



# Shaping symbiosis in bio-based industrial ecosystems based on circular by-design supply chains

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# InfoDay session

The SYMBIO InfoDay aims to present and share the tools and methodologies developed by the SYMBIO project to support industrial symbiosis and help organizations in the sector take advantage of these solutions.

- Gain an in-depth understanding of the objectives and expected impacts of the SYMBIO project in Europe.
- Provide an overview of the progress made by the SYMBIO project and the available tools.
- Illustrate the benefits for companies in the bio-based and circular sectors through resilient and zero-waste models.
- Promote networking among participants and stimulate discussions on circularity, bio-based business, and industrial symbiosis.
- Introduce to an intensive two-day technical workshop provides operational tools for modelling resilient bio-based businesses and their social, economic, and environmental impacts using free AI tools.



# SYMBIO project in a nutshell

The SYMBIO project provides:

- 🌱 **Tools and methodological approaches to building bio-based business models** based on circularity by design and industrial symbiosis
- 🌱 **Symbiotic business models** with high-profitability sustainability replicable at the EU level, **tested and validated in 12 EU pilot regions** (Italy, Austria, Flanders, Spain, Slovenia, Croatia)
- 🌱 **System measuring and monitoring symbiosis** and its social, economic and environmental impacts
- 🌱 **Approach involving all supply chain actors** in participatory pathways to the green transition

- Topic: **HORIZON-CL6-2023-CircBio-01-7**
- Type of action: HORIZON Coordination and Support Actions
- Grant amount: 1.301.000€
- Project duration: 36 months (1/1/2024 – 31/12/2026)
- Project coordinator: **Lombardy Green Chemistry Association – LGCA (Italy)**
- Project partners:



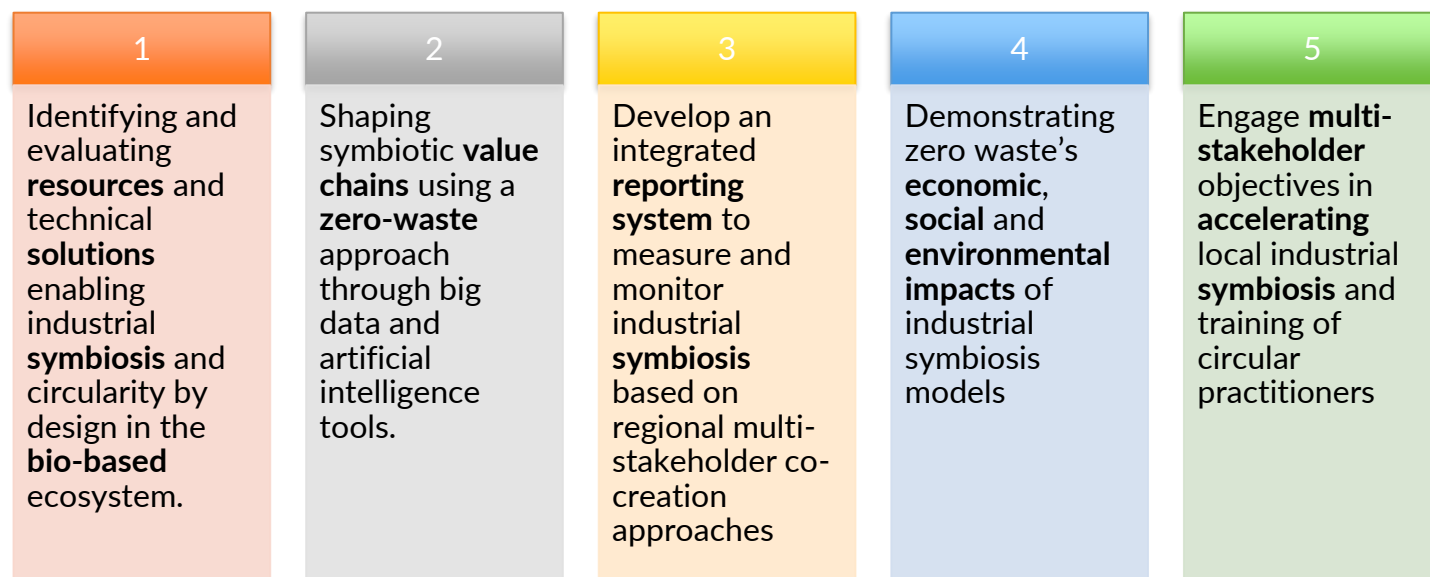
Cardiff  
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University



Funded by the European Union Grant  
Agreement No 101135166



# SYMBIO objectives



The SYMBIO methodology is designed, tested and validated in **12 EU pilot regions** (Lombardy, Piedmont, Veneto, Friuli-Venezia Giulia, Emilia-Romagna, Carinthia, Slovenia, Croatia, Andalusia, Brussels Capital, Wallonia, Flanders) selected based on their biobased resources, socioeconomic indicators, intangible networks and infrastructure, and the potential for developing close-to-market CBE supply chains.





# Methodology and results



## DATA-HUB BUILDING

**Scout and analyze resources, solutions and market enablers** to make them accessible to industries triggering symbiotic activities close to the market.

 Inventory of regional inputs/outputs


 Ranking of critical factors enabling circularity by-design


- **12 pilot regions** involved
- **10 main gaps** selected



## VALUE-CHAIN DESIGN

**Connect companies** in circular value chains based on their specific material flows and available technologies for material reprocessing, proven value chain designs, regulatory requirements and more.

 150+ technologies available to cluster/business networks thanks to tailor-made training


 Prioritisation of circular by-design value chains


**50 cross-sectional value chains** based on zero-waste supply chains modelled



## BUSINESS MODELLING

Develop of **Circularity Index** and a **reporting system** supporting companies to build a business model based on recycling, upcycling, downcycling of by-products/energy use in industrial symbiosis context.

 Selecting high-potential industrial symbiosis models by MCDA


 Model a reporting system by MFA fully integrated into the corporate GRI Sustainability Reporting Standards.


- **10 symbiosis business models** designed
- **3 dimensions of sustainability** investigated
- **6 co-creation multi-stakeholder workshops**



## BUSINESS DEPLOY

**Accelerate the development of business cases** identified by measuring social, economic and environmental impact to maximise the support of companies, investors and regions.

 LCC, LCA, social and sociological benefits assessment

 Synergies with EU projects, networks, initiatives

 Exploitation routes

- **1,000 subjects reached**
- **3 thematic events organised**
- **Policy recommendations** designed



# Expected outcomes

1

Create a **regional community of stakeholders** that helps build local capabilities for symbiotic business models.

2

Leverage **EU networks, projects, and initiatives** (e.g. Vanguard Initiative, EU Circular Economy Stakeholder Platform, Processes4Planet, H4C, EIT Climate-KIC and other EU-funded projects) to incorporate circularity indicators/measurements.

3

Enabling **local biomass security** through supply chain resilience and diversification and creating economies of scale across multiple operators.

4

Identify **circular infrastructure gaps** and accelerate the deployment of net-zero emissions technologies in regional biobased ecosystems

5

Measure the level of **integration of renewable energy/raw materials**, promote CO2 capture and storage, and close the energy and raw materials loop through improved eco-design of **high-value-added bio-based products**.

6

Support corporate **decision-making processes** to be integrated into sustainability reports by acting as a circularity performance reporting system

7

Increase the **use of less economically attractive secondary resources** by measuring and incentivising mechanisms that reward and promote products with a high content of renewable raw materials.



# Value Chain Generator® Maximise the value and minimise the climate impact of organic by-products & waste

Leverage data insights & advanced matchmaking to develop the optimal circular bioeconomy solutions for every region and supply chain



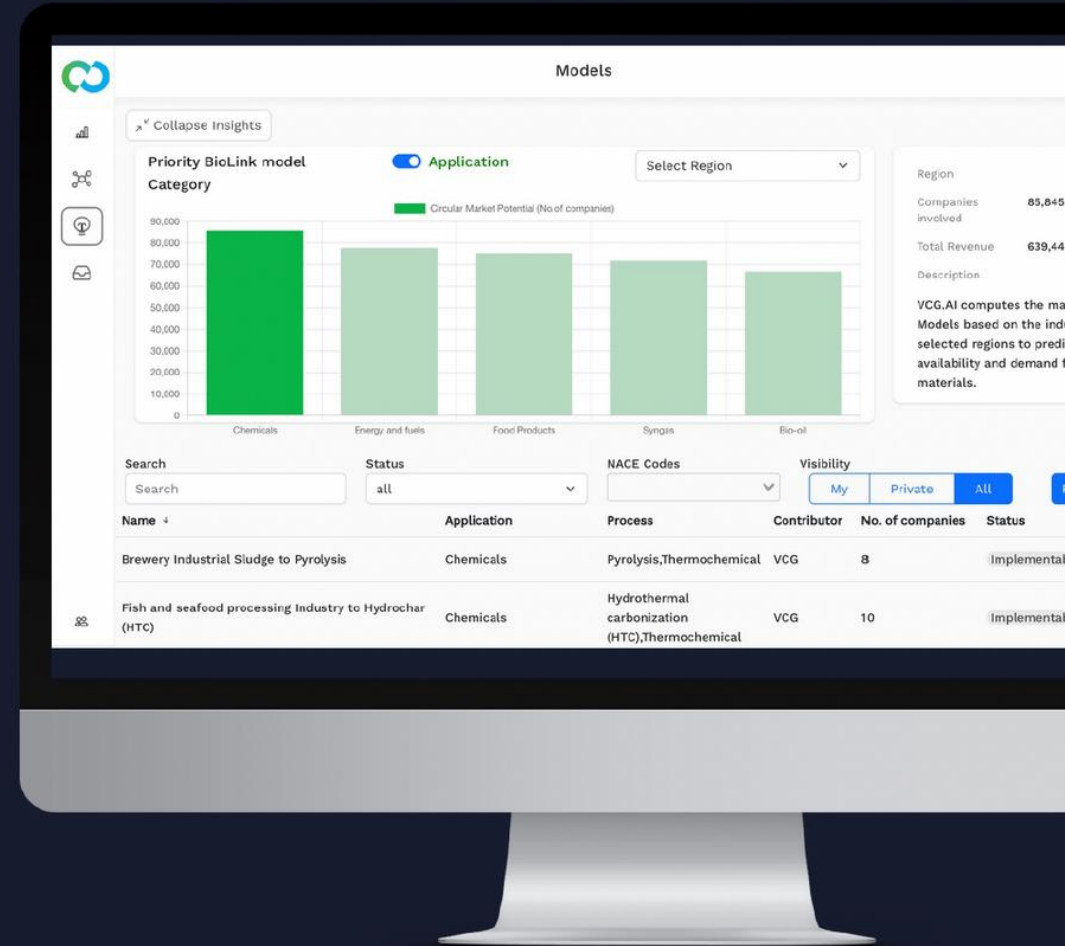
Reduced climate footprint



Reduced waste & better utilisation



Increase profitability



# BioLink® Algorithm: Leveraging data to facilitate the development of circular bioeconomy business models at scale



**+250**

By-product & waste types



**+150**

Waste conversion technology



**+450**

Waste-to-value models

**+1 Million documents**

Science, technology, business & climate data



# The Value Chain Generator approach



## ANALYSE

all the companies  
operating in the  
region

1



## DETECT

by-products & waste  
streams generated  
by the companies

2



## PRIORITISE

the circular solutions by  
their market potential  
and climate impact

3



## MATCHMAKE

the right supply chain  
& technology partners  
for implementation

4

# Data analytics of regional companies & residuals

## Location-based analysis of regional companies & the related material flows

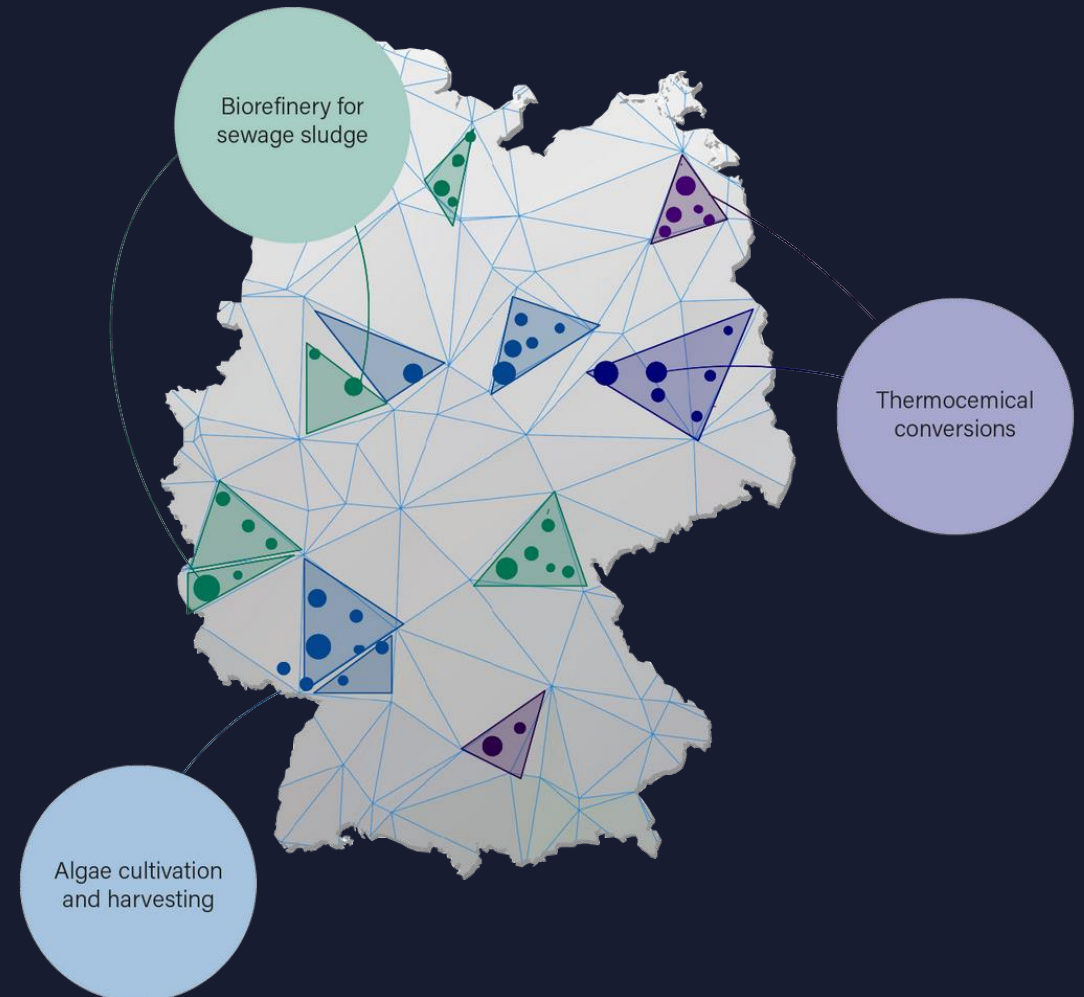
- Identify important industry sectors and available organic feedstocks
- Map of the potential organic feedstock suppliers in the region
- Map of potential buyers of the new circular bio-based products



# BioLink<sup>®</sup> Algorithm to find opportunities for more profitable & sustainable resource utilization

**Evaluate** the potential circular business models and technologies for every residual

**Prioritise** the circular opportunities with the highest market potential and climate impact in the region



# Matchmake & collect data to develop chosen opportunities

**Matchmake** the right companies into new potential supply chains & find the optimal technology providers in the VCG.AI network

**Collect data** from companies to learn about their current residual management practices & validate their interest in the new business models



# International deployments in 2024

13  
Countries

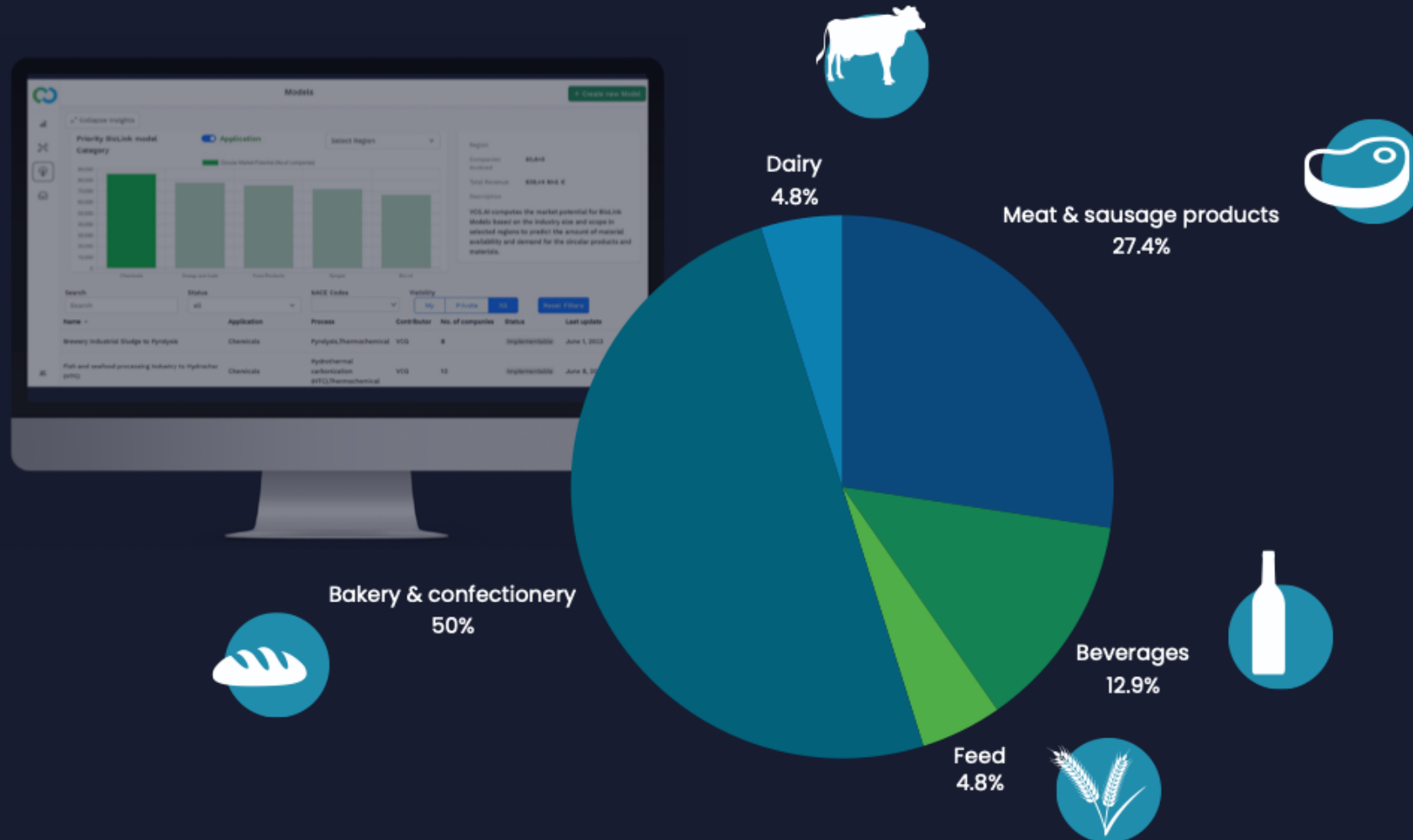
35  
Regions



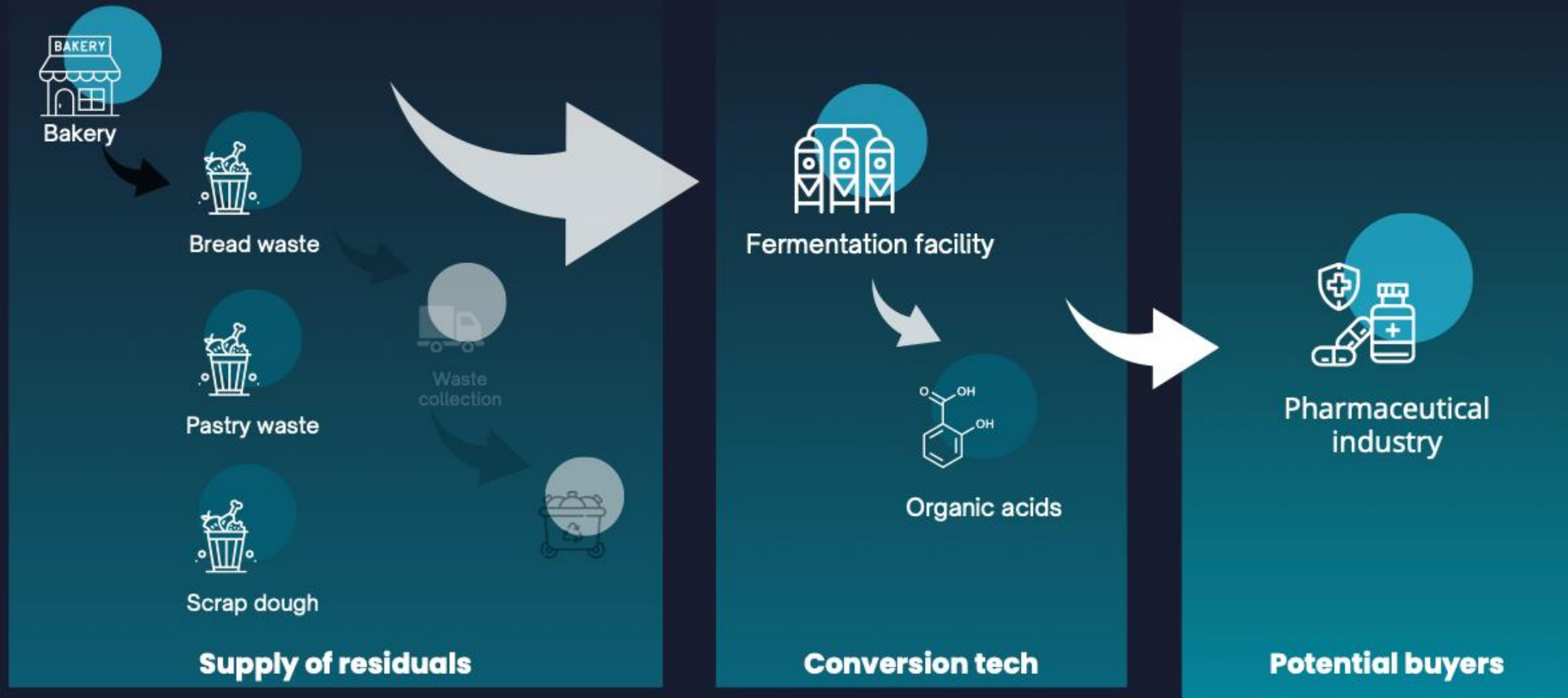
# **CASE STUDY: UPPER AUSTRIA REGION**

**Value Chain Generator supporting regional development  
of circular industries**

# Data Analytics High-priority industries and organic residuals in the region

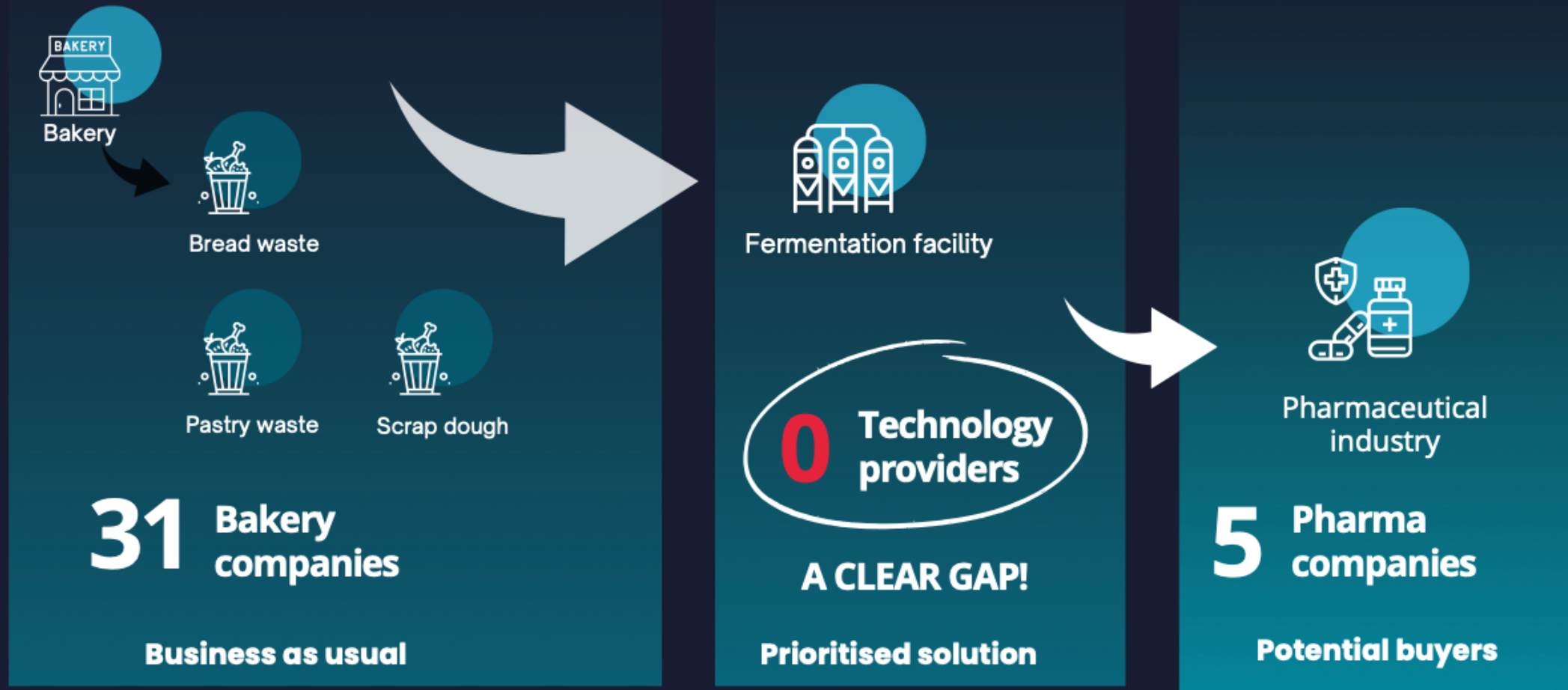


# Discover and Evaluate: Bakery residuals to produce organic acids for pharmaceutical industry



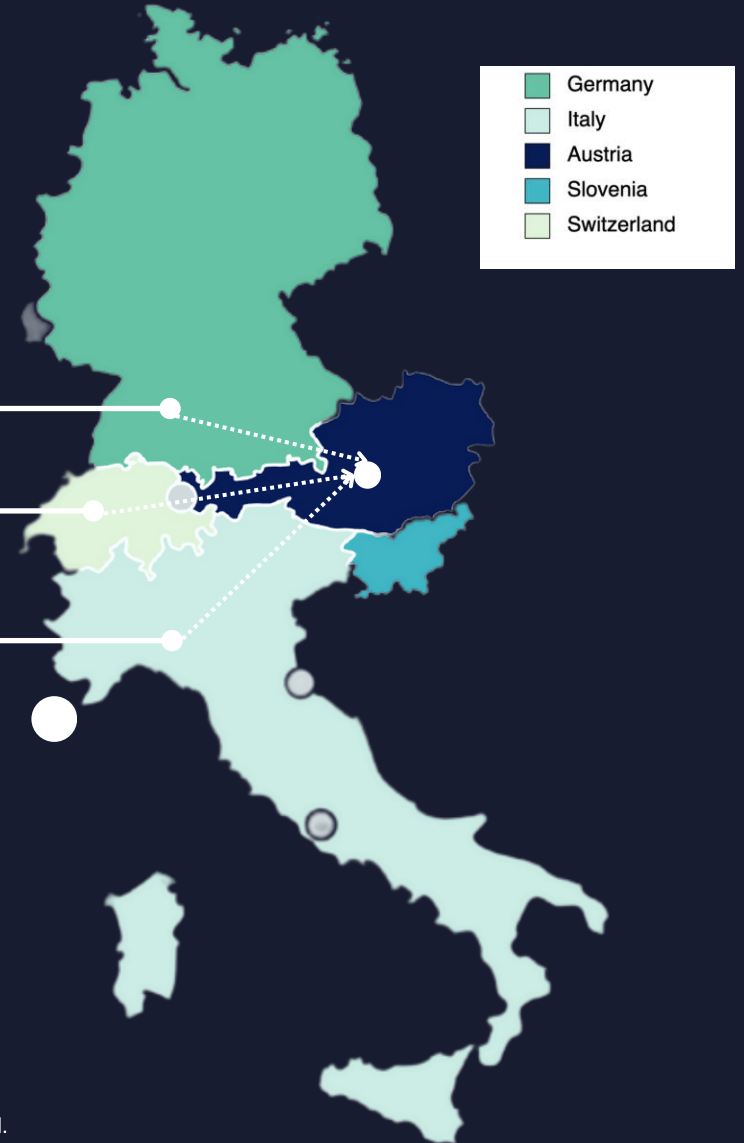


# Discover and Evaluate Availability of companies in the region



# Addressing the gap in the BioLink

The region is **missing the technology providers** of fermentation for producing organic acids. The right technology providers can be found in the VCG.AI network.



Fraunhofer

btg  
bioliquids

BiCT  
BIOTECHNOLOGY INNOVATION

bering  
PROCESS SOLUTIONS

ACIES BIO

BIOREFIC™  
Biorefinery for the Future

Chemie  
Cluster Bayern

c-LEcta  
A KERRY® COMPANY

50+

UNIVERSITY OF  
HOHENHEIM

Hochschule Reutlingen  
Reutlingen University

# Two-Day Workshop

An intensive **two-day technical workshop** provides operational tools for modelling resilient bio-based businesses and their social, economic, and environmental impacts using free AI tools.

## *First session – Industrial Symbiosis session*

- SYMBIO's Data Collection Inventory: Bio-based Technologies & Raw Materials availability and distribution in Northern Italy, Slovenia, Andalusia (Spain), Carinthia (Austria), Croatia, and Belgium.
- Social Value in Bioeconomy Business Models
- Policy Insights in Bioeconomy

## *Second session – Training session*

- VGA.AI Tool: Value Chain Analysis Training
- Accelerating SME Growth: Sustainability, Policy Advocacy, and Business Models



# Two-Day Workshop Target groups

An intensive **two-day technical workshop** provides operational tools for modelling resilient bio-based businesses and their social, economic, and environmental impacts using free AI tools.

## SMEs

- ❖ Get tools to improve your investment readiness and build sustainability into your business model by using AI
- ❖ Connect with regional and international industry and institutional players
- ❖ Get concrete advice on your business strategy and achieve a “greener” investment profile

## Clusters

- ❖ Be better equipped to help your SME members develop zero-waste circular business models
- ❖ Add a new service to your portfolio that your members can benefit from, or improve the existing service
- ❖ Upgrade the skills of your cluster managers



# Two-Day Workshop

The two-day technical workshop will be held online between January and May 2025 in 6 countries.



## ITALY WORKSHOPS

- Session 1: 20/03/2025
- Session 2: 21/05/2025



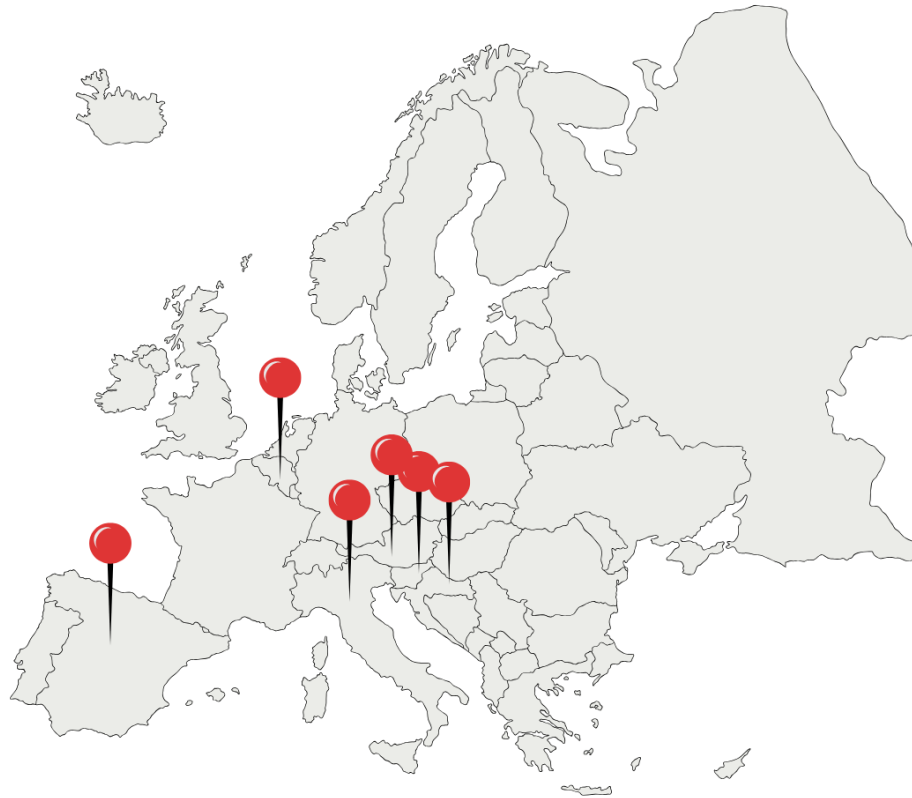
## SPAIN WORKSHOPS

- Session 1: 19/03/2025
- Session 2: 2/04/2025



## CROATIAN WORKSHOPS

- Session 1: 12/03/2025
- Session 2: 13/03/2025



## AUSTRIAN WORKSHOPS

- Session 1: 24/03/2025
- Session 2: 25/03/2025



## BELGIUM WORKSHOPS

- Session 1: 20/02/2025
- Session 2: 3/04/2025



## SLOVENIAN WORKSHOPS

- Session 1: 17/02/2025
- Session 2: 16/04/2025





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