



Driving SME Sustainability and Circular Innovation: Strategies, Tools, and Advocacy for a Resilient Future

2nd Workshop

15.05.2025



Funded by the European Union Grant
Agreement No 101135166



Agenda

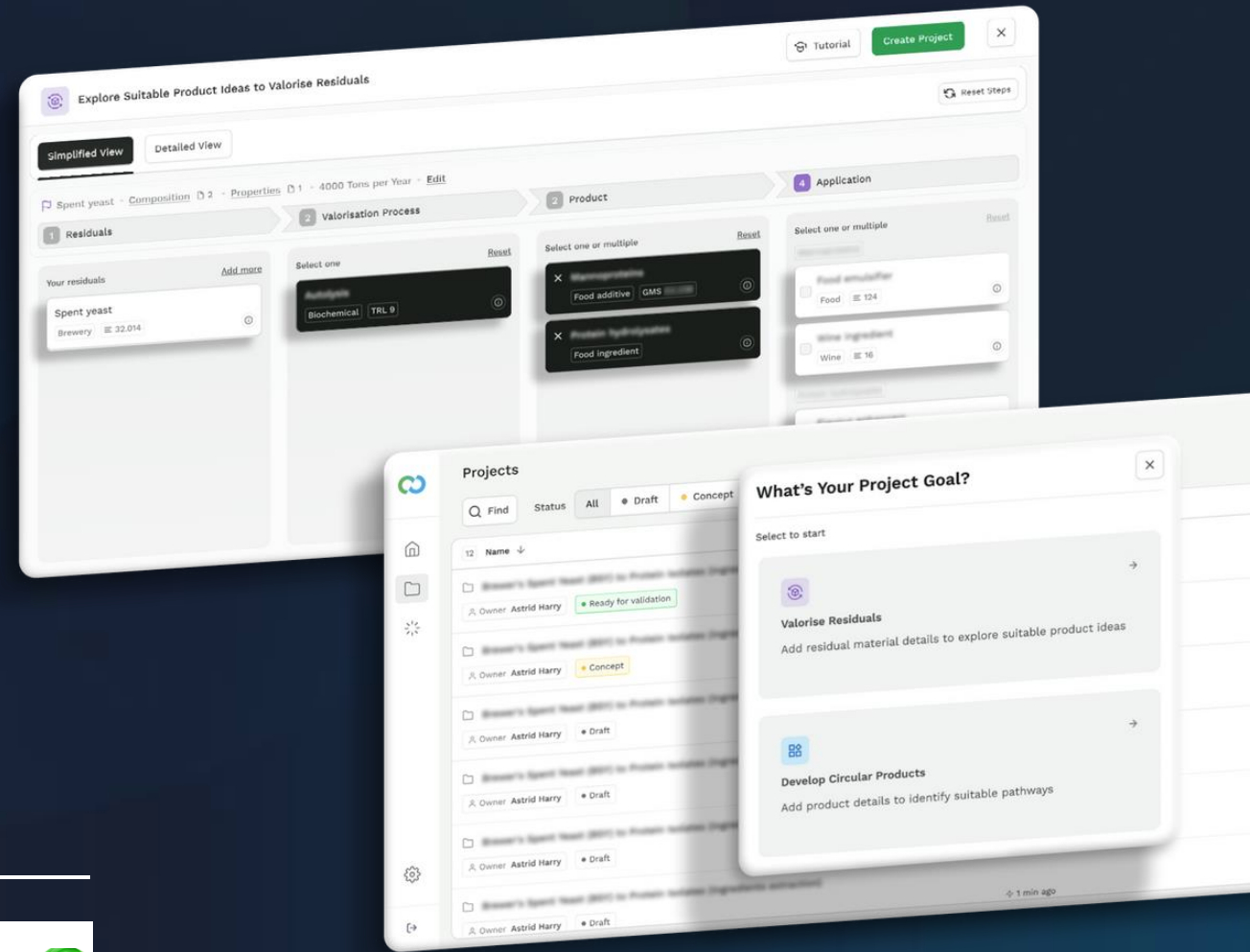
- 1. Presentation of VCG.AI platform and how it contributes to the SYMBIO project (Gašper Božič)**
- 2. Demo of VCG.AI (Gašper Božič)**
- 3. Presentation of VCG.AI results for Carinthia (Miha Škrokov)**
- 4. Discussion on implementing circular value chains in Carinthia (Miha Škrokov, Gašper Božič)**





vcg.ai[®]
VALUE CHAIN GENERATOR

AI development of circular & biobased products and business models



EIC Accelerator

CYBER ONE
DER HIGHTECH AWARD BADEN-WÜRTTEMBERG

#FRAME
OF HELP



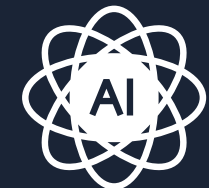
CIRCULAR

DEVELOP TECHNICALLY FEASIBLE & PROFITABLE CIRCULAR INDUSTRY SOLUTIONS

AI to develop circular solutions and business opportunities based on the latest technological and scientific advances combined with material, market, and feedstock availability intelligence.

A COMPETITIVE EDGE WITH SPECIALISED AI

Leveraging more than 5 million of the latest patents, technologies, scientific publications, market reports, LCAs, and specialised data sources, you can realise circularity with global intelligence at your fingertips.



1. SIDE STREAM VALORISATION

SOLUTION EXAMPLE

VCG.AI enables a multinational brewery to get 6x the value for their side stream compared to the existing market outlet.

2. PRODUCT DEVELOPMENT

SOLUTION EXAMPLE

VCG.AI enables a chemical company to develop and launch new bio-based products to diversify its product portfolio.

3. FEEDSTOCK SOURCING

SOLUTION EXAMPLE

VCG.AI enables project implementation through reliable feedstock sourcing, meeting quantity & quality requirements.

THE INTELLIGENCE BEHIND GLOBAL CIRCULARITY

OVERVIEW OF VCG.AI SOLUTIONS



OUTLINE

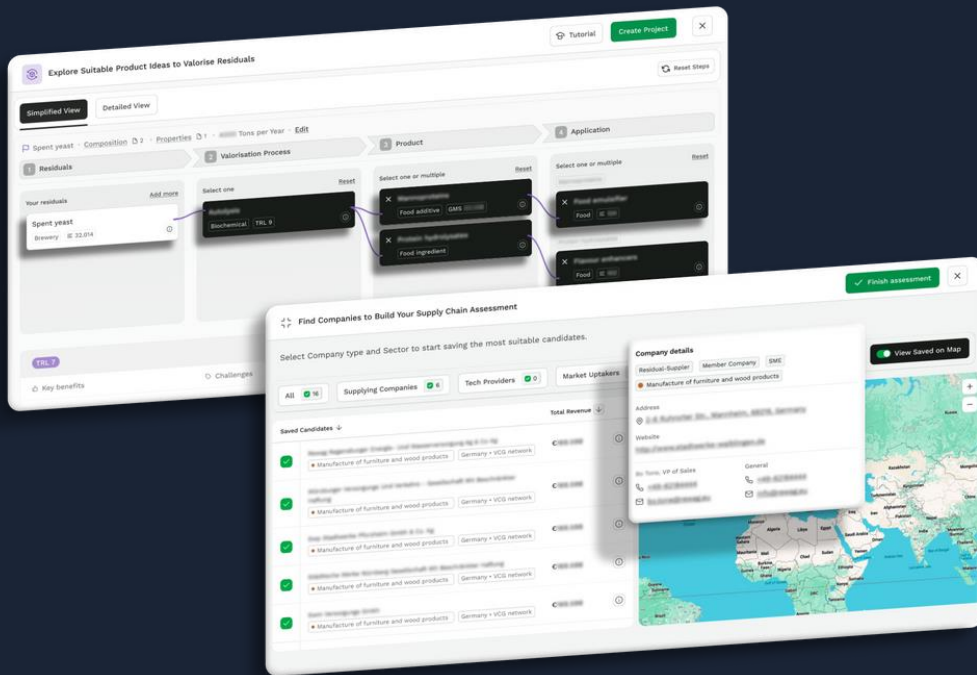
1. INTELLIGENCE BEHIND CIRCULAR OPPORTUNITIES

- 1.1 Analysis and Live Monitoring of the Technology Landscape
- 1.2 Overview of Pilot, Demonstration, and Industrial Plants
- 1.3 Patent Landscape Assessment
- 1.4 Scientific Publications and R&D Projects
- 1.5 VCG.AI Roadmap (Upcoming Features)

2. TECHNICAL VALUE CHAIN SOLUTIONS

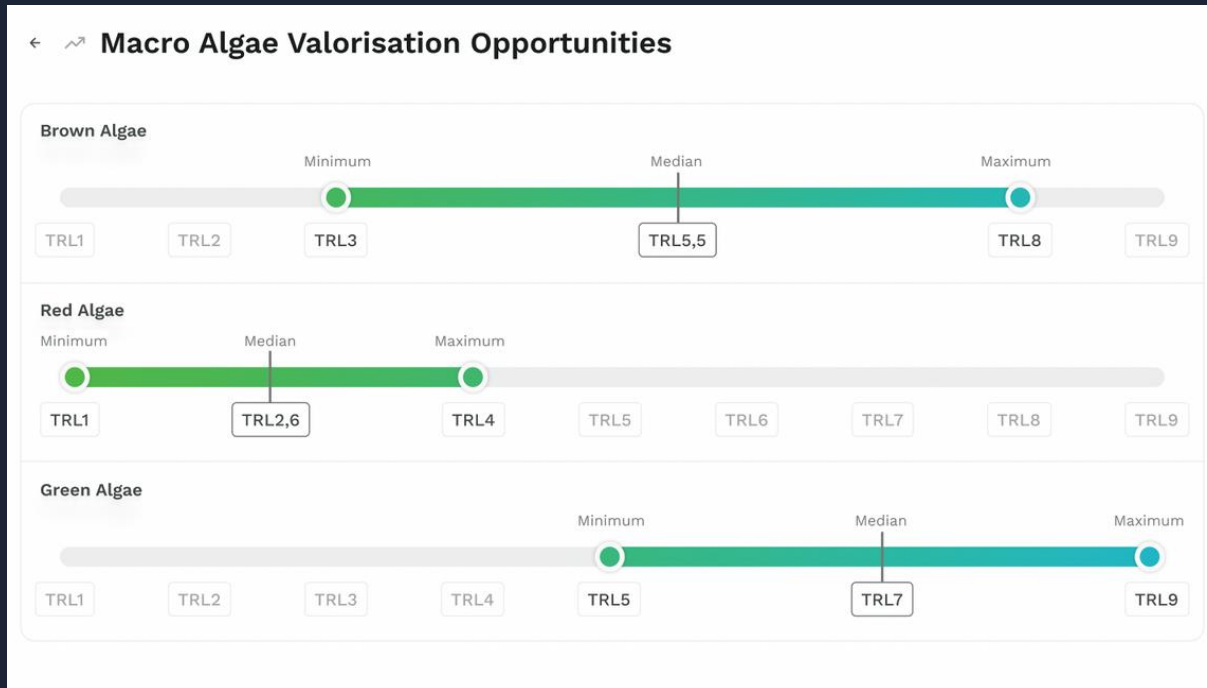
- 2.1 Feedstocks and Sidestreams
- 2.2 Valorisation Processes
- 2.3 Product Development
- 2.4 Market Applications

3. MARKET DEVELOPMENT AND FEEDSTOCK SOURCING



1. INTELLIGENCE BEHIND CIRCULAR OPPORTUNITIES

1.1 ANALYSIS AND LIVE MONITORING OF TECH LANDSCAPE



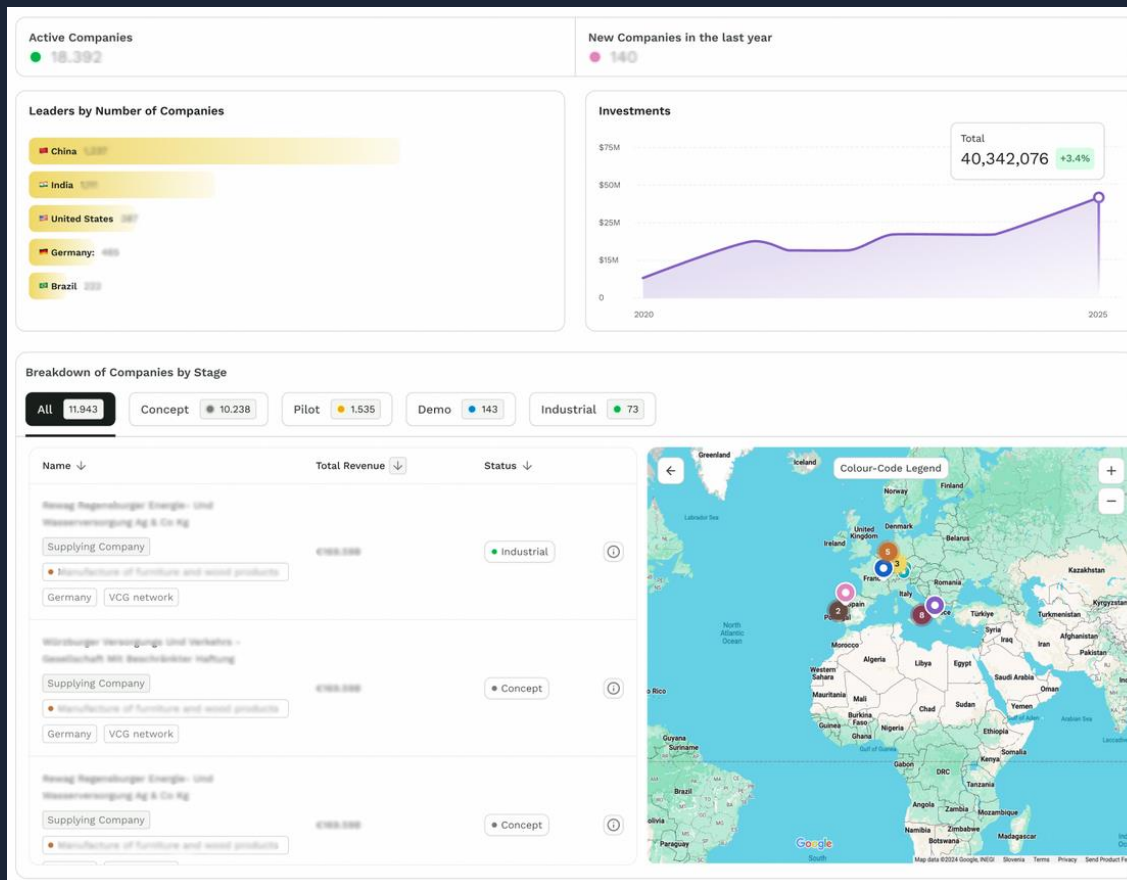
Exemplary

Assessing Technology Readiness and Market Potential

- **Evaluate technology maturity** across feedstocks, processes, products, applications to identify readiness levels and business opportunities.
- **Conduct multi-level analysis** of technology trends, integrating macro and micro perspectives for a comprehensive understanding.
- **Leverage real-time monitoring** with access to continuously updated background data (weekly updates).

1. INTELLIGENCE BEHIND CIRCULAR OPPORTUNITIES

1.2 OVERVIEW OF PILOT, DEMO AND INDUSTRIAL PLANTS



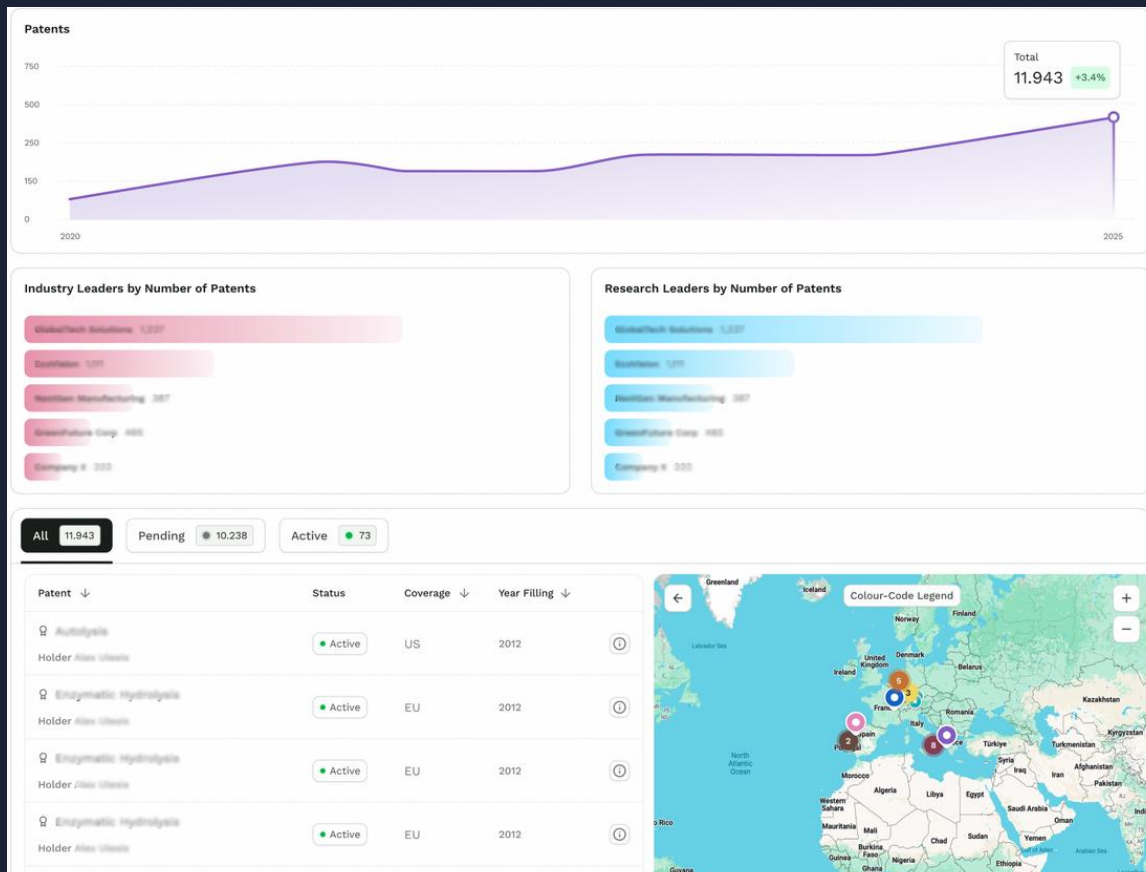
Tracking Investments and Technology Advancements

- **Map pilots, demonstration and industrial-scale plants** to assess commercialization progress.
- **Analyze key players**, including technology developers, processors, and investors, to understand the market landscape.
- **Monitor plant development** to mitigate investment risks and anticipate emerging opportunities.

Exemplary

1. INTELLIGENCE BEHIND CIRCULAR OPPORTUNITIES

1.3 PATENT LANDSCAPE ASSESSMENT



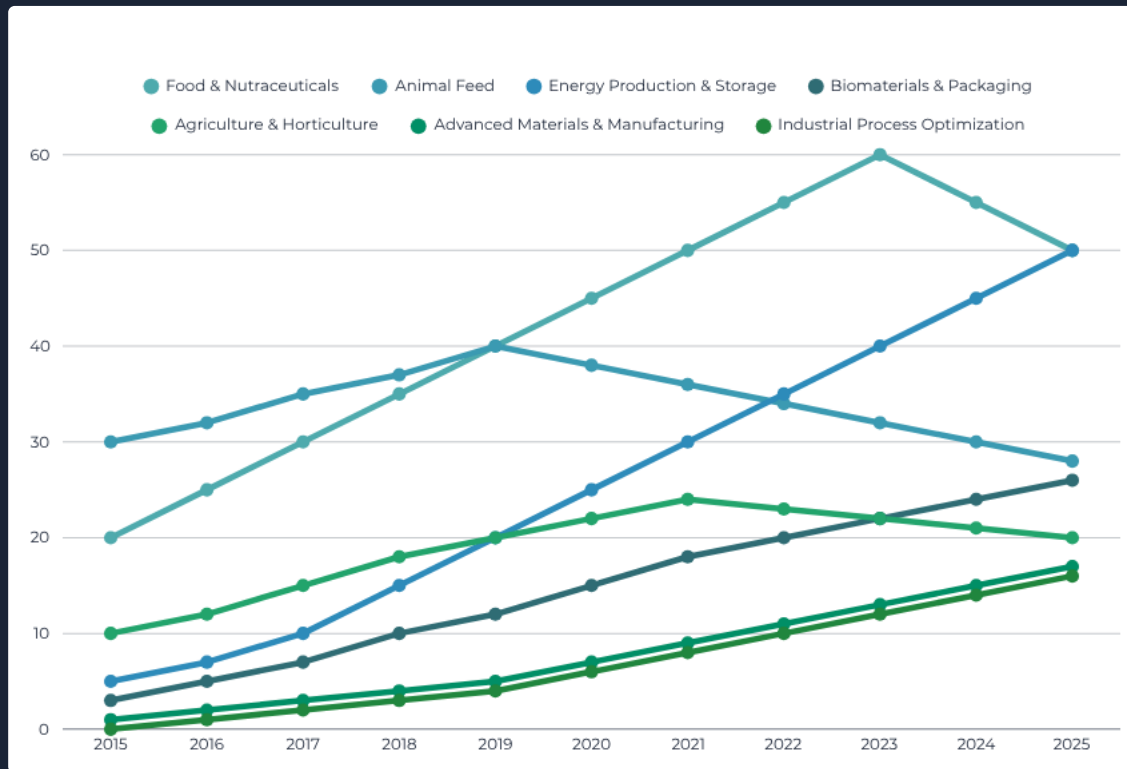
Exemplary

Monitoring the Global Intellectual Property (IP) Landscape

- **Track patent trends** across processes, products, and applications to uncover innovation hotspots.
- **Identify leading technology developers** across industries and research institutions.
- **Assess geographic patent coverage** to determine market entry and protection strategies.

1. INTELLIGENCE BEHIND CIRCULAR OPPORTUNITIES

1.4 SCIENTIFIC PUBLICATIONS AND R&D PROJECTS



Exemplary

Monitoring Global Research and Innovation Trends

- **Analyse publication and project trends** in feedstocks, processes, products, and applications to predict the future advancements.
- **Assess industry participation** in research projects to map the competitive landscape.
- **Identify top research institutions** and **latest R&D breakthroughs** to leverage emerging technologies.

1. INTELLIGENCE BEHIND CIRCULAR OPPORTUNITIES

1.5 VCG.AI ROADMAP (UPCOMING FEATURES)



IDENTIFY AND MONITOR HIGH-POTENTIAL STARTUPS & SCALEUPS

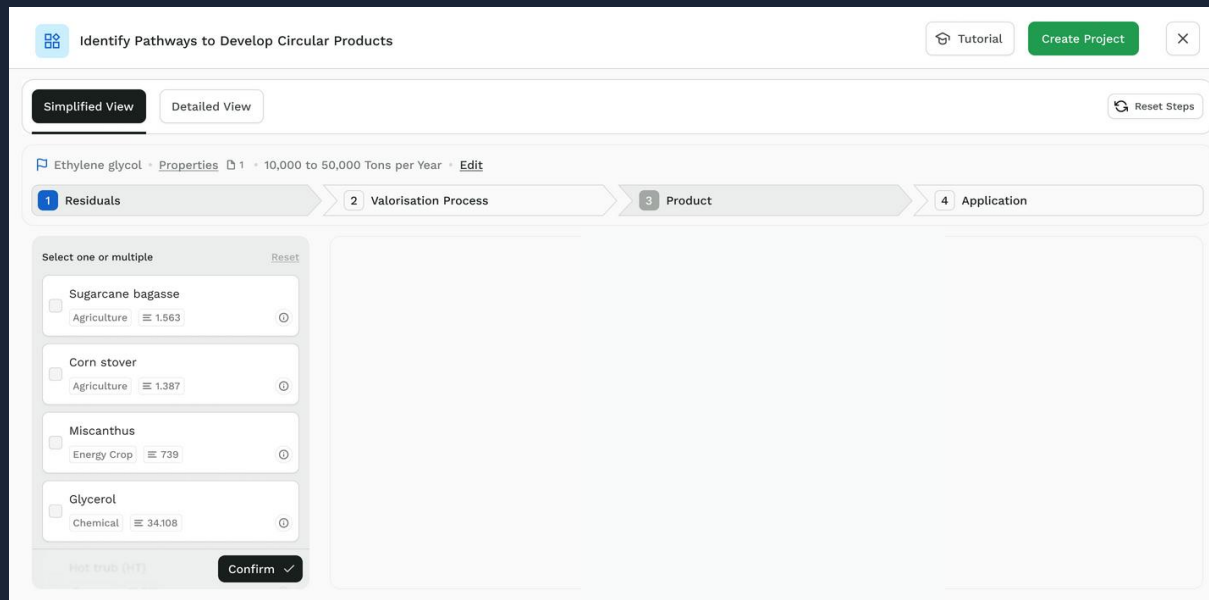
- **Assess total investments and active companies** to understand the competitive landscape.
- **Monitor individual company progress**, including funding, milestones, and scale-up stage (concept to industrial scale).
- **Track emerging trends** in feedstocks, technologies, products, and applications to identify strategic opportunities.

STAYING AHEAD WITH INDUSTRY INTELLIGENCE

- **Track major industry investments** and projects to monitor competition & anticipate market shifts.
- **Identify key market trends** shaping the future of feedstocks, technologies, and applications.
- **Stay informed with real-time updates**, including press releases and industry news, to maintain a competitive edge.

2. TECHNICAL VALUE CHAIN SOLUTIONS

2.1 FEEDSTOCKS AND SIDESTREAMS



Exemplary

EXPLORING FEEDSTOCKS AND SIDESTREAMS

Explore all available feedstocks and sidestreams

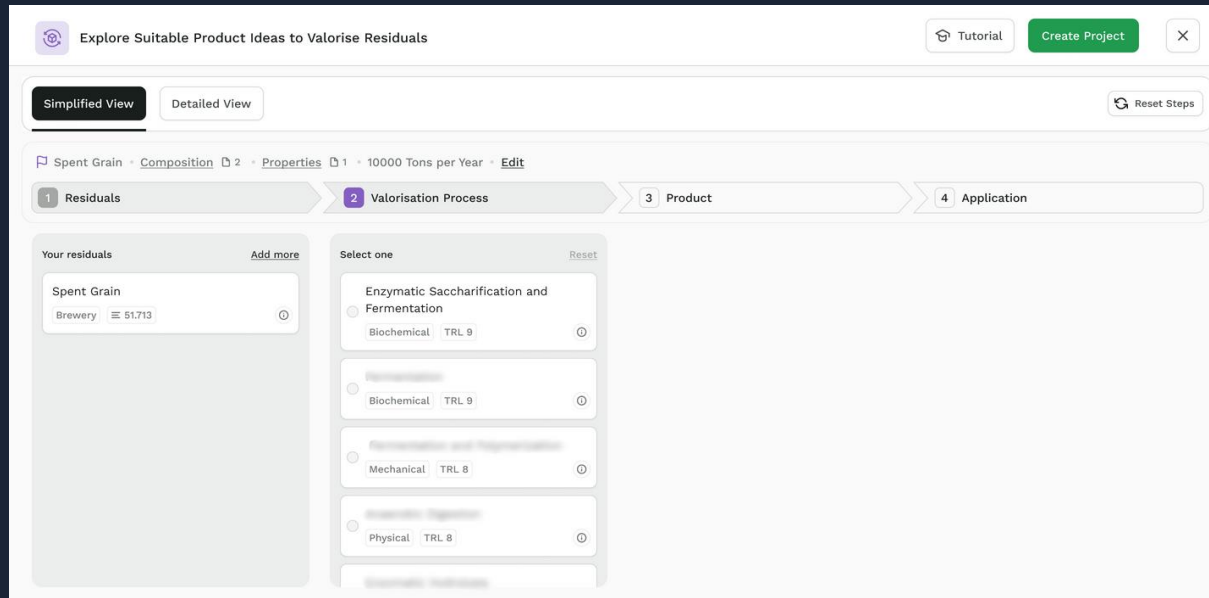
- Get descriptions
- Enter pre-required criteria

Technical deep dive

- Material composition (such as moisture content, proteins, minerals, and many more)
- Material properties (such as pH, particle size, density, and many more)
- Production process it originates from
- Number of sources (e.g. patents) describing the feedstock or sidestream
- and more

2. TECHNICAL VALUE CHAIN SOLUTIONS

2.2 VALORISATION PROCESSES



Exemplary

COMPREHENSIVE ASSESSMENT OF PROCESSES FOR EVERY SIDE-STREAM

Valorisation processes ranked & grouped by

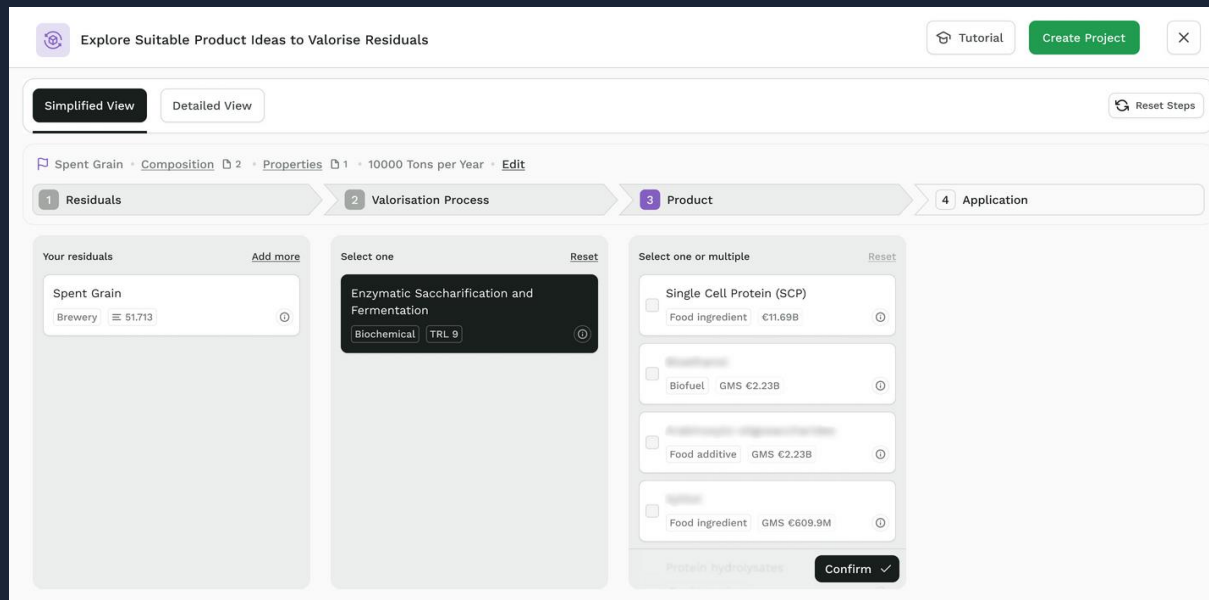
- Compatibility score.
- TRL of the valorisation processes.
- Process type (e.g. biochemical).

Technical deep dive

- Process parameters (yield, energy consumption, process temperatures, residence times and more).
- Preprocessing requirements (feedstock quality requirements, process steps and more).
- Downstream processing (process steps and parameters and more).
- Scale-up factors.
- Related IP landscape.

2. TECHNICAL VALUE CHAIN SOLUTIONS

2.3 PRODUCT DEVELOPMENT



Exemplary

ASSESSMENT & IN-DEPTH ANALYSIS OF PRODUCTS THAT CAN BE PRODUCED THROUGH THE SELECTED PROCESSES

Products are ranked and grouped by

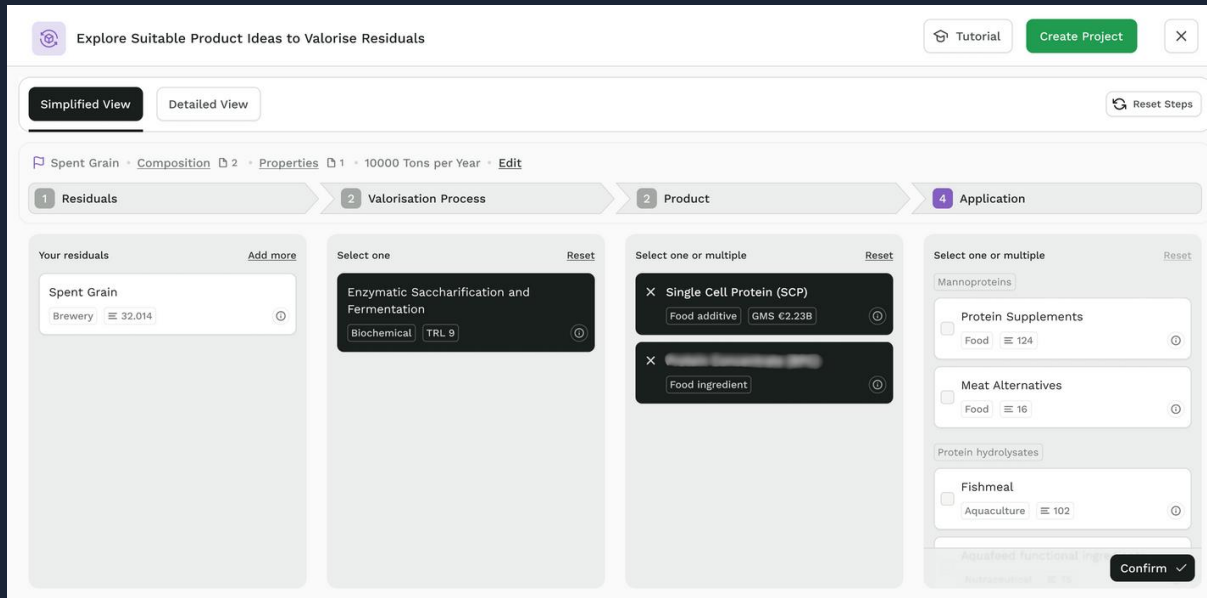
- Market size.
- Product types (e.g. food ingredients).
- Number of data points confirming the process-product fit.

Technical deep dive

- Product qualities and compositions.
- Market growth rates.
- Emerging product trends.
- Related IP landscape.

2. TECHNICAL VALUE CHAIN SOLUTIONS

2.4 MARKET APPLICATIONS



Exemplary

ANALYSIS OF MARKET APPLICATIONS FOR THE SELECTED PRODUCTS

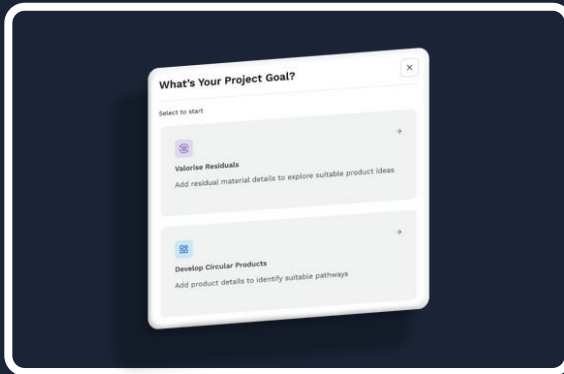
Market applications are ranked & grouped by

- Price ranges.
- Industry types for each application.
- Number of data points confirming the product-application fit.

Technical deep dive

- Product quality restrictions - purity levels.
- Required downstream processing steps.
- Analytical method validation.
- Regulatory.

USE CASE: CIRCULAR CHEMICALS



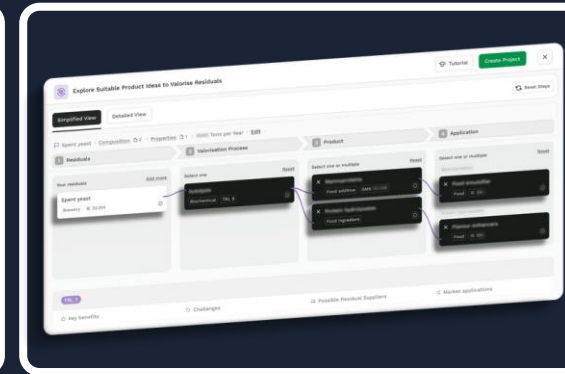
1. CHOOSE YOUR STARTING POINT

A company engaged VCG.AI to explore the potential for **sourcing and manufacturing Ethylene Glycol (EG)** in a more **circular way**. EG is used among others for PET production.



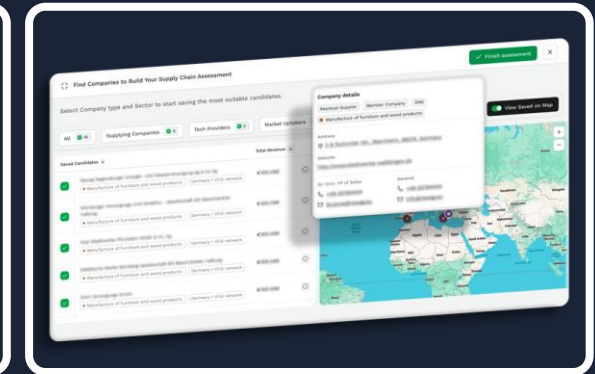
2. ANALYSE THE LANDSCAPE

VCG.AI conducted an effective landscape analysis covering **emerging technologies, patents, R&D developments, and commercialization trends** across both startups and established industry players.



3. DISCOVER THE SOLUTIONS

Through technical value chain mapping, VCG.AI identified **seventeen** distinct valorisation processes and mapped **forty-seven viable feedstocks**, leading to **nine end-use markets** relevant to EG.



4. DEEP DIVE ASSESSMENTS

A deep dive into each stage of the value chain uncovered **key data on technology readiness levels**, process yields, feedstock characteristics, **market pricing, suppliers and off-takers, and other commercialisation factors**.

Exemplary

3. MARKET DEVELOPMENT & Feedstock sourcing PROJECT IMPLEMENTATION SUPPORT

Source qualified feedstock from trusted suppliers with up to 10-year supply guarantees

+4.5 MIO TONNES / YEAR

Find Companies to Build Your Supply Chain Assessment

Select Company type and Sector to start saving the most suitable candidates.

All 16 | Supplying Companies 6 | Tech Providers 0 | Market Uptakers

Company details popup:
Residual-Supplier | Member Company | SME
Sector: Manufacture of furniture and wood products
Address: B. B. Bahnerstr. 20, Mannheim, 68225, Germany
Website: http://www.stahlwerke-waldinger.de
No. Title, VP of Sales | General
Phone: +49 6228 9444 | +49 6228 9444
Email: info@stahlwerke-waldinger.de | info@stahlwerke-waldinger.de

Company Name	Total Revenue
Waldinger Holzwerkstoffe GmbH & Co. KG	€100.000
Waldinger Holzwerkstoffe GmbH & Co. KG	€100.000
Waldinger Holzwerkstoffe GmbH & Co. KG	€100.000
Waldinger Holzwerkstoffe GmbH & Co. KG	€100.000
Waldinger Holzwerkstoffe GmbH & Co. KG	€100.000

1M+ PRODUCTION SITES

For example, assess feedstock availability & site selection based on regional feedstock availability analytics.

PROJECTS IN DEVELOPMENT

SUPPORTING THE SCALE UP OF SOLUTIONS

VCG.AI has partnered with a European project development company to **deploy 10 billion EUR into projects focused on renewable feedstocks by 2035.**



We handle the CAPEX and project execution to de-risk and scale up production according to the needs of the market.

SOUTH EAST EUROPE

Feedstock

Brewer's spent yeast

Technology

Mechanical separation & ingredient extraction

Products

Active peptides & β -glucans

CAPEX

€45-50 Million

SOUTH EAST EUROPE

Feedstock

Dairy side streams

Technology

Membrane separation & Ultrafiltration

Products

**Proteins & pharmaceuticals
lactose**

CAPEX

55-60 mio EUR



PARTNERS & CLIENTS

EUROPE AND BEYOND



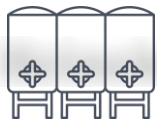
**F&B
Company**



**Chemical
Company**



**Retail
Chain**



**Global
Brewery**



**Fertilisers
Producer**



15 countries

where VCG.AI is already deployed

+300,000 tonnes

of renewable feedstock sourced for
projects already in development

THE TEAM BEHIND VCG.AI



Jon Goriup, CEO
Product development
and business



Mateja Dermastia, COO
Previously founder of a
biotech scaleup with a
+100 team.



**Dr. Dominik Patzelt,
Director of Biz Dev**
PhD in circular business
transformation

+25

BIO-TECH ENGINEERS
DATA SCIENTISTS
CIRCULAR BUSINESS EXPERTS

ADVISORY BOARD



Dr. Beat Wolf, CTO
15 years in AI & big
data application
development



**Dr. Andreas Fischer,
Chief Scientist (AI)**
PhD with over 100 AI &
ML publications



**Fadli Fadli, Head of
Projects** Led industrial
scale circular projects
in Europe & Asia

Dr. C. Patermann
Former director of
EU Commission
for bioeconomy

Ilaria Re, MSc
Coordinator of
bioeconomy pilot
Vanguard Initiative

Dr. E. Reinmuth
Head of
Bioeconomy at Uni.
of Hohenheim

Dr. Karen Zheng
Professor at MIT,
AI in circular
supply chains

Dr. D. Hertweck
Digital business
modelling of circular
value chains



v^cg.ai[®]

VALUE CHAIN GENERATOR

LET'S REALISE CIRCULARITY TOGETHER!

SCHEDULE A DEMO CALL TO SEE VCG.AI IN ACTION

CONTACT US

VCG.AI GmbH
Seyffer Strasse 34
70197 Stuttgart, Germany



www.vcg.ai

Jon Goriup Dermastia
CEO VCG.AI
jon@vcg.ai

Introduction

SYMBIO OBJECTIVE: TO UNCOVER CIRCULAR VALUE CHAINS AND SUSTAINABLE SOLUTIONS FOR AUSTRIA

- **Key Insight:** The Carinthia region has extensive feedstock streams, especially **wood**, exceeding **1,1 million tonnes** and **soybean meal**, exceeding 100 thousand tonnes.
Bioeconomy Companies: SYMBIO identified 107 companies that can participate in specific circular value chains.
- **Focus:** Aligning these companies and their feedstock resources with **possible value chains**.



Methodology for Evaluating Bioeconomy Value Chains

The Data Used

- Data on feedstock availability (SYMBIO)
- Database on viable technology routes (SYMBIO, VCG.AI)
- Technology availability (VCG.AI)
- Clear local market demand (SYMBIO, VCG.AI)
- Database of existing infrastructure in Carinthia (VCG.AI)



Use of VCG artificial intelligence capabilities

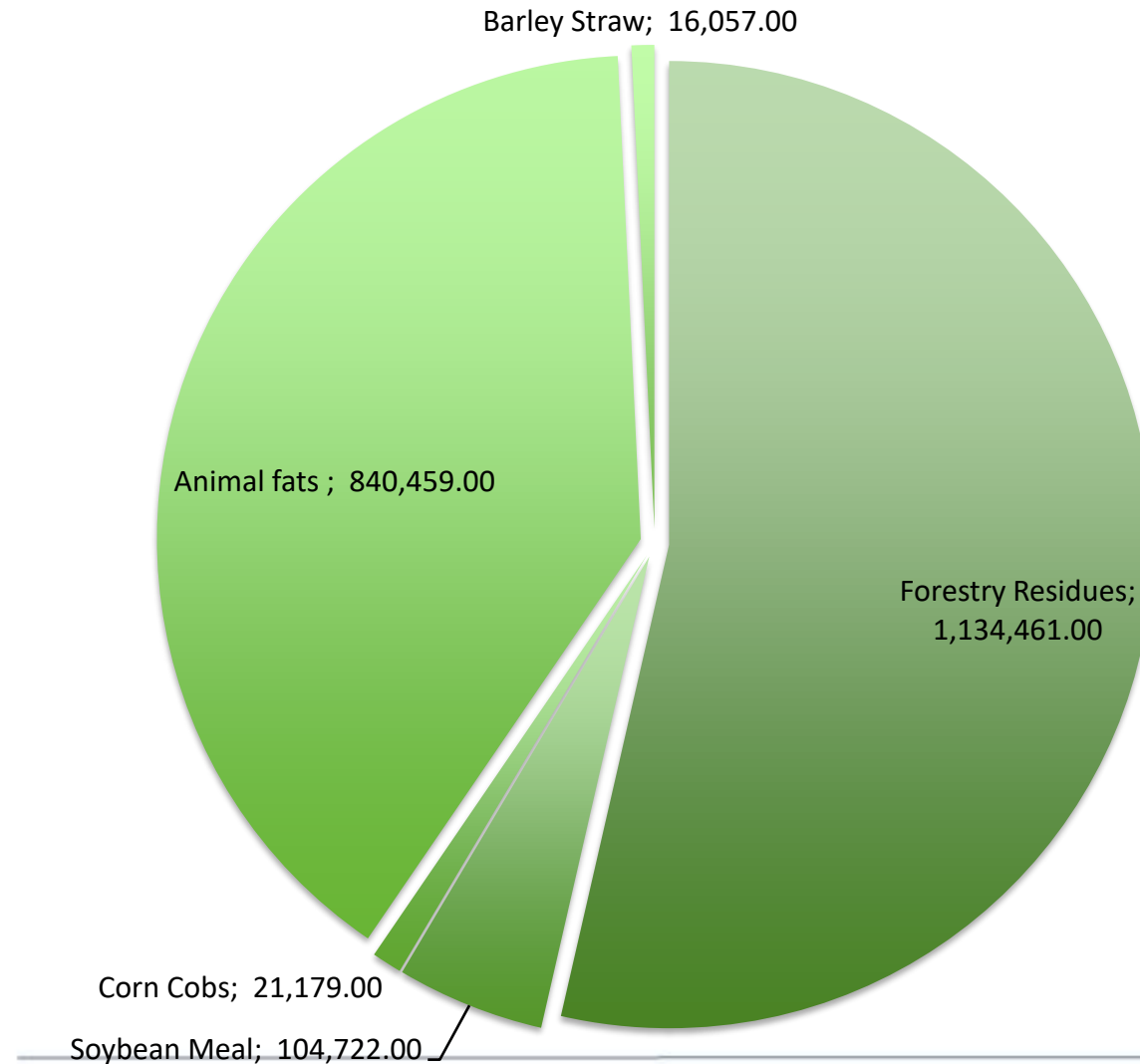


Step 1.1: Finding feedstock availability from companies

Sector	# of Companies	Examples	Main Activities
Sawmills	10	HASSLACHER NORICA TIMBER, Holz Granitzer, Johann Offner Holzindustrie	Processing and trading of timber and wood-based products
Brewery industry	6	Hirter Bier, Villacher, Wimitzbräu	Large-scale beer production, craft brewing.
Dairy industry	6	Kärntnermilch, Sonnenalm, Unterkärntner Molkerei	Milk processing, cheese, and dairy product manufacturing
Chemical production	6	Akdeniz Chemson, Treibacher Industrie, Tribotecc	Industrial and specialty chemical manufacturing
Furniture Manufacturing	5	Heraklith, AGRICOLA Consultants, FREJO Wohndesign	Manufacturing of wooden furniture and interior design solutions



Step 1.2: Uncovering top Biomasses in Carinthia



Funded by the European Union Grant Agreement No 101135166



Step 2: Finding Viable Technology Routes

Corn and wood residues → Furfural:
acid hydrolysis → dehydration

- Established technological readiness (TRL High)

Soybean meal → Glycerol: Enzymatic
hydrolysis → saccharisation

- TRL mid-to-high: commercially viable, with innovation potential



Step 3: Filling in the tech gaps

Approach: Leverage VCG European technology providers database (450+) to fill local technology gaps

- Identify and engage companies in the EU specialised in:
 - Advanced fermentation technologies
 - Biochemical refining processes
- Identification of partnerships for tech transfer, licensing, or joint ventures

Benefits:

- Accelerates local bioeconomy development
- Lowers technological and financial risk
- Strengthens integration within European bioeconomy networks



Step 4: Identifying clear local market demand

Identified through market analysis & existing industrial partnerships:



Finding companies in the region who have the capacities to offtake the products identified

Key local partners



Glycerol: Food industry, personal care, pharma

Local industrial partnerships: Treibacher Industrie, Tribotecc, HOS-Technik, DonauChem, Elox



Furfural: Specialty chemicals market (resins, adhesives, solvents).

Carinthian chemical companies: ASK Chemicals, Akdeniz Chemson, DonauChem



Step 5: Existing Infrastructure & Overlap Analysis

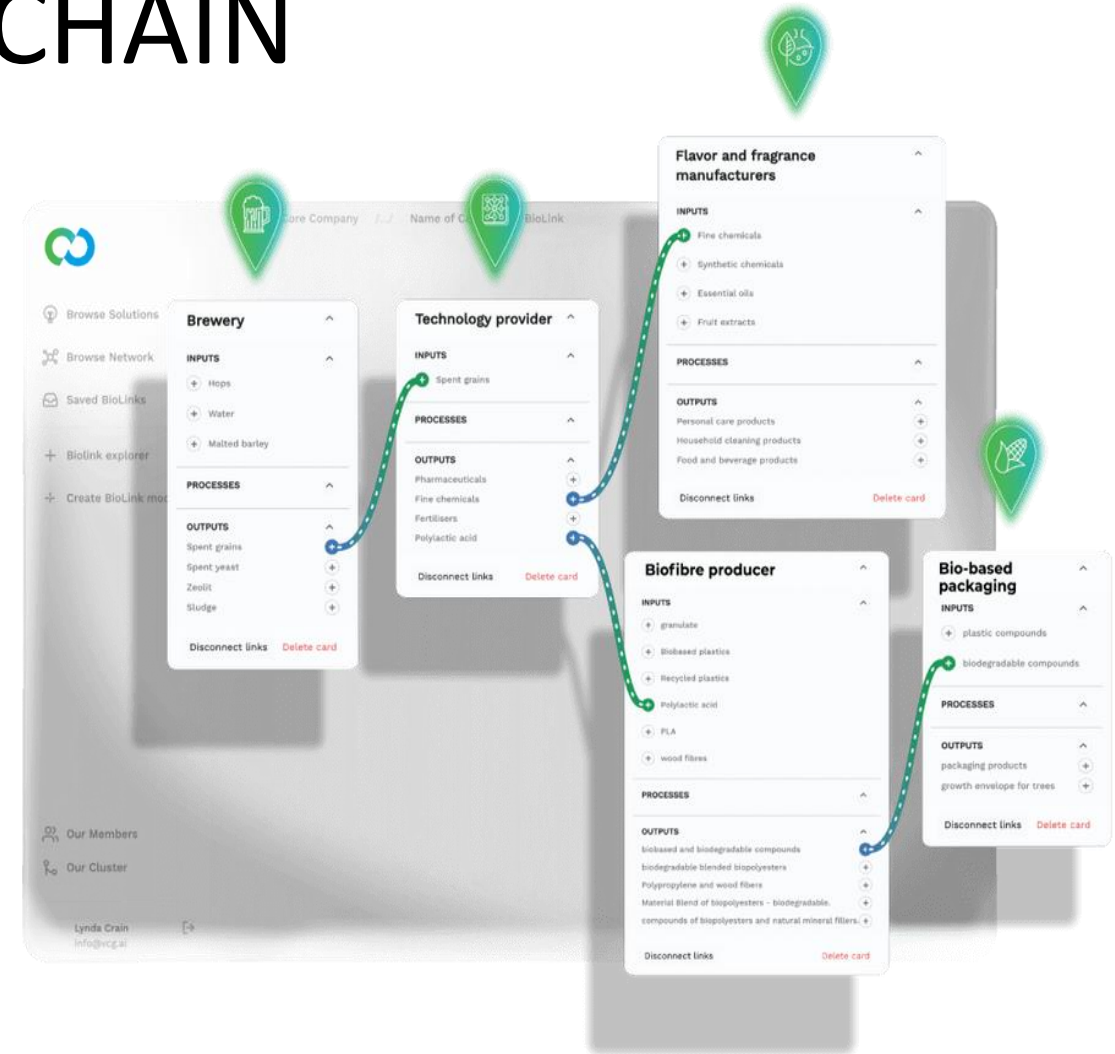
Mapped from VCG database (>13,000 existing EU bioeconomy facilities):

- **Incineration plants**
- **Fermentation facilities**
- **Biodiesel producers**



2nd PRIORITISED VALUE CHAIN

CORN COBS AND WOOD RESIDUES TO FURFURAL



Furfural – product overview



What is it? An organic chemical derived from hemicellulose (mainly pentose sugars like xylose) present in agricultural and forestry residues.



Main applications: Production of resins, adhesives, solvents, lubricants, pharmaceuticals, agrochemicals, and bioplastics.



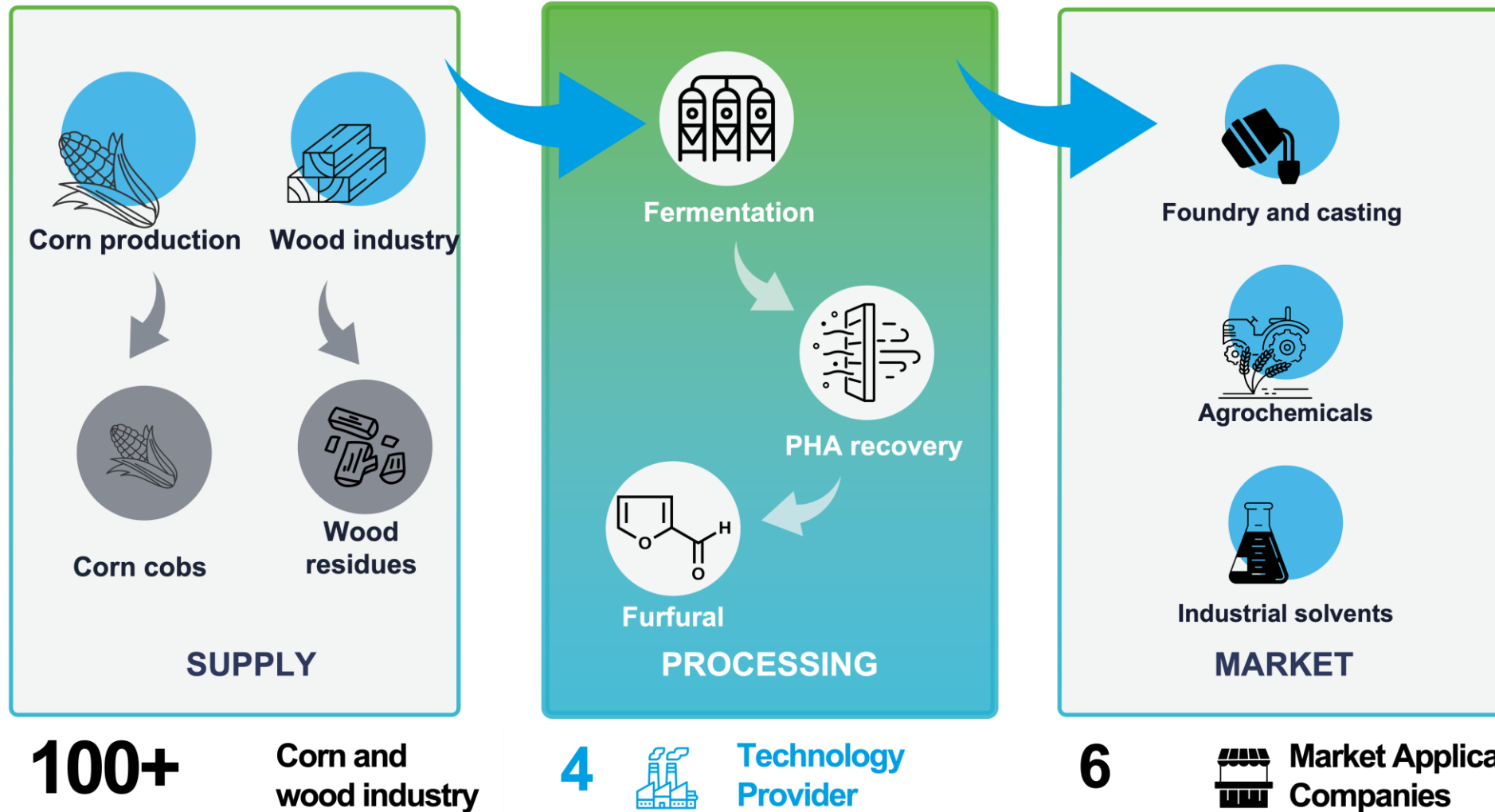
Circular potential: Platform chemical – acts as an intermediate building block for various specialty chemicals.



High market potential in diverse industries (chemical, pharmaceutical, food, agriculture).



Bio-based Furfural Value Chain In Austria



Regional partnerships – Feedstock and market demand

100+

Biomass Producers

RiSE Holz, Holz Huber, Sägewerk Greiler, Planegger Holz. Samonig Sägewerk und Holzhandel, Sägewerk und Holzhandel Steinbauer Hermann, Ferdinand Schuster, Holz Granitzer, Winterholz Sägewerk, Johann Offner Holzindustrie, Reiter Bioholz & Sägewerk

4

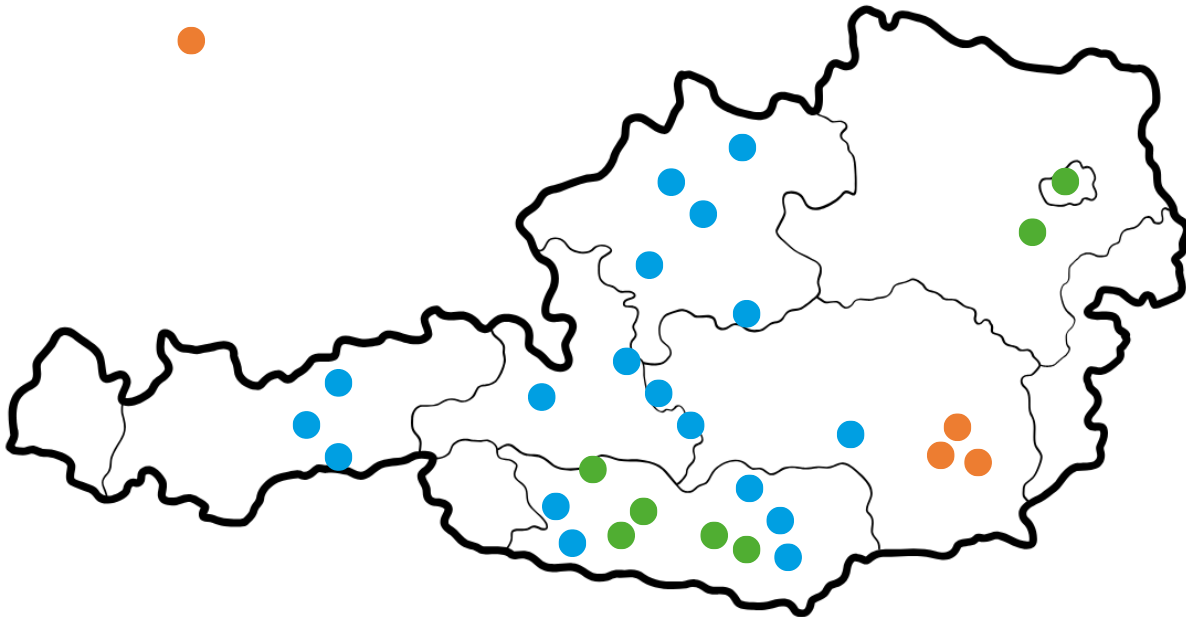
Technology Providers

Andritz AG, Kanzler Verfahrenstechnik GmbH (KVT), BDI-Bioenergy International GmbH, Rieckermann GmbH

6

Market Application Companies

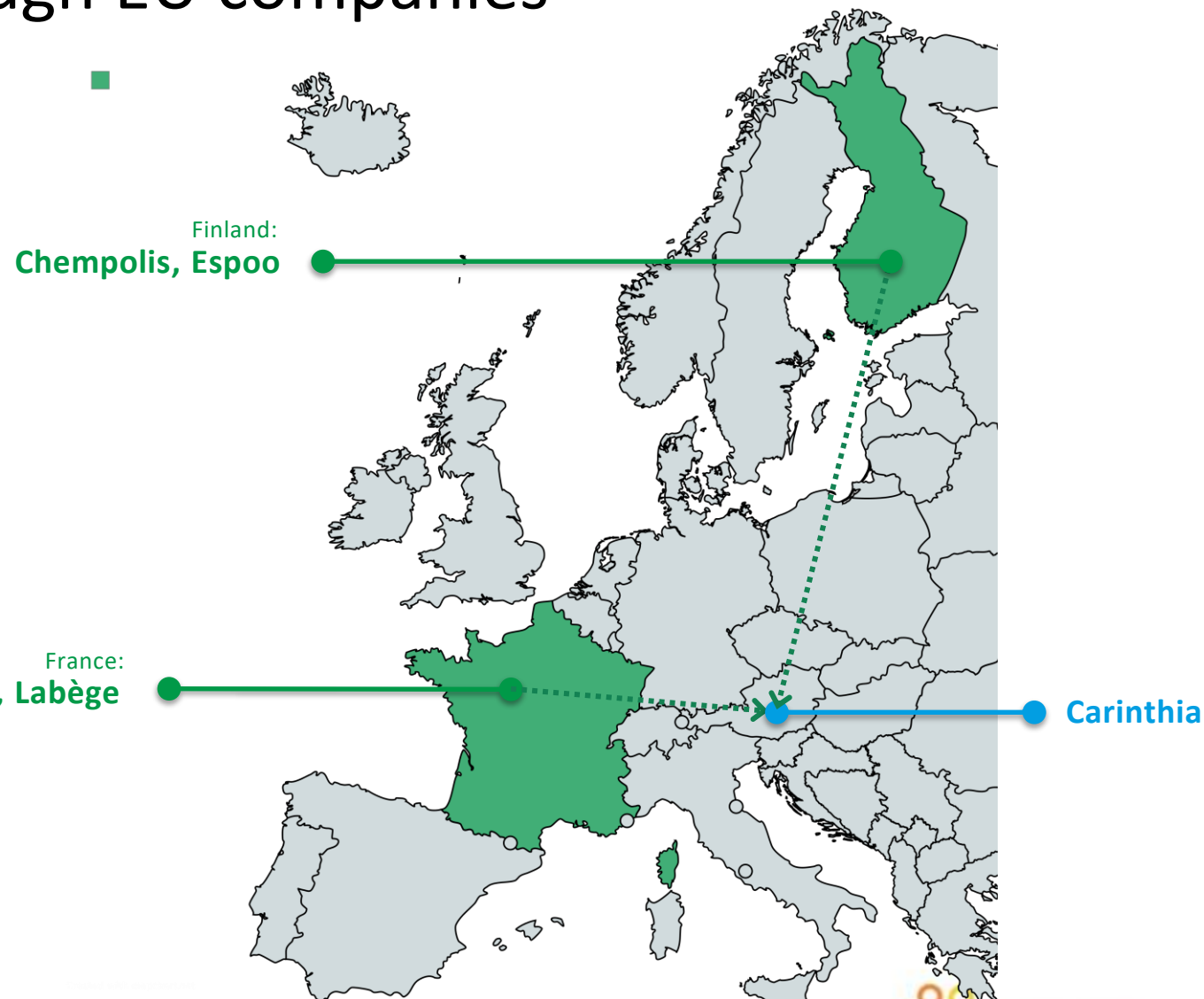
Univar Solutions Austria, Brenntag Österreich, Foseco, ASK Chemicals, Akdeniz Chemson, DonauChem



Filling technology gaps through EU companies

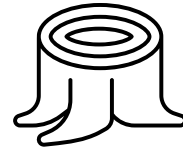
Creating international value chains and bringing innovation to Carinthia.

Companies providing Hydrolysis processes in Europe that could be eligible for a tech transfer to Carinthia

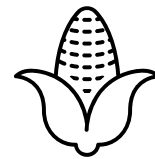


Biomass Availability Carinthia Region

1,1 million tonnes
of wood residues in Carinthia



21 thousand tonnes
of corn residues in Carinthia



By adopting a multi-feedstock strategy - co-processing corn cobs alongside wood residues - you maximise feedstock availability year-round and hedge against seasonal or price fluctuations in any single biomass source.



Viable Technology Routes

Furfural Production

- **Technology:** Acid hydrolysis, catalytic systems, solvent-thermal conversion (commercially mature)
- **Established industrial processes:** widely used in specialty chemical manufacturing globally (resins, adhesives, solvents).



Existing Infrastructure Overlaps

Moderate to high competition: The competition for wood biomass in Carinthia is relatively strong, particularly from the bioenergy industry. Bioenergy plants are well-established and generally offer attractive pricing for farmers, leading to stable supply chains.

Obstacles: Corn cobs lack collection and transport systems. No local acid-resistant chemical storage or handling facilities for furfural.

The sheer volume (approx. **1,1 million tonnes/year**) of wood residues produced in Carinthia implies substantial surplus capacity, especially in rural or isolated areas that might not currently be fully exploited.



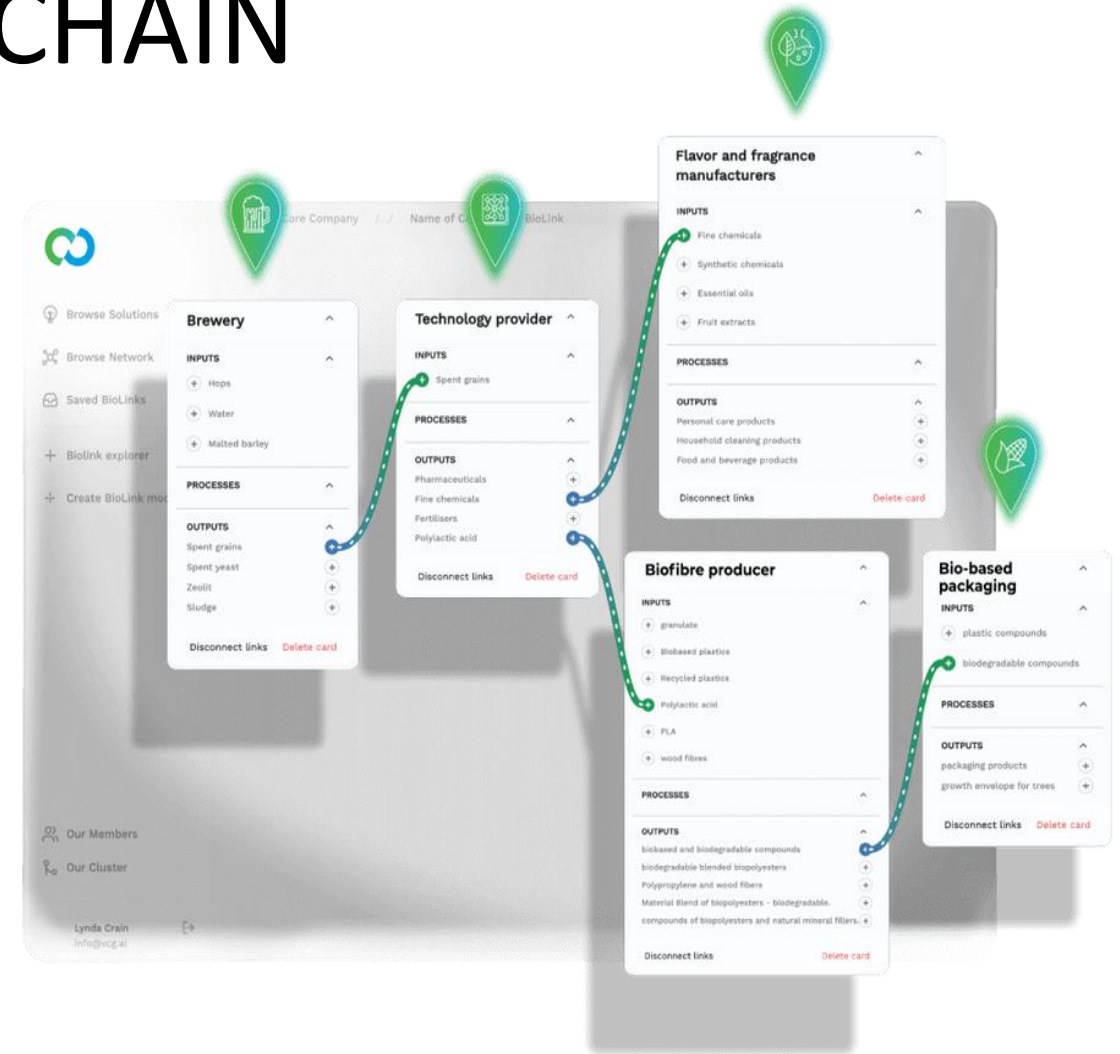
Conclusion

Value Chain	Feedstock Availability	Tech Maturity	Market Integration	Infrastructure Overlap
Furfural	Very High	High	High	Moderate to High



2nd PRIORITISED VALUE CHAIN

SOYBEAN MEAL TO GLYCEROL



Glycerol (Glycerine) – product overview

What is Glycerol?

- A versatile sugar alcohol used widely in industries such as cosmetics, pharmaceuticals, food, chemical intermediates, and biofuels.
- Appears as a clear, odorless, viscous liquid.

Applications:

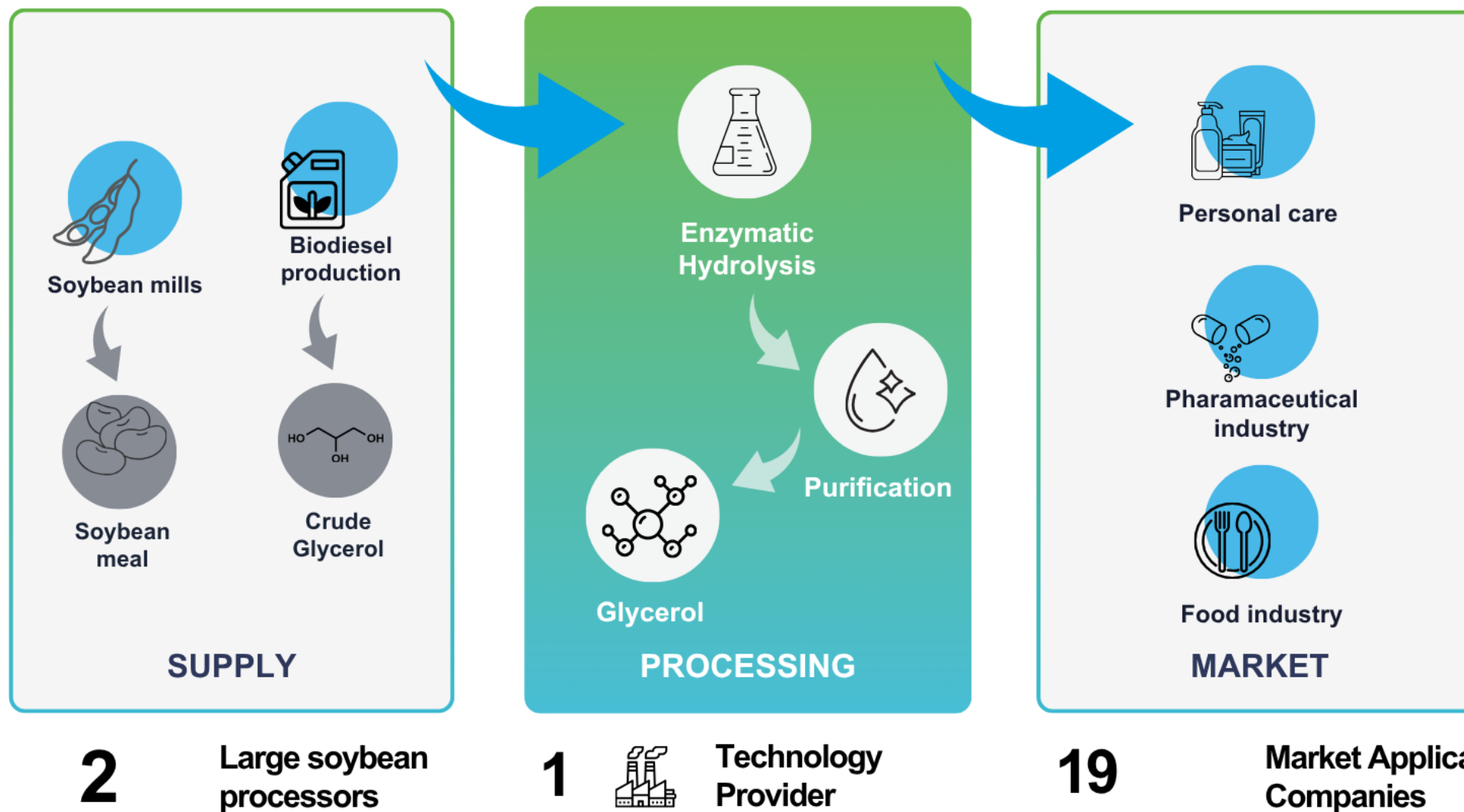
- Food industry (sweeteners, humectants, preservatives)
- Cosmetics and personal care (moisturizers, soaps, lotions)
- Pharmaceuticals (solvents, excipients, ointments)
- Bio-based chemical intermediates (biofuels, propylene glycol, epichlorohydrin)

Circular potential:

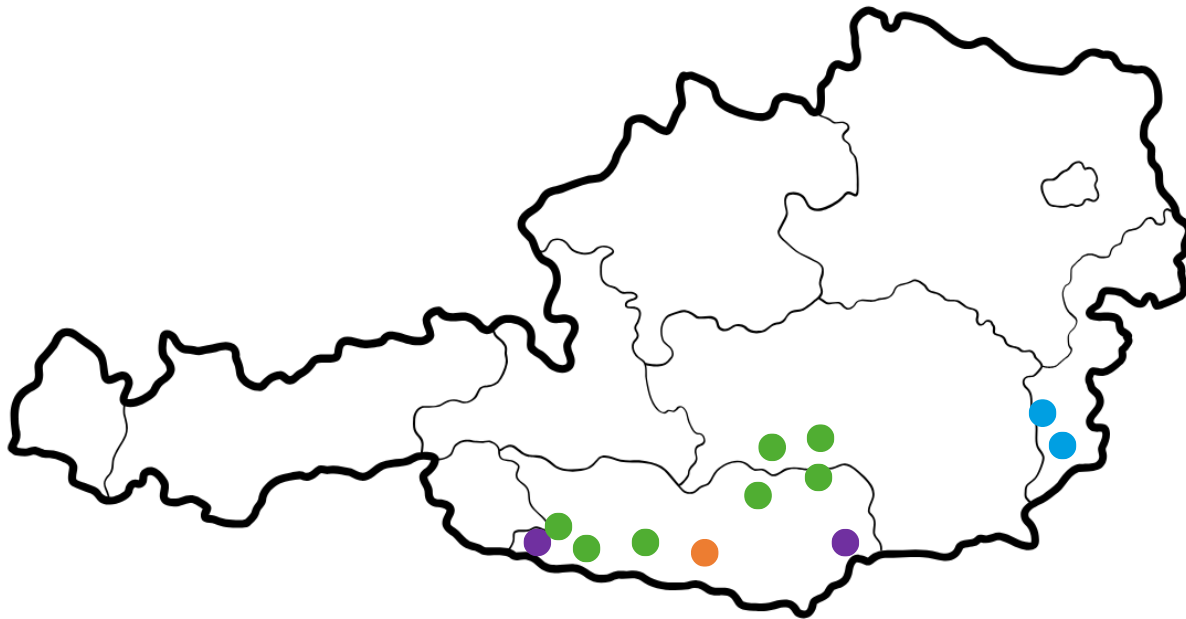
- Important intermediate in the circular bioeconomy, providing sustainable and renewable chemical alternatives.



BIO-BASED GLYCEROL VALUE CHAIN IN CARINTHIA



Regional partnerships – Feedstock and market demand



2

Large soybean mills

SOM Soja Ölmühle
BAG Ölmühle BetriebsgmbH

2

Biodiesel plants

Biodiesel Kärnten
BIO-OIL Group

1

Technology Provider

Unser Lagerhaus

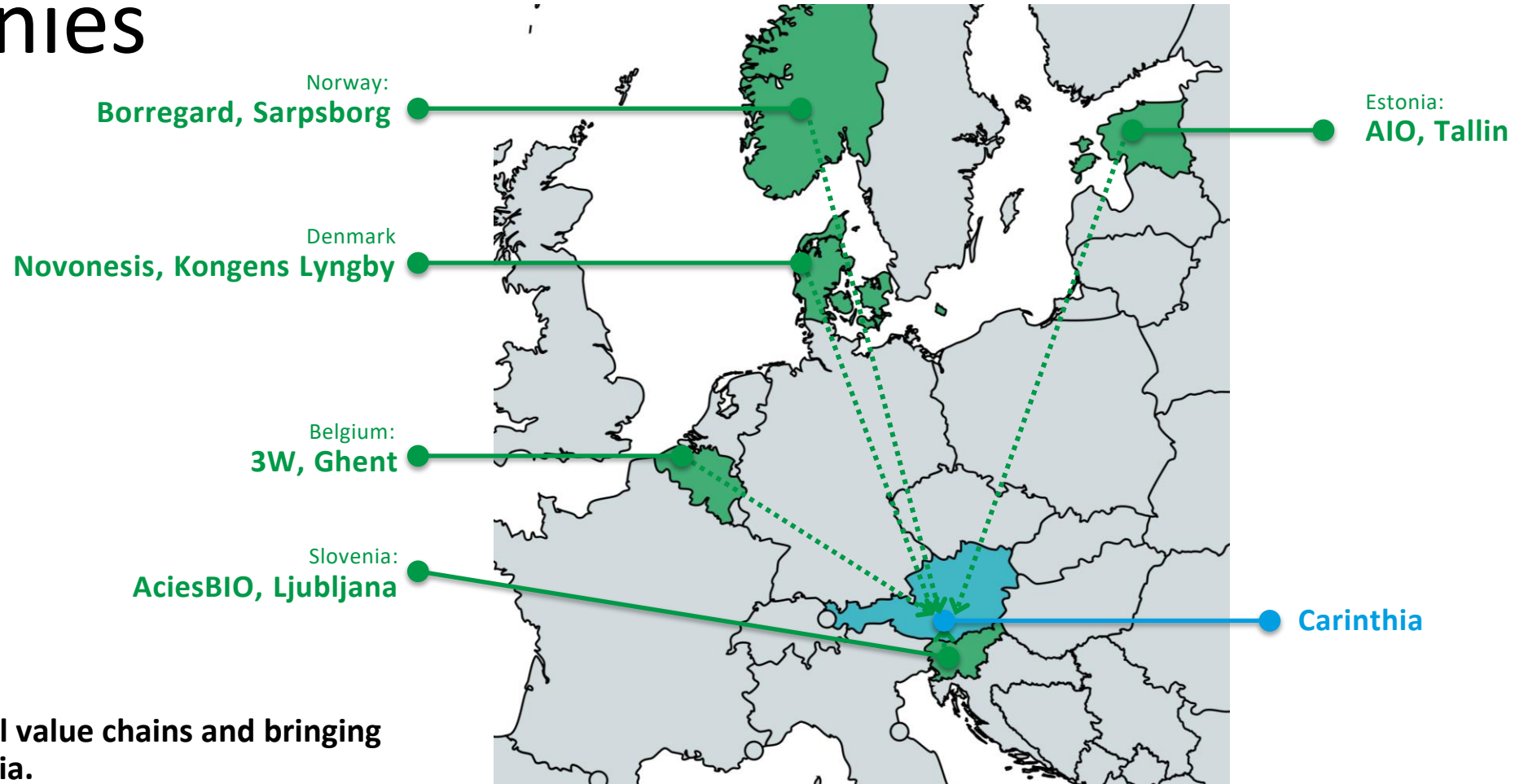
15

Market Application Companies

Akdeniz Chemson, Treibacher Industrie, Tribotecc, HOS-Technik, DonauChem GmbH, Elox GmbH, Hermes Pharma, Bioenergie Kärnten, SAUBERMACHER, Pre Zero Polymers GmbH, SynCycle Operations GmbH, KRM GmbH, Mondi Frantschach GmbH, Fundermax



Filling technology gaps through EU companies

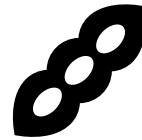


Creating international value chains and bringing innovation to Carinthia.

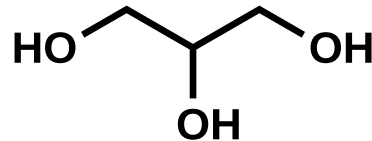


Feedstock Availability

104.000 tonnes
of soybean meal per year



5.600 tonnes
of glycerol generated through bioethanol
and biodiesel plants



The numbers represent a viable opportunity to bring a glycerol value chain to life

Sources: SYMBIO project, VCG.AI



Funded by the European Union Grant
Agreement No 101135166



Viability Technology Routes

Glycerol Production

- **Technology:**
 - From soybean meal: hydrolysis → saccharification
 - From biodiesel plants: Biodiesel production via transesterification, glycerol as a by-product
- **Mature, established technology:** Biofuel industry (biodiesel plants) widely uses transesterification technology. Hydrolysis is TRL 9.



Existing Infrastructure Overlaps

Medium to high overlap: While soybean meal faces no significant alternative uses outside animal feed, there is strong competition among domestic compound-feed producers and livestock sectors

Recommended actions: Offer a price premium or shared logistics cost in exchange for guaranteed meal deliveries.



Conclusion

Value Chain	Feedstock Availability	Tech Maturity	Market Integration	Infrastructure Overlap	EU Tech Gap Filling Opportunity
Glycerol	Medium to High	High	Very High	Medium to High	Enzymatic hydrolysis & biodiesel technology





Funded by the European Union Grant
Agreement No 101135166





vcg.ai[®]

VALUE CHAIN GENERATOR

**Let's accelerate the development
of the circular economy together!**

Contact Us

VCG.AI GmbH
Seyffer Strasse 34
70197 Stuttgart
Germany

Jon Goriup Dermastia

CEO VCG.AI

jon@vcg.ai

LI: /jongoriupdermastia

