Upscaling of Bio-Processes: Developments and Plans at the BioCampus Straubing
Challenge for Industrial Biotech: Bridging the Valley of Death

Sources: Physics World, 2014; BioMotiv, 2018
Our Contribution: Open-Access Scale-up Infrastructure

- Ernst & Young study: Bavarian biotech industry needs multi-purpose, open-access, scale-up infrastructure
- Start of project development with location in port of Straubing in late 2015
- Market demand and technical studies by Bavarian Ministry of Economy
- Analysis of market demand worldwide
- Benchmarking of comparable infrastructure in Europe
- USP assessment / technical design
Goals & Framework Conditions

- **One-stop-shop** offer for verified needs of start-ups, SME & TNCs, as well as research institutions

- **Portfolio:** validation of processes, scale-up tests, product samples along entire process chain in relevant scale (TRL > 5)

- **Non-commercial but professional service:** public ownership and operation, professional staff, option to integrate client staff, highest IP security, no IP claims by owner/operator

- **Partnering** with professional, proximate partners to supplement own services

- **Investment budget:** 40 Mio. € dedicated for construction secured in Bavarian household
Basic Concept Process Equipment

Pretreatment
- Dimension up to 200 kg lignocellulosic material/hour
- Grinding, sieving, pulping
- Mechanical, chemical, enzymatical treatment
- Extraction and solid/liquid-fractioning
- Optional: solvents

Reaction
- From 20 l up to > 25 m³, stirred tank reactors
- Fermentation and enzymatical reaction
- Optional: cell disruption
- Conventional separation (filterpress, membrane technologies, separators)
- Mixing & feeding & inactivation tanks

Downstream-Processing
- Processing up to 10 m³ reaction volume
- Extraction/precipitation/cristallisation/chromatography
- Separation processes (liquid/solid, liquid/liquid, membrane technologies)
- Evaporation, drying
- Packaging
Realization Strategy

• Decision on initial equipment for dedicated customers

• Fixed (permanently installed, e.g. large fermenters, tanks) & flexible (mobile, e.g. separators, purification) units

• Ensure building & technical infrastructure with option to retrofit installed equipment and to use rental devices

• Retrofitting of equipment starting with launch (e.g. specific public projects, alternative financing options)

• Integration of demoplant in overall development strategy – esp. combination with Technology- & Start-up Center
Location: Danube port Straubing-Sand

Profile specific: thematic focus on biobased economy, sustainability and industrial biotech in the region

Profile specific: Large port area and industrial plots
Synergy: Technology- & Start-up Center

44 companies with 160 employees
4,000 m² offices, labs & workshops
Extension planned for 2021
Integration Demoplant on BioCampus (Draft)

- **Clariant Demoplant „sunliquid“** (existing)
- **Multi purpose Plant on BioCampus** (planned)
- **BioCampus 6 ha plots for biobased companies**
- **Extension Start-up Centre (labs & offices)** (planned)
- **Start-up Centre & BioCubator** (existing)
Schedule:

Demoplant & Extension Tech & Start-up Center

- Application funding demoplant
- Final approval funding demoplant
- BC2 funding in suppl. Budget BY
- Application funding ext. TSC
- Contracting engineering demoplant
- Final approval funding ext. TSC
- Contracting planning ext. TSC
- Construction start demoplant
- Construction start TSC
- Commissioning demoplant
- Finalization investment demoplant
- Opening BC2

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The R&D&E Ecosystem Straubing: Excellence for Biobased Economy in Bavaria

Science and applied research in the city of Straubing:
Focussing on biotech, carbon usage, circular economy and sustainability

Innovation transfer in the port:
Networking know-how,
Start-up culture & infrastructure,
technical infrastructure

TUM CS, Fraunhofer BioCat

BioCampus & partners

Biobased companies

Biobased companies
Regional to global, start-up to TNC
Backup
Contact

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Public owner & operator

- **HAFEN STRAUBING-SAND**
  - Public Shareholders
    - Stadt Straubing
    - Straubing-Bogen
    - Gemeinde Aiterhofen
- Zweckverband Hafen Straubing-Sand
- Hafen Straubing-Sand GmbH
- BioCampus Straubing GmbH
Current activities ZVH (autmn 2019)

✓ Finalization funding & state aid modalities in cooperation w/ authorities

✓ Finalization business plan & funding model incl. customer stress-test

✓ Application submission to ministry

✓ Validation of process engineering & equipment of 3 modules w/ engineering firms

✓ Recruiting technical staff

✓ Accompanying activities, e.g. development marketing strategy
Where we want to go – A brief outlook

- Straubing as model region for industrial biotechnology & bioeconomy: innovation flagships, infrastructure, research projects, settlements, jobs, added value

- Completion of bioeconomy value chain: agriculture & forestry – academia & research – innovation & scale-up in SMEs & TNCs - marketable products & services

- Integration of inland waterway transport and the Danube region: generate added value in the Danube region - establish IWT as sustainable logistics option for bioeconomy
Lageplan – verfügbare Flächen

- **G1** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 15.860 m²; Zulässige Grundfläche: 10.950 m²
- **G2** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 34.450 m²; Zulässige Grundfläche: 24.115 m²
- **G3** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 15.980 m²; Zulässige Grundfläche: 11.185 m²
- **G4** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 10.700 m²; Zulässige Grundfläche: 7.490 m²
- **G5** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 5.790 m²; Zulässige Grundfläche: 4.050 m²
- **G6** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 10.680 m²; Zulässige Grundfläche: 7.475 m²
- **G7** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 1.450 m²; Zulässige Grundfläche: 1.015 m²
- **G8** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 42.375 m²; Zulässige Grundfläche: 29.660 m²
- **G9** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 12.700 m²; Zulässige Grundfläche: 8.890 m²
- **G10** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 13.435 m²; Zulässige Grundfläche: 9.400 m²
- **G11** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 90.025 m²; Zulässige Grundfläche: 63.017 m²
- **G12** – FH max: 15 m; GRZ – 0,7; Fläche des Baulandes: 6.990 m²; Zulässige Grundfläche: 4.895 m²
Lageplan physischer BioCampus
Potentielle Flächenzuordnung Umgebung TGZ

Idee:
Ausbildung südlicher Teil BioCampus als F&E&I-Areal mit TGZ einschl.
Erweiterungsstufen, Mehrzweckdemoanlage, Instituten, z.B. Fraunhofer

Grundstückszuordnung und Schnitt noch variabel/nicht verbindlich
Variante: Parkhaus zwischen TGZ und Demoanlage
Variante mit Demoanlage plus Erweiterung nord-östlich TGZ