearing their expiration dates, reinforcing Gwiker's commitment to minimizing food waste
6	2023	**Rescue of 170 Tons of Imperfect Produce** Gwiker successfully diverted 170 tons of fruits and vegetables from waste by transforming them into natural snacks, exemplifying effective circular economy practices
	2024	**Expansion into Major Retail Chains** Gwiker's products became available in prominent retail outlets, including the FoodLab section of Continente, increasing accessibility to sustainable food options

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	Gwiker's business model is deeply rooted in local sourcing, particularly using surplus or out-of-specification fruits and vegetables from nearby farms. They operate in Caldas da Rainha, Portugal, collaborate with local producers, and promote regional bio-based economic development. This makes them a model example of local circular economy in practice
team and network	4	Led by Diogo Maurício, Gwiker is a small, mission-driven team that has established valuable external networks—from farmers to packaging suppliers, distributors, and EU innovation support programs. However, because it's a relatively young SME, there is still room to scale up team diversity and institutional partnerships to strengthen long-term resilience
effectiveness-relevance - applicability	5	Gwiker's solution is highly relevant: food waste is a global problem, and their method (transforming waste into value) is directly applicable in many contexts. Their natural, additive-free, shelf-stable products make effective use of surplus resources while addressing consumer demand for health and sustainability. Multiple product lines (fruit crisps, veggie bars) show adaptability
Testing & piloting - scalability & replicability	4	Gwiker has tested and validated its products locally and is already expanding through major Portuguese retailers (e.g., Continente). The model is technically scalable and replicable across regions with similar food supply chains. However, scaling across borders may face regulatory and logistics challenges, especially when it comes to sourcing or labeling standards
financial sustainability	4	Gwiker has proven its financial viability by successfully placing its products in large retail chains and through private label production. These mainstream sales channels indicate solid and recurring income streams beyond niche or grant-reliant models. The business benefits from a scalable product line with strong market demand, and the use of upcycled ingredients likely supports healthy margins. While early-stage

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		growth still poses risks (e.g., competition, supply scalability), their clear revenue model and existing traction in the retail sector warrant a high sustainability score
social cohesion	4	Gwiker contributes meaningfully to social cohesion by supporting local farmers, educating consumers, and engaging in food rescue missions. They also promote values like fairness, community engagement, and sustainable behavior change. To achieve a full 5, they might need stronger involvement with vulnerable or excluded social groups (e.g., employment programs or food donation schemes)

Relevant links

1. https://www.gwiker.com/

5.3.2 Conclusion

Gwiker constitutes an excellent paradigm of circular bioeconomy that contributes to one of the greatest current societal, environmental and economic challenges; food loss. This endeavor produces healthy and sustainable food products by treating nutritious fruits and vegetables that would be otherwise discarded as a surplus or out-of-specification product. Thus, Gwiker contributes to waste and GHG emissions reduction and effective management of resources, while also supporting local development, by leveraging short value chains.

5.4 Bioeconomy Theme: Forestry

5.4.1 Amorim Agro-Florestal

5.4.1.1 Success story report

General Information	
Success Story Title	Amorim Agro-Florestal
Subtitle - tagline	Using pruning residue in cork oak forest as an organic mulch
Bioeconomy theme	Forestry and natural habitats
Core Activities	Agroforestry management, R&D
Full Address	Lugar de Salteiros de Baixo, Longo Mel 7400-402 Ponte de Sôr
No of employees	20
Funding sources	Self-financing

The Success Story Profile	
Short description of bio-based solution	Transformation of waste from cork oak pruning into wood and cork chips to be used as an organic mulch that will support moisture retention in the new plantations of cork oak trees, making them more resilient to climate change.
Detailed Description	Currently, forest plantations in Portugal are subject to long summer periods resulting from climate change, which result in high mortality of young plants installed. In order to fight these consequences of drought, this initiative aims to reintegrate a subproduct (waste resultant from the necessary pruning operation in adult stands) into the production of new plantations of oak tree, applying it near the young saplings (20 liters/tree). By transforming the material resulting from pruning activities into wood and cork chips, the mulch created is a natural, organic, and lightweight material, which is easy to handle and transport. Therefore, its production and integration into local plantations (within a radius of less than 1 km) does not involve great storage or transportation logistics. On the contrary, purchasing mulch elsewhere would represent great costs in terms of CO_2 emissions.

The Success Story Profile	
	These cork/wood chips have insulation properties, helping to regulate temperature and, most importantly, providing moisture retention when it is more needed - during the summer. The use and integration of this green waste, in benefit of the installation of new forestry plantations, has added value compared to the traditional use of this kind of waste, which is burning to create energy. Furthermore, this technique also improves some soil characteristics, especially the content of organic matter and biological activity.
The team behind the story	Core team constituted by forest engineers and agronomists with more than 15 years' experience. Field personnel specialized in various components of animal production, agriculture and forestry.
Target audience / Key client / Key partners	**End-users of the solution:** Forest landowners and forest managers
Vision and Future plans	Currently, mulch is applied to new plantations, and monitoring projects are awaiting funding. This will result in the optimization of its application and will provide insights into further research. The solution can then be adopted ubiquitously throughout the territory in favor of the successful installation of forest plantations, despite long periods of drought.

	Milestones Timeline	
	Date / Year	**Milestone**
1	2010	Start of the cork oak forest exploration
2	2011/2012, 2017-2019	Loss of production caused by severe droughts
3	2023	Idea of using pruning residue as an organic mulch
4	2024	Site selection
5	2025	Treatment (mulch applied to new plantations)
6	2025	Monitoring

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	All resources are local. More specifically, the raw materials are extracted from the property, and the companies that carry out pruning activities, wood/cork chip production, and distribution of mulch in the forest plantations, also operate locally.
team and network	3	Interdisciplinary team; local partnerships (companies, university and collaborations, associations).
effectiveness-relevance-applicability	4	The biggest problem that this project aims to solve is the high mortality rate of forest plantations due to prolonged periods of drought. The solution of adding a locally produced mulch contributes to maintaining soil moisture levels when they are most needed, and thus, to the survival of the young trees.
Testing & piloting-scalability & replicability	4	Monitoring of the project will start when funding is achieved. Depending on the collected results, this solution will be applicable to all areas where forest residue/mulch is produced locally and where it can be applied to nearby forest plantations.
financial sustainability	4	The financial sustainability of this project is quite complex to assess, as the survival levels of planted forest species have not only economic but also environmental

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		impacts. The wood/cork chip production and distribution operation are economically viable when compared to purchasing mulch from companies operating in the sector.
social cohesion	4	These operations and activities are entirely developed in rural areas, often characterized by problems of lack of employment and low economic activity. With initiatives like this, new economic activities are generated, and employment is encouraged.

5.4.1.2 Conclusion

Amorim Agro-Florestal provides a simple yet highly effective and circular solution concerning sustainable forest management, highlighting the importance of initiatives tailored to local needs connected with optimal utilisation of resources and low environmental impact. By producing organic mulch from pruning residues, Amorim Agro-Florestal reduces organic waste that ends up in landfill and related emissions, utilises biomass remaining value and empowers product development from secondary resources.

5.5 Bioeconomy Theme: Aquatic and Water Systems

5.5.1 Design and Manufacturing of Microalgae Cultivation Reactors and Their Use Across Different Fields

5.5.1.1 Success story report

General Information	
Success Story Title	Design and Manufacturing of Microalgae Cultivation Reactors and Their Use Across Different Fields
Subtitle - tagline	Tecnoalgae SL has developed an optimized system in various formats and scales, currently in use for water treatment, production of bio-stimulants for irrigation water, and air purification in offices and urban environments.
Bioeconomy theme	Aquatic
Core Activities	- Technology development from TRL 3 to TRL 8 during 10 years - Implementation of the first industrial pilot - Collaboration with agri-food companies and biomethane producers to launch the first use cases in Spain - Patented innovation - Turnkey product design for industrial installations - Exploring other market niches and development of marketable products for individual users: small-scale systems for farmers (bio-stimulants), and air purification columns for offices and urban areas - Business planning, product promotion, and customer trust building
Full Address	Urbanización El Galope, 9. 41130. La Puebla del Río (Sevilla, Spain)
No of employees	1 employee
Funding sources	The development of the technology received multiple funding streams during R&D and pilot phases prior to establishing Technoalgae SL. Since its founding, the company has been supported by Andalucía Emprende, which provides free office and workshop space. Tecnoalgae SL has also benefited from no-cost collaborations with several innovation centers, accelerators, and incubators, although no direct financial subsidies were granted.

The Success Story Profile	
Short description of bio-based solution	Tecnoalgae SL was born from the meeting of two key persons: a university researcher from the University of Seville who had been developing R&D and microalgae production technology for years, and an entrepreneurial woman with strong knowledge of the microalgae market. From this collaboration, Technoalgae SL emerged, turning university technology into a market-ready solution and bridging the gap between pilot testing and commercial use. Tecnoalgae SL was established as an engineering and technology enabler company, specializing in microalgae production. Its core innovation is a patented hydrodynamic reactor design without moving parts. This design creates turbulence and vortex flows, prevents dead zones in circulation circuits, and boosts productivity by 20–30% compared to conventional systems. The technology can be used in large-scale reactors (3,000–4,000 m^2) for industries like agri-food, biogas, and wastewater treatment. However, once Technoalgae was born, its market oriented mindset moved them to explore other market niches, and developed solutions for small farmers through downscaled reactors (just 10 m^2), allowing individual farmers to produce their own bio-stimulant from irrigation water—enough to treat 10 hectares. The company is moving to other new market niches like for example air purification and urban green active furniture, as new breackthrough market products.
Detailed Description	Microalgae are invisible to the human eye—unicellular organisms that thrive in various aquatic environments. Through photosynthesis, they absorb carbon dioxide, release oxygen, and produce large amounts of antioxidants like β-carotenes, phycocyanin, as well as minerals (K, Na, Ca, Mg, Fe, Zn), vitamins (tocopherols), fatty acids, proteins, carbohydrates, and lipids. Given their high value for the bioeconomy, a research team at the University of Seville, led by Dr. Javier Dávila, began R&D on microalgae in 1997. They started with proof-of-concept experiments to understand how to cultivate microalgae, their composition, and the commercial potential of different species. By 2009, they identified the need and opportunity to improve the photobioreactors available on the market by increasing efficiency through better mixing and elimination of dead zones in the water circuit of the reactors. Between 2009 and 2013, they developed a lab-scale reactor and, in 2015, scaled it up to install a pilot unit next to a wastewater treatment plant (reaching TRL7). In 2019, they designed a separation and mixing system to maximize algae use, which was tested in a pre-industrial pilot plant (TRL7) in 2023. Meanwhile, Dr. Javier Dávila met entrepreneur Nuria Egea, a biologist and zoologist with a multidisciplinary background, experience in labs and education, and a strong entrepreneurial spirit. At that time, in 2019, Nuria Egea had founded and was managing G2G Algae Solutions, a company that produced algae for bio-stimulants and other algae-based products. After several years of collaboration, they decided to co-found Tecnoalgae SL—a startup that brings to market the innovative technology developed at the University of Seville, now led by a market-savvy partner. Today, their IP-Algae technology offers more efficient pumping systems, optimized tanks and circuits with no dead zones, a patented mixing system, improved IoT for process control, and integration with renewable energy. Altogether, these improvements boost algae production by 30% compared to traditional systems. A key factor in Tecnoalgae SL's success has been their participation in support programs, recognition awards, and pilot initiatives—especially during their early growth phase. So far,

The Success Story Profile	
	they have received awards like AgroBank Tech Digital INNovation 2025, which named them one of the top 15 startups transforming the agri-food sector in Spain. Tecnoalgae SL has gone further. Based on their knowledge they have utilised the lab-downscaled algae circuit reactor, to re-design in an easy to manufacture format, so that the system can be utilised by individuals. This is a key to their success, which is currently allowing individual farmers to use the technology for production of bio-stimulants. A farmer with a 10 m^2 reactor can produce bio-stimulant algae to be added to the water to irrigate 10 hectares. Tecnoalgae SL has also developed a new system, not anymore in open air reactors, but in closed columns, to purify air. They are already commercialising these breakthrough products. In summary the company has developed at the moment three product lines that allow the company to access various market niches: - Industrial-scale production plants for the agri-food sector and wastewater treatment facilities (WWTPs) - Portable systems for small-scale users, such as farmers - Microfiltration systems for air purification in office buildings, with a decorative column-style design - Outdoor filtration systems integrated into urban furniture—ideal for areas without space for trees. A pilot system measuring 8 meters high and 20 meters long has already been installed in Plaza de la Escalinata in Algeciras Tecnoalgae SL is now considered a success story, with three clients already on board: spirulina producers and R&D centers focused on agricultural applications who have acquired the first reactors. In addition, the company has signed contracts for its first pilot projects in all areas: agri-food companies, biomethane plants, agricultural businesses, and urban furniture developers.
The team behind the story	The creation of Tecnoalgae SL was made possible by the collaboration of three key individuals who came together as co-founders: ● Dr. Javier Dávila (University of Seville), who led the development of the technology, reaching TRL 7 in 2019 ● Nuria Egea, a multidisciplinary biologist with entrepreneurial mindset and experience in the microalgae market ● Dr. Inés Herrero, professor of Business Organization at the Pablo de Olavide University in Seville Strategic partnerships have also been essential, especially in the early stages, including collaborations with companies in the agri-food and water treatment sectors. Key supporters include Cajamar as an accelerator, Incubazul as their incubator in 2024, and the Andalucía Emprende program, which provided free access to office and workspace. Other valuable collaborations include the IFAPA agrarian institute in 2024 for testing new developments, the CENTA technology center for wastewater treatment trials, and Grupo Álea and AgroBank La Caixa for commercial field testing.
Target audience / Key client / Key partners	Depending on the product line, Tecnoalgae SL serves a variety of clients and partners: ● Individual farmers looking to improve irrigation water with added bio-stimulants

The Success Story Profile	
	• Agri-food companies interested in treating their wastewater while producing bio-stimulants for their upstream supply chain actors • Wastewater treatment facilities • Office building managers seeking indoor air purification systems • Urban development stakeholders looking to improve air quality in dense city areas where there's no space for trees
Vision and Future plans	Tecnoalgae SL aims to strengthen relationships with its current customers while expanding its client base. The team is currently developing an automation system for small-scale photobioreactors designed for farmers. Additionally, they are working on digital twins for large-scale plants to simplify operations and adapt the systems to a wide range of wastewater types. The systems for air purification in column reactors are proven, and are getting new clients, as well as products are being re-sized and redesigned according to clients actual needs. The company also plans to expand its line of urban air purifiers, integrating them with other types of plant organisms to enhance environmental impact and aesthetic value.

Milestones Timeline		
	Date / Year	**Milestone**
1	2009	Dr. Dávila group, first photo bioreactor TRL3 after several years of R&D from TRL1)
2	2013 - 2019	Dr. Dávila group, development of technology and pilots at TRL 7 in waste water and agroindustry
3	2019	Ms. Egea, founds G2G Algae Solutions, and start first contacts with Dr. Dávila
4	2023	Dr. Davila evolves the technology system to pre-market stage
5	2024	Creation of Start-up Technoalgae, search for first clients, starting cooperations and support by accelerators and incubators . Development of business plan.
6	2025	Entrance in market with first sales, access to funding under the award of Agrobank program by Caixabank. First contracts with agri-food companies and farmers.

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	4	The system has been adapted to different sizes, from 10 to 4,000 m2. This allows water treatment and valorisation in diverse rural contexts: agroindustries, biogas plants and small farms. The photo-bioreactors are specially suitable for rural areas, with more available land and space. Additionally the column systems for air purification allow for contributing in-situ in towns (outdoor) and buildings (indoor air).
team and network	4	The team involves the technology specialist developing algae systems for more than 15 years from university Seville together with 2 persons oriented to business, professor in business administration from University of Pablo de Olavide (Seville) and person with market knowledge and entrepreneurial mindset currently managing the everyday of the company. Success of Technoalgae SL relies on multiple collaborations with incubators, accelerators, start-up support programs, technology centres and agroindustry and WWT plants.
effectiveness-relevance-	5	The system can easily be adopted in all formats, either the industry-sized systems, or the small scale individual systems. In comparison to other bioreactors this system

Measuring Success		
Key Indicator	**Rating**	**Explanation**
applicability		improves production at a 20-30% rate, and lacks mobile parts. This enables the use by individuals of the small systems, though the automatization for this market niche is under development. These small units open the door for small farmers to produce their own algae as bio-stimulants, which can be added to irrigation water to improve crop yields and improve soil activity, nutrient efficiency and resiliency.
Testing & piloting-scalability & replicability	4	The system has been developed since 2009. The scales TRL5 and 7 have taken place in WWT plant and in an agroindustry in 2023. The system is demonstrated in sizes from 10 m^2 till 4000 m^2. The small scaled systems have been the object of lab testing from the beginning, and therefore have been fully tested, and later on adapted for easing the manufacturing to make them marketable.
financial sustainability	5	The utilisation of microalgae for WWT is very adequate since they have a high capacity to transform the organic loads of water (DBO, DQO) whilst also consuming CO_2 and producing oxygen. For industrial systems the 20 to 30% increase of production with similar CAPEX costs, implies an equivalent impact in the operational costs balance, and thus improves the ROI, making algae technology more appealing as a bio-based solution. For small farmers, the small system (circa 3 m long reactor), allows to cover the production of bio-stimulants for 10 hectares. This reduces the needs for fertilisers and water, and improves productivity. Assays indicate a ROI of 3 to 5 years, depending on the crop and climatic zone.
social cohesion	4	The system allows for better water and nutrients efficiency. It can partially reduce water demand by crops, thus being rural areas subject to lower stress and disputes for access to water. The system allows for utilisation of waste water streams, thus allowing for de-impacting effects of direct waste water use. The production of small systems and simplicity may allow for small companies as distributors and facilitators in rural areas. Furthermore production of algae has multiple applications, bio-stimulants, spirulina, oils, among others, thus enabling potential new bio-based business in remote areas.

Additional Information

- Solid and reliable technology design
- Pilot testing in cooperation with key market actors
- Constitution of a tech-based company (start-up) to exploit the knowledge
- Development of a business plan with market experts, business experts, and with other supporters (accelerators, incubators)
- Adapting technology and knowledge to design new market products (like air purification units for indoor air or for urban furniture)
- Establishment of early contracts and sales, agile redesign and adapting products to clients / market needs / preferences
- Market oriented mindset
- Establishment of multiple non-economic cooperations, and access to expert and free support services (for start-ups, entrepreneurs, among others)

Relevant links

1. Technoalgae SL

   https://tecnoalgae.com/

2. Awardee by Agrobank program for agri-food start-ups in Spain

https://www.caixabank.com/es/actualidad/noticias/agrobank-escoge-las-15-startups-mas-punteras-de-espana-en-tecnologia-agroalimentaria

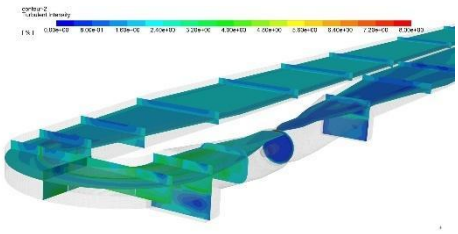
3. Pilot of urban application of air purification in Plaza Escalinata in Algeciras

https://www.youtube.com/shorts/SnWfNQmrIlg

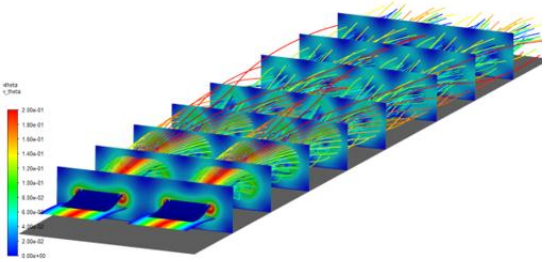
Photos

Industrial reactor detail #1

Industrial reactor detail #2



Science based fluid-dynamics design



Science based fluid-dynamics design

First batch of small-scale systems for farmers

Small system for individual farmers in operation (3 m long)

Air purification system for indoor air

Air purification system for indoor air, featured

5.5.1.2 Conclusion

Tecnoalgae SL serves as a "Water and Aquatic Systems" success story based on offering innovative technologies and, specifically, microalgae cultivation reactors to support various applications, ranging from wastewater treatment, to production of bio-stimulants and air purification. The ability of the offered technology to be adapted to several environments and scales and cover different market needs, in a more efficient way than existing technologies, as a result of market opportunities assessment and continuous research and development, constitutes one of the Tecnoalgae SL's outstanding features, contributing to the development and competitiveness of this endeavor.

5.6 Bioeconomy Theme: Bioenergy

5.6.1 No waste from residual wood

5.6.1.1 Success story report

General Information	
Success Story Title	No waste from residual wood
Subtitle - tagline	A wood biorefinery around the gasification plant
Bioeconomy theme	Bioenergy
Core Activities	Production of energy and biofuels
Full Address	Loc. Borratino, 121 – Prulli di Sotto – Reggello (Fi)
No of employees	3
Funding sources	National and regional cofinancing

The Success Story Profile	
Short description of bio-based solution	The company is a micro enterprise that produces several wood products (timber products, wood logs, wood chips, animal litter) using a gasification plant for electrical energy production, heat for drying wood and biochar production.
Detailed Description	Gasification plants have grown significantly in Italy between 2013 and 2017 thanks to a support mechanism that pays for electrical energy production. However, anything but all the gasification plants installed in that period are success stories. Several plants fail for problems during the installation, management problem, lack of maintenance and poor valorization of the residual heat. The success story qualifies as such thanks to the approach to the valorization of mostly residual wood from forestry management. The innovation is in the management; even if the company is a micro enterprise, it approaches the use of resources with the strategy of a large sawmill. The production tends to take advantage of all the wood processing in order to produce the most valuable output.

The Success Story Profile	
	It all starts from the gasification plant that is at the center of the little wood biorefinery. In order to be used in the gasification plant the woodchip needs to be produced, sieved and dried. Sieving the raw woodchips the company obtains the woodchips for the gasification plant, smaller woodchips suitable for small and medium boilers and sub-measures that are commercialized as animal litter. The company also produces wood logs and provides a service for installation of local space heaters and boilers fueled with woodchips and wood logs, closing the circle. To better exploit the wood that is suitable for timber the company acquired a small sawmill and produces customized timber assortment.
The team behind the story	The company is managed by three brothers that with different roles cooperates to manage the plant and produce the wood products.
Target audience / Key client / Key partners	The target audience is mostly the end user who is interested in renewable heat, but the company also works with distributors and other companies for the commercialization of litter and timber.
Vision and Future plans	The company already tested the biochar produced in the plant and used it in cooperation with some universities. In the future the idea is to commercialize biochar for agricultural purposes.

Milestones Timeline		
	Date / Year	**Milestone**
1	1987	The company was born as a forestry management company
2	2012	Installation of the gasification plant
3	2024	Commercialization of biochar to close the circle

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	The company operates and procures raw material locally
team and network	5	The team has invested a lot of time in understanding the gasification plant and is able to independently operate it and perform maintenance and repair. Moreover, the company is family managed and the team works with the passion that is typical of people who work on their own business.
effectiveness-relevance-applicability	5	The solution is very interesting as it combines electrical energy, heat, biofuels and biomaterial production, without external input. It's really a suitable small-scale solution for circular bioeconomy.
Testing & piloting-scalability & replicability	2	The success is in the approach that is strongly related to the organization and the scale of the company.
financial sustainability	3	Financial sustainability is a problem, as the technologies involved (both gasification and sawmill) are relevant investments that cannot be sustained at a small-scale level without public support.
social cohesion	4	The plant creates benefits for the local economy, so it is positive for social cohesion, as it creates a network between forestry companies, product distributors and contractors with the aim to valorize local wood.

5.6.1.2 Conclusion

"No waste from residual wood" constitutes a success story that highlights the potential of biomass cascading treatment as a key factor for resilient business development, via diversification of activities towards optimal utilisation of biomass. This endeavor evolved from operating as a gasification plant to a small-scale biorefinery that fully integrates circular economy principles by closing the circle of materials and by-products. Through the production of a wide range of bio-based products, "No waste from residual wood" minimises waste occurring from forest management, valorises residual biomass and contributes to the transition to cleaner forms of energy.

5.6.2 A singular spa hotel heated with local straw

5.6.2.1 Success story report

General Information	
Success Story Title	A singular spa hotel heated with local straw
Subtitle - tagline	The use of a local abundant agricultural by-product for high added value heating bringing sustainability and energy sufficiency
Bioeconomy theme	Bioenergy
Core Activities	Initial trial and testing using a forestry biomass boiler adapted to straw Search for efficient and reliable straw based solutions Adoption of a new innovative solution available for farms and agroindustry
Full Address	CTRA DE JACA, 37, 22808 Murillo de Gállego, Huesca Coordinates: 42.3307, -0.7531
No of employees	18 full time employees
Funding sources	Own resources – 50,000 € Circa 20,000 € of FEDER funding for climate neutrality.

The Success Story Profile	
Short description of bio-based solution	The adopted biobased solution is the "Straw energy" system of ACR ECOCALDERAS. The Straw Energy system by ACR Ecocalderas is a patented solution designed to optimize the combustion of loose straw in biomass boilers. It features a controlled feeding mechanism that ensures consistent and efficient burning, maximizing energy output while minimizing emissions. This system is particularly suited for agricultural biomass, offering a sustainable and cost-effective heating option. Its innovative design enhances operational efficiency and aligns with environmental sustainability goals. The first systems were developed in 2010, and from then onwards the system has been improved and adapted, to be not only applicable in farms, but also in industry and service sector.
Detailed Description	Hotel Spa "Aguas de los Mallos" resembles the innovation in rural areas adopting bioenergy for services utilising local underutilised resources. The Spa Hotel was built in 2011 by a local family. The area is well settled for nature and adventure tourism. It was evolving during the 90s and early years in the 21st century from more young adventure tourism to more rural and family tourism. The entrepreneurs, local inhabitants, were dedicated to agriculture (mainly growing cereals), and had started two small local businesses, a bakery and a small hotel in the village. Given the changing profile of tourism and the increasing demand for other types of accommodations, they decided to invest in a spa resort, which would be a singular tourist offer in the area. After the opening, the energy bills became a burden, given the relevant need of heat supply to keep an appropriate spa water temperature and a comfortable room temperature of the hotel facilities. The owners started a search for solutions, and in 2013 identified that biomass could be a potential solution. Even if forestry woodchips were offered by several providers, they had the idea: why not to use other biomass, like straw: it was abundant in the area, and furthermore, the hotel owners family was also growing cereals, and producing circa 1,000 t/year of straw. Most of it is dedicated to cattle feeding

The Success Story Profile	
	and bedding, but not always finding a buyer. They only needed a facility able to safely convert straw to energy. The first steps were to invest in renewable energy sources, complementing the heating facility with geothermal (500 kW) and solar heating (40 kWp), and later on, by adopting biomass. The 300 kW biomass boiler was initially placed in 2014 as a pilot, using a conventional forest woodchip boiler, with an adapted straw feeding. The retrofitted biomass facility (in collaboration by the technologist and a local engineer) ran for 3 years, experiencing more troubles with time, leading finally to unstable operation and shutdowns. At that moment it had achieved its payback period. Hotel owners had to switch back to the original twin 75 kW gas boilers. But thanks to the experience, they learned straw was a good and economic option, as far as they could count with reliable technology. It is then in 2017 when they meet ACR ECOCALDERAS, a technology provider who had evolved the technology from 2010, and had installed multiple medium-sized facilities in farms and agroindustries. They visited several facilities and stated that, for the moment, the "Straw energy" system had been working without troubles. Thanks to the continued improvements by ACR ECOCALDERAS, the technology was fully automated, secure and with very efficient combustion. Hotel spa "Aguas de los Mallos" owners decided to go ahead, and in 2019 the new 200 kW boiler started operation. During the post-covid period 2020-2022, with peaking prices of natural gas, the resort kept low energy supply bills, showing the resilience of the biobased solution in times of crisis. This allowed the hotel to remain open, and to keep thermal comfort to visitors. Given the success of the first facility, in 2019 they also started installation of a small 60 kW boiler fed with straw bales, in the small hotel they belonged, which in this case, is inside the urban area of the town.
The team behind the story	The story happened thanks to the vision of the hotel family owners. Even if they found troubles with the first retrofitted boiler, they kept with the idea that straw was a potential solution, local and economic. The first facility was a genuine biomass boiler adapted to straw, and then the collaboration between the owners, the local engineering company (INTEC - Instalaciones técnicas de electricidad y climatizacion SL) and the boiler technologist was crucial to produce a first functional unit from which owners learnt and stated the viability of their idea. It was a batch boiler able to burn 2 bales at once, but required cleaning and inserting new bales after fuel had been totally burnt. The collaboration with ACR ECOCALDERAS led to the final solution. This company started 2010 from the initial idea of straw firing and developed the system, where the core is the automation of the feeding system and the boiler gate. They achieved a mature product, which was ready in 2019 to be installed next to a spa-hotel which needed a clean energy system.
Target audience / Key client / Key partners	Rural hotels, tourist resorts, service sector in rural areas Agroindustries and farms require hot water or hot air for drying. Key partners: ACR Ecocalderas, or reliable supplier of straw to energy systems
Vision and Future plans	The hotel has already fully decarbonised the heat demand. The next innovations are related to zero-emissions by investing in more renewable energies.

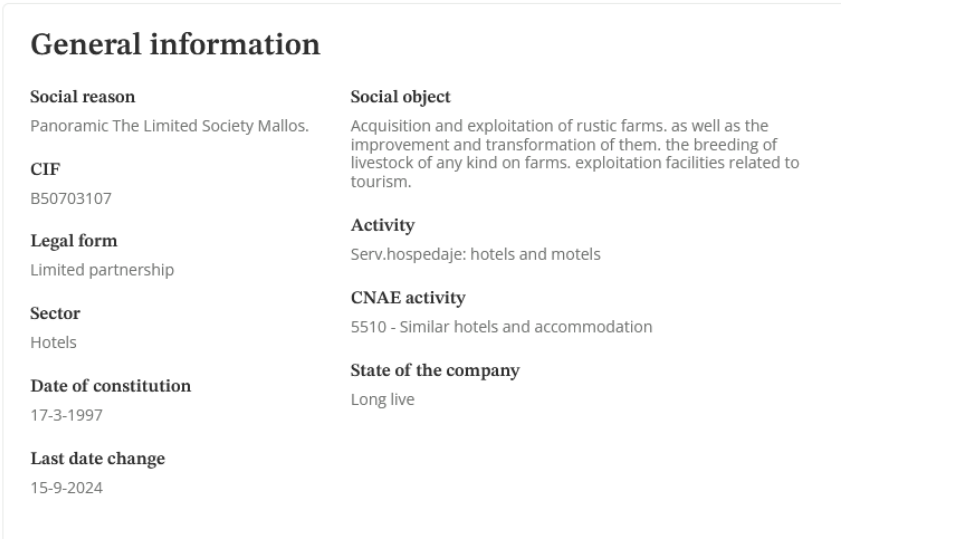
	Milestones Timeline

	Date / Year	Milestone
1	2011	The hotel spa "Aguas de los Mallos" was built and started operating based on natural gas. High energy bills.
2	2013	Decide to switch and realise they could use their own straw residues. Start looking for technology providers
3	2014	Cooperation to install a functional unit for straw by adapting a forest biomass boiler.
4	2017	Search for alternative solution as the pilot installed does not suffice power and generate operational problems
	2019	Installing of 200 kW straw fired ACR-ECOCALDERAS fully automated at Spa-Hotel "Aguas de los Mallos"
5	2020-2022	Use of straw allows operation of hotel as independent of the peaking natural gas prices
6	2020	Owners decide to install a small unit 60 kW straw fired boiler at Hostal "Los Mallos" (first of such small size designed by ACR ECOCALDERAS)

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	The solution was adopted by a local family owning 2 hotels and a bakery. The straw is produced in fields next to the village. It is circular as the straw was not collected every year, and only sold at very marginal prices. The technology is not local, but a technology provider is at reach, and operates other facilities in the same region.
team and network	4	The main team was the hotel owners family, who supported each other. They found as initial ally an engineering company which adapted the first forestry boiler to straw. Even if it failed, they co-developed the solution and was the path to better understand and believe on the capacity of straw as solution for heating. The final connection with ACR ECOCALDERAS was crucial. It was not just a service of selling/buying. Both had to work together and generate mutual trust, since it was the first time to install such a facility next to a hotel (4 star and with a reputable image) and close to a village.
effectiveness-relevance-applicability	5	After 5 years of operation the facility has demonstrated to work properly. The owners are satisfied, and no complaints have been received from the neighbours regarding the fumes, smells, or noises from the facility. As well hotel users do not complain and even cannot notice the fact a straw fired facility is working next by. The solution has solved the economics, reaching an energy cost 4 times less than gas. The payback period was reached in only 3 years. The solution can be applied to other hotels, and rural services, as far as they have space for the bale storage and feeding system.
Testing & piloting-scalability & replicability	4	The initial test with a functional unit designed between the boiler provider and the local engineering INTEC was a pivotal point. Even though after 3 years it was not working properly anymore, it demonstrated the feasibility of straw for hotel heating. The system has been demonstrated to work well in other scales, with references from 60 kW (like in small Hostal "Los Mallos" in Murillo de Gallego) to 1,600 kW (like in agroindustry Puigverd for air drying systems). The system can be replicable with ACR Ecocalderas systems, but other straw energy providers from Central, Eastern and Northern Europe can supply reliable and proven systems.
financial sustainability	5	The first system recovered in 3 years. The second system recovered faster as it operated during the post-COVID period where the energy crisis brought natural gas to unaffordable prices for many companies. On average straw is 4 times lower cost than

Measuring Success		
Key Indicator	**Rating**	**Explanation**
		natural gas. Even though the first facility (adapted forest biomass boiler) received funding, the second facility did not receive any subsidy.
social cohesion	5	The family owners are all residents in Murillo de Gallego. They have established a singular unique hotel. The special experience offered by this hotel is revitalising the local economy. Without the straw energy solution, the spa-hotel might have undergone serious financial troubles. The hotel generates local employment. The facility is operated by ACR Ecocalderas, which is not local, though has regional connections. The original idea was built with a local engineer from the same province. The facility has not caused troubles, and provides an image of sustainability. Thus the hotel and its zero-emissions oriented energy supply is a flagship for the village.

Additional Information



General information

Social reason
Panoramic The Limited Society Mallos.

CIF
B50703107

Legal form
Limited partnership

Sector
Hotels

Date of constitution
17-3-1997

Last date change
15-9-2024

Social object
Acquisition and exploitation of rustic farms. as well as the improvement and transformation of them. the breeding of livestock of any kind on farms. exploitation facilities related to tourism.

Activity
Serv.hospedaje: hotels and motels

CNAE activity
5510 - Similar hotels and accommodation

State of the company
Long live

Trade data

Sales evolution - billing range
Between 0.6 and 1.5 million

Sales trends

2021 2022 2023

Corporate Structure - Participations
NO.

Sector Group
Hotels

Charges
Found 3 charges in this company
See Business Charges

Number of employees
18 (year 2023)

Corporate Social Responsibility
See Information

Quocate on the Stock Exchange
NO.

Relevant links

1. https://empresite.eleconomista.es/PANORAMICA-MALLOS.html

Photos

5.6.2.2 Conclusion

Hotel Spa “Aguas de los Mallos” highlights that circular bioeconomy solutions may be integrated in several economic sectors, providing for economic and environmental benefits. This business successfully adapted to the economic challenges faced by transitioning to renewable energy produced from residual biomass, contributing to waste reduction and utilisation of clean energy. Moreover, persuaded to support their business, the team of this success story invested in trials and errors and showcased the importance of networking and fruitful collaborations, towards the development of resilient ventures.

6 Identified Success Stories: South-East RBP

The section presents the identified success stories of the South-East RBP, including Greece, Slovenia, North Macedonia and Romania and represented in the project by IBO, CPERI, ICO, reframe.food, GGP, UL, Algen and Green Energy Cluster. The South-East RBP had already reached the KPI: 1 success story per bioeconomy theme during Deliverable 2.6 research and identified 4 more success stories for Deliverable 2.7.

6.1 Bioeconomy Theme: Food & Agriculture

6.1.1 Production of solar dryers for the food industry and air solar systems

6.1.1.1 Success story report

General Information	
Success Story Title	Production of solar dryers for the food industry and air solar systems
Subtitle - tagline	
Bioeconomy theme	Food and agriculture
Core Activities	Production of solar dryers for the food industry and air solar systems
Full Address	Village Star Kraorman nn 2000 Shtip
No of employees	2 full time employees and several external collaborators
Funding sources	Own funds and Fund for Innovation and Technological Development North Macedonia

The Success Story Profile	
Short description of bio-based solution	Agro Solar specializes in the production, installation, and maintenance of solar dryers and air solar systems, providing energy-efficient solutions for preserving produce and heating applications. Their systems reduce reliance on conventional energy sources, promote sustainable practices, and help small-scale farmers and processors lower costs and reduce food waste.
Detailed Description	The Agro Solar company specializes In production installation and maintenance of solar dryers and air solar systems. Solar air dryers offer numerous benefits for preserving fruits and vegetables, making them ideal for small-scale farmers and food processors. By harnessing solar energy, these dryers reduce reliance on electricity and fossil fuels, leading to cost savings and lower environmental impact. They extend produce shelf life by removing moisture, preserving essential nutrients and flavors more effectively than high-heat methods. Low-cost to maintain and constructed with local materials, these dryers promote sustainable practices and enhance food security. Additionally, they reduce food waste by processing second-class produce, turning cosmetically imperfect fruits and vegetables into valuable dried products. Air solar systems offer significant energy efficiency, cost savings, and environmental benefits by reducing the need for conventional heating methods and utilizing renewable solar energy. They are versatile, suitable for various applications including residential and commercial space heating and various industrial processes requiring hot air.
The team behind the story	A team of seven people consisting of mechanical engineers, electrical engineers, engineering students and technical personnel.
Target audience / Key client / Key partners	Individual farmers, agricultural associations, companies from the processing industry – drying / EcoSolar company, University of Goce Delcev – Shtip, Fund for Innovations and Technological Development North Macedonia , Venti 2023 company/ Merkur Macedonia Skopje, Agro 9km dooel Shtip.
Vision and Future plans	Preventing wastages of organic and ordinary second class fruits and vegetables, digitalization and saving energy and Wi-Fi control of all processes.

Milestones Timeline		
	Date / Year	**Milestone**
1	1996	Foundation of Eco Solar
2	2020	Foundation of Agro Solar LTD
3	2020	Production and installation of 300kg capacity hybrid solar dryer
4	2023	Upgrades in the remote control and digitalization of processes

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	The solution can be used locally and be produced with locally available materials and resources.
team and network	5	The team behind this bio-based solution is well equipped with the knowledge, resources and network necessary for application.
effectiveness-relevance-applicability	5	The solar dryers and air solar systems are proven to be effective and have a great potential for application across various sectors.
Testing & piloting-scalability & replicability	4	These systems are highly applicable in regions with abundance of sunshine throughout the year. The company is always developing, testing and piloting new solar solutions and it is continuously working on improvements of the existing products.
financial sustainability	5	The company is financially sustainable.
social cohesion	5	Being highly beneficial it brings value to the community.

Relevant links

1. https://www.youtube.com/watch?v=hZu8GKBZsVg

6.1.1.2 Conclusion

"Agro Solar" offers a technical solution to food and agriculture actors towards sustainable food production, preservation and processing. Minimisation of food loss, effective management of resources, utilization of renewable energy and cost effectiveness are some of the key outcomes of integrating "Agro Solar" technology into agri-food economic activities, highlighting the success of this solution, with regards to transitioning to circular bioeconomy.

6.2 Bioeconomy Theme: Biomaterials & Bioproducts

6.2.1 Oinosporos

6.2.1.1 Success story report

General Information	
Success Story Title	Oinosporos
Subtitle - tagline	Handmade Beauty Products from Grape Seed Oil/Oinosporos: Embracing the Bioeconomy for Sustainable Beauty
Bioeconomy theme	Biomaterials & Bioproducts
Core Activities	Oinosporos' core activities encompass a holistic approach to sustainable beauty, research, formulation, manufacturing, marketing, community engagement, and continuous improvement.
Full Address	64 Panepistimiou street, Athens 10677
No of employees	4
Funding sources	Grants - sales

The Success Story Profile	
Short description of bio-based solution	The idea came up in the context of a research of oenologist Dr. Sotiropoulou Evangelia at the National Kapodistrian University of Athens. She focused on the production of grape seed oil from Greek grape varieties. The main purpose of the project is to explore the properties of grape seed oil as a winemaking by-product and how its ingredients could be used in beauty products contributing to winery sustainability. The result was a complete product line of handmade natural body and hair beauty, such as soaps, creams, serum, oils, scrubs and salts, with grape seed oil as their main ingredient.
Detailed Description	Oinosporos is a company that embodies the principles of the circular economy through its innovative use of grape seed oil, a by-product of the winemaking process. By transforming waste materials into valuable beauty products, Oinosporos contributes to reducing environmental impact and promoting sustainability in the beauty industry. Oinosporos is a shining example of how a company can successfully integrate circular economy principles into its operations. By upcycling grape seeds, using sustainable practices, and continuously innovating, Oinosporos not only reduces its environmental impact but also sets a standard for the beauty industry. Through its commitment to sustainability and circular economy initiatives, Oinosporos is paving the way for a more sustainable future.
The team behind the story	Dr. Evangelia Sotiropoulou - Founder and Chief Researcher Dr. Sotiropoulou is an oenologist with experience in viticulture and oenology. Her pioneering research at the National Kapodistrian University of Athens focused on the potential uses of grape seed oil, leading to the creation of Oinosporos. She oversees product development and ensures that each product is backed by rigorous scientific research. The team behind Oinosporos is a diverse group of passionate professionals dedicated to creating high-quality, sustainable beauty products. Their combined expertise in oenology, cosmetic science, marketing, and operations drives the company's mission and vision, ensuring that Oinosporos stands out in the natural beauty industry.
Target audience / Key client / Key partners	**Target Audience** 1. Health and Beauty Enthusiasts: **Individuals who are passionate about natural and organic beauty products.** 2. Eco-conscious Consumers: **People who prefer sustainable and eco-friendly products.** 3. Wine Enthusiasts: **Consumers who appreciate products derived from winemaking processes.** 4. Women (18-45): **Primary demographic for beauty products, including young professionals, mothers, and millennials.** 5. High-end Spa and Wellness Centers: **Institutions looking for premium, natural products to offer their clients.** 6. Retail Stores and Boutiques: **Shops specializing in natural and organic beauty products.** **Key Clients** 1. Individuals: **Direct consumers who purchase through online stores or retail outlets.**

The Success Story Profile	
	2. Spas and Salons: **Businesses looking to provide high-quality, natural beauty treatments.** 3. Health and Beauty Retailers: **Stores that sell beauty and skincare products.** 4. Hotels and Resorts: **Premium accommodations that offer luxury beauty and wellness products to their guests.** **Key Partners** 1. Grape Growers and Vineyards: **Suppliers of grape seeds and other raw materials.** 2. Research Institutions: **Universities and research centers that can contribute to the development of new products and formulations.** 3. Manufacturing Facilities: **Companies specializing in the production of natural beauty products.** 4. Retail Chains and Distributors: **Partners that can help distribute products to a wider market.** 5. Marketing and PR Agencies: **Firms that can help promote the brand and increase market visibility.** 6. Sustainability Organizations: **Groups that can collaborate on sustainability initiatives and certifications.**
Vision and Future plans	Vision: Oinosporos envisions becoming a leading brand in the natural beauty industry, known for its innovative use of grape seed oil and its commitment to sustainability. The company aims to set a benchmark for quality and eco-friendliness, inspiring other brands to adopt similar practices. Oinosporos strives to be synonymous with luxurious, effective, and environmentally responsible beauty products. Future Plans: 1. Product Line Expansion: a. New Product Development: Introduce new categories of beauty products such as face masks, lip balms, and anti-aging treatments, all formulated with grape seed oil. b. Specialized Collections: Develop specialized collections targeting specific skin types and concerns, such as sensitive skin, acne-prone skin, and anti-aging needs. 2. Market Expansion: a. International Expansion: Expand the brand's presence globally, targeting key markets in Europe, North America, and Asia. b. E-commerce Growth: Enhance the online shopping experience with an upgraded website, user-friendly interface, and global shipping options. 3. Sustainability Initiatives: a. Eco-friendly Packaging: Transition to 100% recyclable and biodegradable packaging materials to further reduce environmental impact. b. Sustainable Sourcing: Strengthen partnerships with local vineyards and grape growers to ensure sustainable sourcing of raw materials. c. Carbon Neutrality: Implement practices to achieve carbon neutrality in the production and distribution processes. 4. Research and Innovation: a. Collaborative Research: Partner with academic institutions and research centers to explore new applications of grape seed oil in beauty and personal care. b. Advanced Formulations: Invest in R&D to create advanced formulations that maximize the benefits of grape seed oil. 5. Community and Education:

The Success Story Profile	
	a. Consumer Education: Launch educational campaigns to raise awareness about the benefits of grape seed oil and the importance of sustainable beauty products. b. Community Engagement: Engage with local communities through workshops and events focused on natural beauty and sustainability. 6. Strategic Partnerships: a. Collaborations: Collaborate with other eco-conscious brands and influencers to broaden the reach and impact of Oinosporos. b. Corporate Partnerships: Form alliances with hotels, spas, and wellness centers to integrate Oinosporos products into their offerings. 7. Quality Assurance: a. Certifications: Obtain additional organic and sustainability certifications to reinforce the brand's commitment to quality and environmental responsibility. Customer Feedback: Continuously gather and analyze customer feedback to improve existing products and develop new ones that meet consumer needs.

	Milestones Timeline	
	Date / Year	**Milestone**
1	06/2018	Entrepreneurship & Innovation Award by the Investment Applications Lab & the Innovation and Research Center of National and Kapodistrian University
2	12/2019	Rise Award (1st Prize), Retail Innovation for Sustainable Ecosystem, IELKA-Greek Research Institute of Retail Consumer Goods

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	4	"Localness" is not just a concept for Oinosporos; it's a way of life that permeates every aspect of the company's ethos and operations. By embracing its Greek heritage, we support local communities, and promote environmental sustainability.
team and network	4	With a dedicated team of professionals and a robust network of partners and collaborators, Oinosporos is well-positioned to continue its journey in sustainable beauty, promoting natural ingredients, environmental stewardship, and community engagement.
effectiveness-relevance-applicability	4	Oinosporos' approach to creating handmade beauty products from grape seed oil is not only effective in delivering high-quality skincare solutions but also relevant and applicable in today's beauty landscape. By prioritizing natural ingredients, sustainability, and local craftsmanship, Oinosporos resonates with consumers seeking authentic, eco-conscious beauty options.
Testing & piloting-scalability & replicability	4	Oinosporos' approach to testing and piloting, scalability, and replicability forms a cohesive growth strategy that enables the company to expand its reach and impact while maintaining its commitment to quality, sustainability, and innovation.
financial sustainability	3	Oinosporos' approach to financial sustainability involves a comprehensive strategy that includes diversifying revenue streams, managing costs effectively, expanding markets, and engaging stakeholders. By integrating sustainable practices with sound financial management, Oinosporos not only ensures its economic viability but also reinforces its commitment to environmental stewardship and social responsibility.

		This balanced approach positions Oinosporos for continued growth and success in the competitive beauty industry.
social cohesion	4	Oinosporos recognizes that social cohesion is essential for building sustainable and resilient communities. By actively engaging with stakeholders, investing in employee well-being, fostering partnerships, and supporting community initiatives, Oinosporos demonstrates its commitment to creating positive social impact while promoting its values of sustainability, inclusivity, and collaboration.

6.2.1.2 Conclusion

Oinosporos serves as a circular bioeconomy best practice, thanks to its holistic approach towards the development of sustainable bioproducts. This endeavor transforms a waste stream into a series of eco-friendly beauty products, by leveraging research and development, together with the expertise of a multidisciplinary team, contributing to waste reduction, biomass valorisation and substitution of conventional products based on chemicals. Aspiring to raise awareness and educate target audiences towards sustainable products and putting emphasis on networks and partnerships, Oinosporos also empowers the uptake of bioeconomy social dimension.

6.2.2 MycoMedica

6.2.2.1 Success story report

General Information	
Success Story Title	MycoMedica
Subtitle - tagline	Innovative Food Supplements from fungi
Bioeconomy theme	Biomaterials
Core Activities	Edible and Medicinal Fungi
Full Address	Podkoren 72, 4280 Kranjska Gora
No of employees	8
Funding sources	Self-sustainable

The Success Story Profile	
Short description of bio-based solution	Various products made from several types of medicinal fungi and mushrooms are available under the GOBA® brand. They also develop new cultivating techniques and produce various types of medicinal and edible fungi in their laboratories.
Detailed Description	MycoMedica d.o.o. is a high-tech company specializing in the cultivation of mushrooms and fungi and the production of food supplements derived from medicinal fungi. They possess the requisite knowledge and technologies for cultivating medicinal fungi and processing them into high-quality food supplements, which they have been acquiring and developing for the last 20 years. Many of the techniques have been developed during a wide range of scientific studies and research projects, both at home and abroad. They cooperate with numerous scientific institutions and companies in the field of medicinal fungi. The quality of their products, their effectiveness and the fact that they are 100% organic and 100% produced in the EU are the reasons why various pharmaceutical companies use them in their own brands of food supplements and animal feeds. All fungi used in their products are cultivated on their own farm, situated in a pristine rural setting and in compliance with the European Union's organic production guidelines. Their in-house development and production technology guarantees the highest quality and traceability throughout the entire production process, from cultivation and processing to the finished product. This ensures that their products are free from harmful microbes, pesticides and heavy metals, which are readily absorbed by fungi and mushrooms from their natural environment. In contrast, cultivated mushrooms are provided with the

The Success Story Profile	
	essential nutrients they require. By incorporating these products into their routine, customers can achieve a state of balance and well-being. Consumption and production in the company are organized sustainably. They do not use single-use plastic, the premises are heated with renewable wood biomass, and all leftover cultivating substrates are composted after use and used for growing vegetables. They do not use chemical preparations.
The team behind the story	Director dr. Andrej Gregori
Target audience / Key client / Key partners	Export to: Austria, Belgium, Czech Republic, Croatia, France, Ireland, Italy, Latvia, Lithuania, Hungary, Germany, Netherlands, Poland, Slovakia, Spain, Switzerland and United Kingdom
Vision and Future plans	Export to USA

	Milestones Timeline	
	Date / Year	**Milestone**
1	Feb 2018	*CoPro project* developed a new natural food supplement made from the medicinal fungus Cordyceps
2	Oct 2022	*eRECYn project* developed Sustainable production of standardised food supplements from the fungus Hericium
3	May 2023	*Trametes versicolor heteropolysaccharides* showing anti-metabolic syndrome, blood pressure control and antidiabetic effects
4	Aug 2023	*IPANEMA project* whose main area of research is the development of biosensors
5	Jan 2024	We prove that our product *GOBA Galimmun* effectively binds heavy metals and potentially helps to detoxify the body

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	Organic production situated in a quiet, clean, natural environment of Julian Alps Biosphere Reserve. Food supplements entirely produced in Slovenia according to organic production regulations, vegetarian and allergens free.
team and network	5	Very well coordinated team with a very high level of education and expertise in medicinal fungi and mushroom cultivation, processing and research.
effectiveness-relevance-applicability	4	Very effective process in terms of energy and labor intensiveness. Use of heat pumps, wood biomass and solar panels in order to reduce energy consumption and central system to reuse residual heat for heating of facilities and drying of fungi.
Testing & piloting-scalability & replicability	5	Own development and long-term experience. Involved in R&D projects financed by the EU. Conducting engineering, developing and automation of processing equipment needed in food supplements production. Developing new techniques for cultivation of fungi, extractions, chemical analysis in joined research projects as well as a part of pedagogical processes (master theses, PhD theses, student projects etc.).
financial sustainability	5	Complete control over raw materials traceability and regular certification, no foreign investments, own real estates, very low rate of financial loans. Very good ties with existing customers purchasing products developed to order. Most probably the best in the EU in the field of medicinal fungi cultivation, processing and research.

Measuring Success		
Key Indicator	**Rating**	**Explanation**
social cohesion	5	Situated in a rural environment, employing local population, supporting local NGO's, conducting research, publishing results in scientific journals, giving talks about effects and use of medicinal fungi in order to elevate the knowledge and health of a general population.

Relevant links

Website: https://www.goba.eu/home

Photos

6.2.2.2 Conclusion

MycoMedica d.o.o. is a success story that highly integrates key features and principals of circular bioeconomy, in the sector of "Biomaterials and Bioproducts". Dedicated to the production of high quality organic food supplements, offers a sustainable solution, opting for shorter supply chains and excluding the use of chemicals and pesticides. Additionally, MycoMedica puts great emphasis on incorporating sustainable materials and practices throughout the whole production process, including the use of sustainable packaging, ensuring product sustainability and circular management of by-products.

6.3 Bioeconomy Theme: Bioenergy

6.3.1 1 village 1 MW

6.3.1.1 Success story report

General Information	
Success Story Title	1 village 1 MW
Subtitle - tagline	Biomass for heat
Bioeconomy theme	Bioenergy
Core Activities	Bioenergy production from biomass (woodchip) valorization
Full Address	Romania, Centru Region, Presei 4, Sfantu Gheorghe
No of employees	
Funding sources	Norway grants, Horizon2020 projects (Bioenergy Villages and AgroBioHeat)

The Success Story Profile	
Short description of bio-based solution	The concept foresees the following: identification of biomass sources at local level (waste from felling of trees in forests, wood waste from pastures, pruning from green areas, orchards, gardens, parks, households, etc.), harvesting of biomass at community level, cultivation of energy crops, logistics (milling, storage, transport), boiler manufacturing, installation and commissioning of biomass heating plant and connecting the users to the system (especially public buildings). Given that localities have a considerable amount of green waste, each has the potential to produce its own raw material for heating and to become energy self-sufficient. Across Romania, more than 200+ small and medium-sized biomass-based heating systems have been installed in more than 45 villages, with a total capacity of 30+ MW. A platform BioVillMap www.biovillmap.ro has been created, listing around 25-30 rural municipalities, highlighting their major achievements in bioenergy production from local biomass.
Detailed Description	The 1 village 1 MW concept was developed and is promoted by Green Energy Cluster. The cluster's work focuses on helping communities secure energy from local renewable sources such as biomass. Thus, it supports the development of biomass value chains, and the spread of the 1 village 1 MW concept, taking into account the three aspects of sustainable development: environmental, social and economic. The cluster provides the framework for cooperation between the economic environment, local public authorities in rural areas and small towns, and consumers This integrated approach takes into consideration the principles of sustainability, and emphasizes the importance of cooperation of various stakeholders: a) business players along the value chain (fuel producers, technology, and service providers that include harvesting and collection, pre-treatment, upgrading, storage, transportation, and handling), b) researchers, knowledge and education providers to identify innovative solutions and facilitate technology transfer in the field of bioenergy, and c) local public authorities for adopting adequate policies to implement integrated bioenergy solutions. The small-scale, community-based systems are taking into consideration the local potential, creating value for the local communities, by preserving and protecting the environment, creating local jobs and business opportunities, as well as ensuring energy from local biomass resources. It is a sustainable business model: good for nature, and good for the communities. For example, at the level of a village, a capacity of about 1MW is reached in buildings such as: town hall, school, cultural center, kindergarten, library, local police, post office etc. The pipeline is about 1200 meters long and there is only 1 biomass storage facility with access to it with a machine for handling (unloading) it. Also, at the biomass storage is located the power plant room, connected by a shaft to it and automatically transporting the wood chips in the combustion process. Technical solutions for the implementation of the "1 village 1 MW" concept: - Individual heating systems based on wood waste/biofuel at each final consumer (private houses). - Small-scale biomass heating system (connecting several buildings nearby) e.g. in the centre of the village.
The team behind the story	Biomass fuel producers, technology providers, heating system manufacturers and installers The Cluster currently has 85 members representing biofuel producers, heating system manufacturers, local authorities, research institutes and public institutions. The Cluster

The Success Story Profile	
	has a large territorial coverage, leading various bioenergy-related projects across Romania and cooperating with international partners within the EU and beyond. Businesses are mainly represented by the energy willow cultivators, businesses dealing with the harvest and process of the wooden residues as well as of the industrial wooden residues. On the other hand, the biomass-based heating systems represent a key element in the value chain (from planning to construction). The cluster is integrating large scale functions around sustainable development especially. This means that social enterprises are organic parts of the value chain in the following activities: energy willow harvesting, wood waste collection.
Target audience / Key client / Key partners	A relevant aspect is the mobilization and involvement of stakeholders, strengthening cooperation between actors, and disseminating information and knowledge about different renewable energy sources and solutions based on them. There is a need to promote and raise awareness of local communities to adopt sustainable solutions and practices regarding environmental issues, waste management, and issues related to biomass energy production. Users of the facilities can be industrial and agro-industrial users, greenhouses, tourism facilities, social care service housing that are heated with biomass (woodchips), and households.
Vision and Future plans	There are approximately 3000 villages in Romania. For the moment only 60 villages started to implement such initiatives. The BioVillMap platform shows which sustainable communities are securing energy from local biomass sources. Specifically, the map is designed so that anyone can find out details about investment, results, partners, and community. Extend to more facilities and inspire more communities to transition to clean energy based on local sources. Initiating programmes to subsidize collecting green waste, support for establishing facilities for biomass trade and logistic centres, storage of biomass at local level.

Milestones Timeline		
	Date / Year	**Milestone**
1	2009 - 2011	Establishment of an Association (mainly farmers interested in energy willow cultivation), individual cases of biomass valorization to bioenergy. Extending the interest to other sources of solid biomass (forestry, industrial waste and from cleanings, prunings) as well as to heating system manufacturers
2	2011	Establishment of the Cluster, involving more companies, research and universities, local authorities, agencies and catalyst organization. Launching projects for awareness raising and facilitating collaboration between SMEs and RDI entities
3	2014	Launch of the project Biomass – the green business (supported by the Norway Grants GII): Create a community scale model for biomass utilization for sustainable local economic development and encourage development of local eco-businesses along biomass value chain, promoting the 1 village 1 MW concept. Cluster development trainings and cluster strategy, formation of the working groups of the cluster.
4	Since 2016 - ongoing	Several research projects for demonstration and promoting purposes

Milestones Timeline		
		Biovill – Bioenergy villages project, BioenergyTrain, AgroBioHeat and more.
5	2022	Creation of the BiovillMAP platform, a tool to inspire communities in the transition to clean energy based on local sources. The BioVillMap platform shows which sustainable communities are securing energy from local biomass sources. Specifically, the map is designed so that anyone can find out details about investment, results, partners, and community.

Measuring Success		
Key Indicator	**Rating**	**Explanation**
local-ness	5	The small-scale, community-based systems are taking into consideration the local potential, creating value for the local communities, by preserving and protecting the environment, creating local jobs and business opportunities, as well as ensuring energy from local resources, especially waste wood, and other biomass resources.
team and network	4	Stakeholders involved along the supply chain To implement such integrated and sustainable systems it is necessary to raise the awareness of the local communities, to carry out capacity building activities. Furthermore, it is necessary to sensitize decision-makers, policy makers, public authorities, local stakeholders towards developing the sector.
effectiveness-relevance-applicability	4	Obtaining woodchips from various biomass sources: landscape maintenance, cleaning of green areas, prunings from orchards, green areas - the environmental dimension being an important element of the model. Ensuring energy for different type of users: households, industrial users, greenhouses
Testing & piloting-scalability & replicability	4	Tested, scalable, replicable model Guidance in setting up on behalf of the Cluster, study-visit to different solutions already in function (Ghelinta, Estelnic, Locodeni, Baia Mare, Bretcu, Borsec villages)
financial sustainability	3	To realize the investment it is necessary to attract financial support (from different supporting schemes) or to allocate funding from the local budget Necessity of various incentives for harvesting biomass, landscape maintenance, ecologization works.
social cohesion	4	close collaboration with local public authorities and the local community Public meetings (info days for citizens), working group meetings (stakeholders from the village) and personal contact with the people of the village and spreading oral information (info office, helpdesk). These meetings enable a transparent and very powerful participatory process forming the base for a fundamental trust within the population for the sense and practicability of the project.

Relevant links

1. Examples of biomass to bioheat solutions in Romania
   Dalia greenhouse
   Solfarm agroindustrial company
   Locodeni village
   Estelnic village
2. Other examples are listed on the BioVillMAP platform: www.biovillmap.ro

6.3.1.2 Conclusion

“1Village 1MW” stands out as a circular bioeconomy success story that benefits local communities on an economic, environmental and social level. Through the circular management of locally available residual biomass, via the utilization of compliant technologies, to cover the specific needs of each participating actor and community, by leveraging a wide range of stakeholders, this initiative showcases in practice that waste may actually be a valuable resource benefiting the producer, if committed to sustainable management efforts.

7 Conclusions

Deliverable 2.7 was developed in the framework of Task 2.4: Identification of Success Stories in each Regional Bioeconomy Platform (RBP) and includes the second batch of bio-based solutions that were identified and selected as success stories across Europe (21 success stories). The report highlights the promising success stories within the rural bioeconomy across various regions of the European Union. By identifying and documenting these case studies, we have showcased the potential of bioeconomic activities to foster sustainable rural development, enhance local economies, and contribute to the EU's broader environmental and economic goals.

The number of success stories that have been identified per bioeconomy theme, i.e. food & agriculture, forestry & natural habitats, water & aquatic systems, biomaterials & bioproducts, and bioenergy, in the framework of Deliverable 2.7, is the following:

- ➔ 7 success stories related to “Food & Agriculture”
- ➔ 2 success stories related to “Forestry”
- ➔ 2 success stories related to “Water & aquatic systems”
- ➔ 5 success stories related to “Biomaterials & Bioproducts”
- ➔ 5 success stories related to “Bioenergy”.

In total, in the framework of Task 2.4, 41 success stories have been identified. The total number of success stories that have been identified per bioeconomy theme is the following:

- ➔ 12 success stories related to “Food & Agriculture”
- ➔ 5 success stories related to “Forestry”
- ➔ 5 success stories related to “Water & aquatic systems”
- ➔ 11 success stories related to “Biomaterials & Bioproducts”
- ➔ 8 success stories related to “Bioenergy”.

All success stories have been uploaded to the BioRural Toolkit and have become a part of ERBN.

It is noted that, for the purposes of T2.4, at least 20 success stories in total, 5 per RBP covering all themes of the bioeconomy, i.e. 1 success story / bioeconomy theme / RBP, had to be identified by the end of the Task (M36). As presented above, the targets were successfully achieved.