



Biomanufacturing in Europe

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Dr. Klaus Pellengahr, Corden BioChem

OUR LOCATION

Welcome to Corden BioChem!



Serving our worldwide customers
from the heart of Europe

- 📍 **Berlin, Germany**
- 📍 **Frankfurt Höchst, Germany**
- 📍 **Podari, Romania**

🏭 One of Europe's largest CDMOs in Industrial Biotechnology

OUR SERVICES

Serving a Diverse Product Range



Food & Beverages

Biomass, Proteins,
Flavors



Materials

Biomass,
Biobased Chemicals



Health Ingredients

Nutraceuticals,
Antioxidants



Agriculture & Feed

Biofertilizers,
Feed additives



Animal Personal & Household Care

Bioactive ingredients,
Biosurfactants

OUR SERVICES

Development



Process optimization with large-scale in mind.

- ⊕ Rapid Onboarding & Tech Transfer
- ⊕ Piloting of Fermentation and DSP
- ⊕ Scalable Process Development

🏭 0,5 L – 3,000 L

📍 Berlin and Frankfurt

OUR SERVICES

Upscaling



Accelerating your transition from pilot scale to market.

- ⊕ Efficient Upscaling
- ⊕ Collaborative Optimization
- ⊕ Demonstration Batches

🏭 3,000 – 120.000 L

📍 Frankfurt


OUR SERVICES

Manufacturing



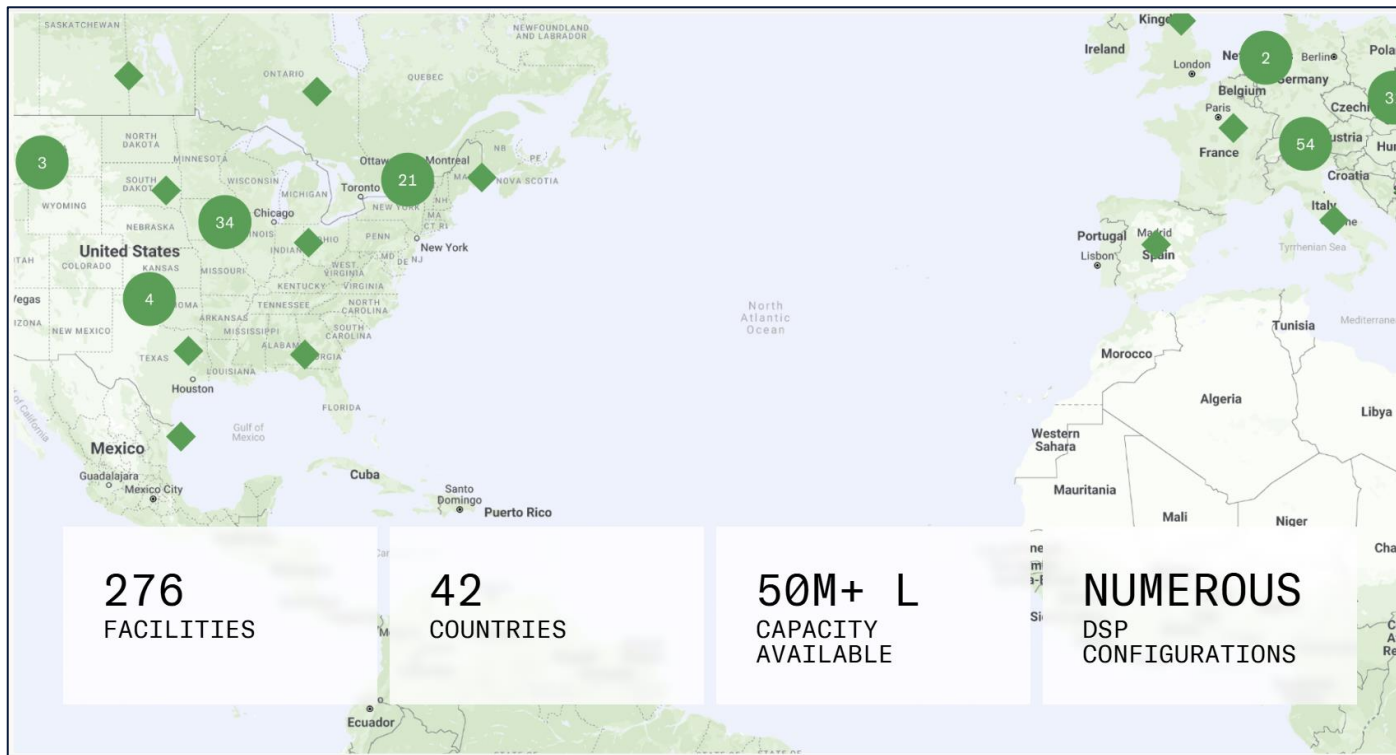
Economy of scale for cost-competitive products.

- + Extensive USP & DSP Capacity
- + Flexible Business Models
- + Continuous Optimization

 120.000 – 300.000 L (aerobic)
up to 2.000.000 L (anerobic, Podari)

 Frankfurt and Podari

“Capacitor” database – fermentation capacity



➤ Volumes (liter)

- Europe: 34.2 m
- Americas: 14.3 m
- APAC: 1.8 m

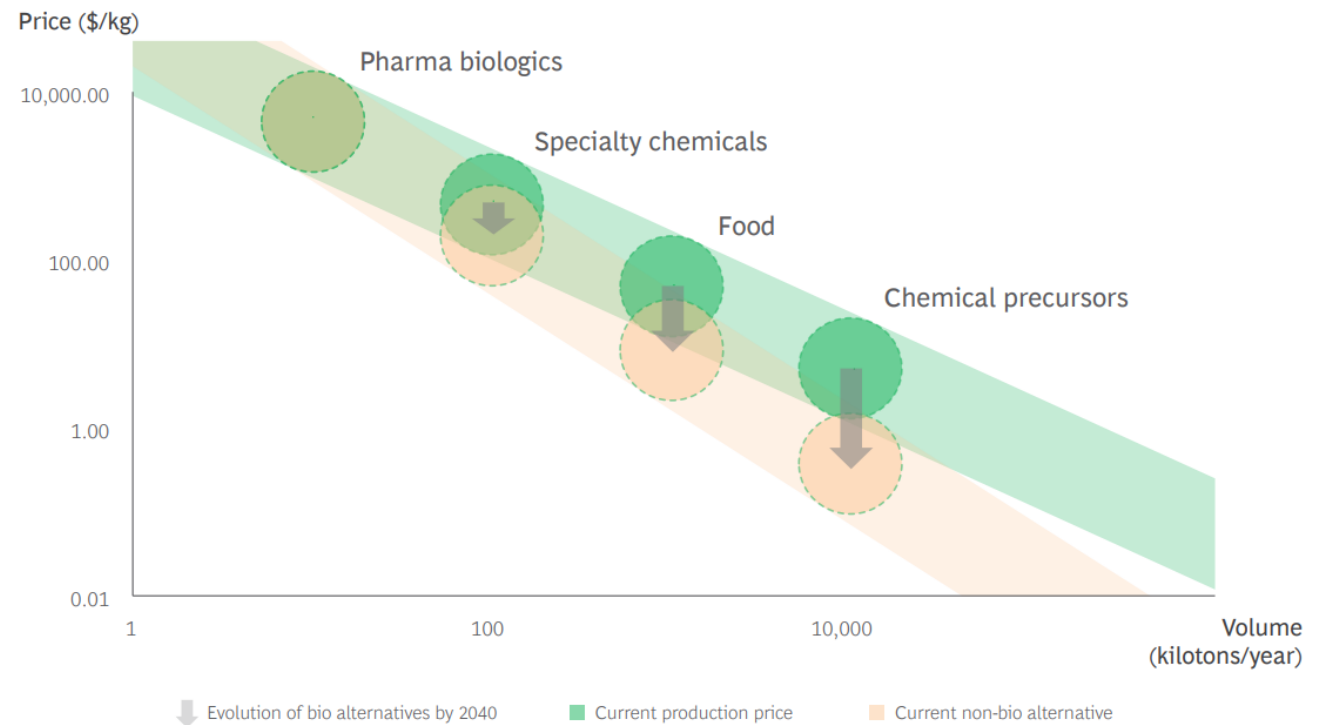
➤ Sizes:

- focus on bench and pilot scale, few facilities focusing on demo and commercial scale operations
- only 20 facilities with tanks greater than 100,000-liters for true commercial operations

Cost structure of Biomanufacturing



Exhibit 6 - Potential Biomanufacturing Development Toward 2040

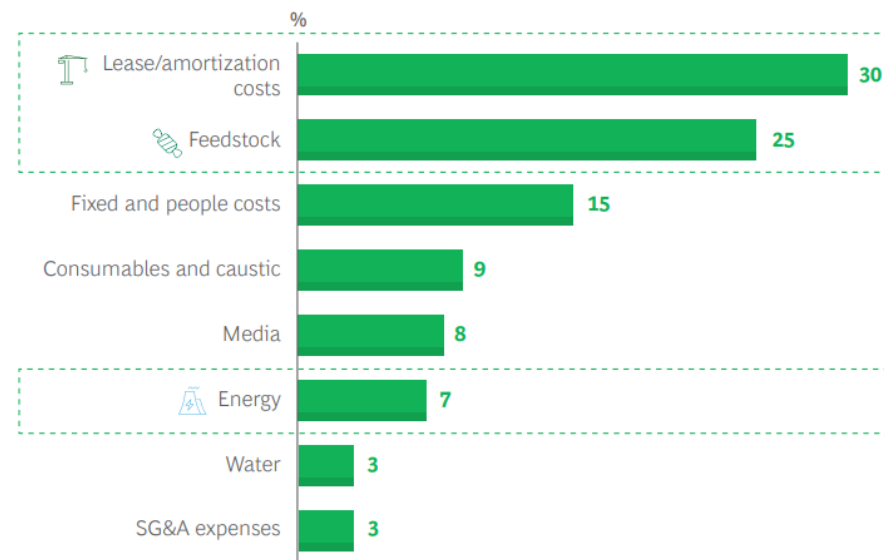


Source: BCG analysis.

Cost structure of Biomanufacturing



Exhibit 10 - Feedstock, Energy, and Leasing Costs Jeopardize Europe's Ability to Compete



Europe has more constraining permitting laws and higher construction costs

Feedstock costs in Europe are twice the global average per kg, owing to CAP regulations on sugar and lower availability

Energy costs per megawatt in Europe are twice the global average

Sources: Synonym analysis; BCG analysis.

Note: CAP = common agricultural policy.

Biomanufacturing - way forward

R&D

- High-yield & robust strains for scaling (“producibility”)
- Development with “the end in mind” - media, process conditions, DSP process, etc.
- Standardization of processes – efficient use of prod. Facilities
- Alternative feedstock potential?

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Piloting & Upscaling

- Quick iterations: testing of candidate strains under production-relevant conditions
- Optimization of mass transfers, cooling systems etc.
- Opportunities for by-product valorizations, water recycling?
- Potential for automation?

Biomanufacturing - way forward

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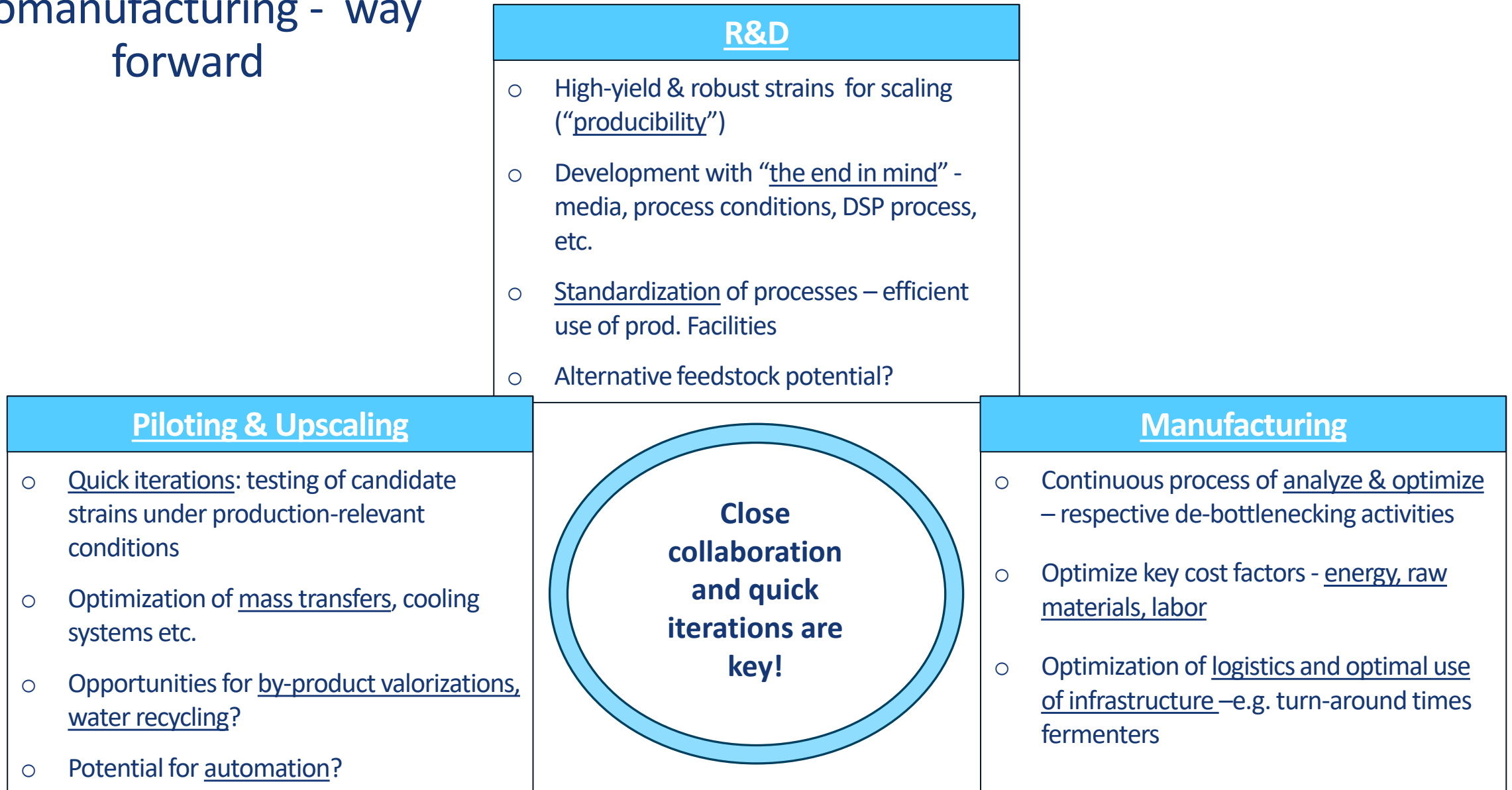
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Manufacturing

- Continuous process of analyze & optimize – respective de-bottlenecking activities
- Optimize key cost factors - energy, raw materials, labor
- Optimization of logistics and optimal use of infrastructure –e.g. turn-around times fermenters

Biomanufacturing - way forward



Dr. Klaus Pellengahr

Managing Director

Corden BioChem International GmbH

Brüningstraße 50
65929 Frankfurt am Main
Germany

M: +49 (0) 162 6715857

E: Klaus.Pellengahr@cordenbiochem.com

Corden BioChem

Your Organism. Your Process. Your Product.

OUR EXPERTISE. OUR CAPACITY.

