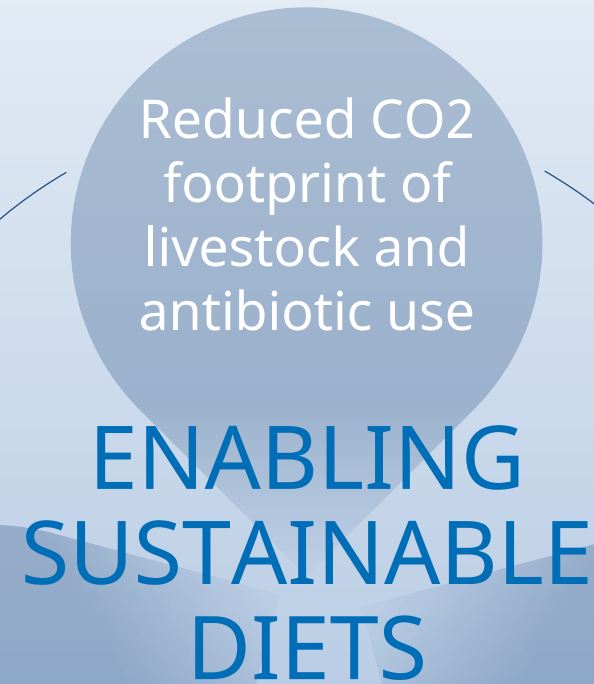


Smart & Lean Processing for Small-Scale Efficiency

Bridge2Food North America Summit
23rd October 2025, Lissy Frantzen

Sustainable Protein Supply



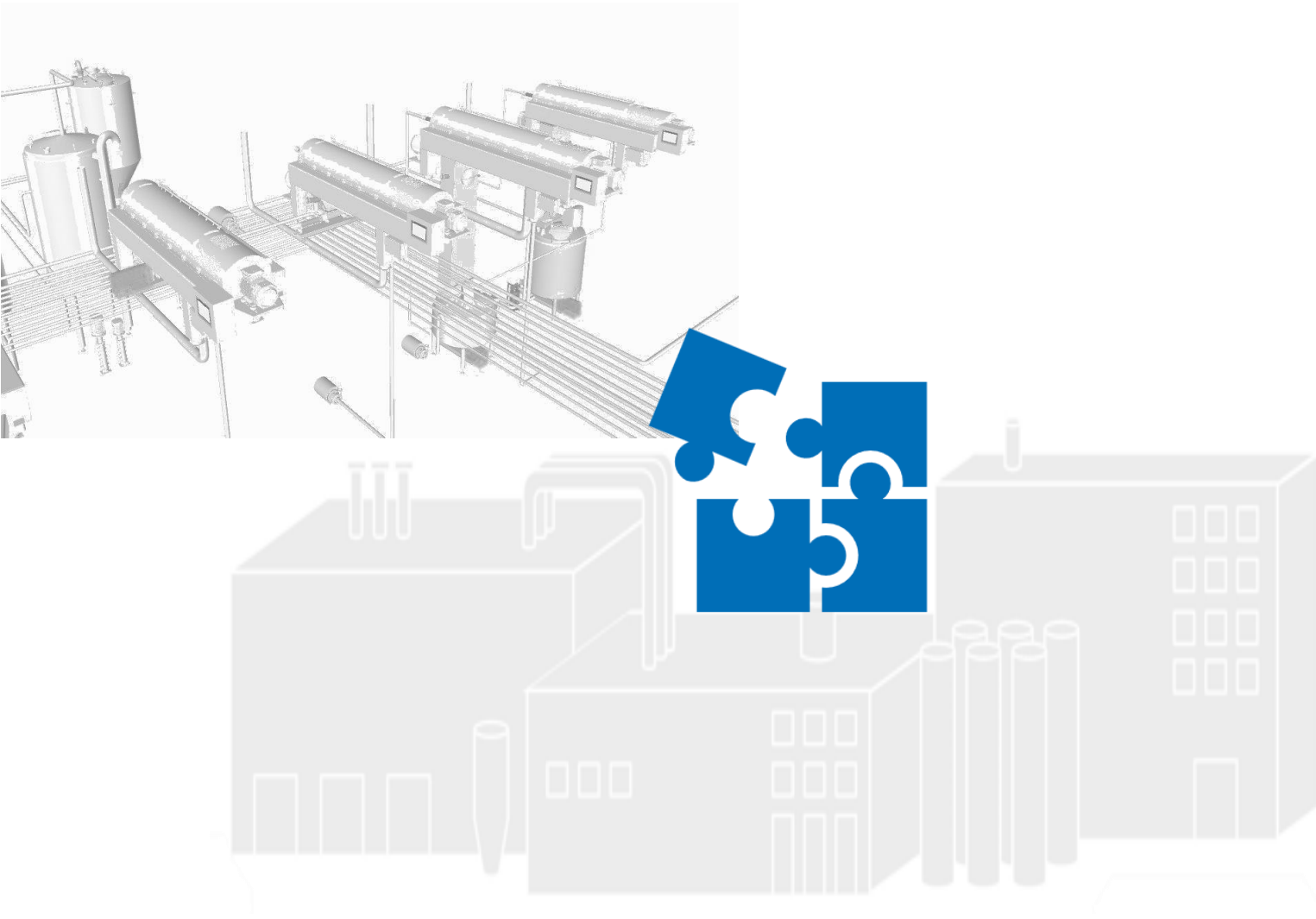
Challenges



of LARGE VOLUME GREENFIELD PLANTS

- High CapEx – Involvement of investors & banks
- Long timelines
- Technological complexity
- Dependence on raw materials in future
- Volatile market prices impacting planning & profitability
- Consumer acceptance of final B2C product
- Regulatory barriers & lengthy approval processes

Re-Action

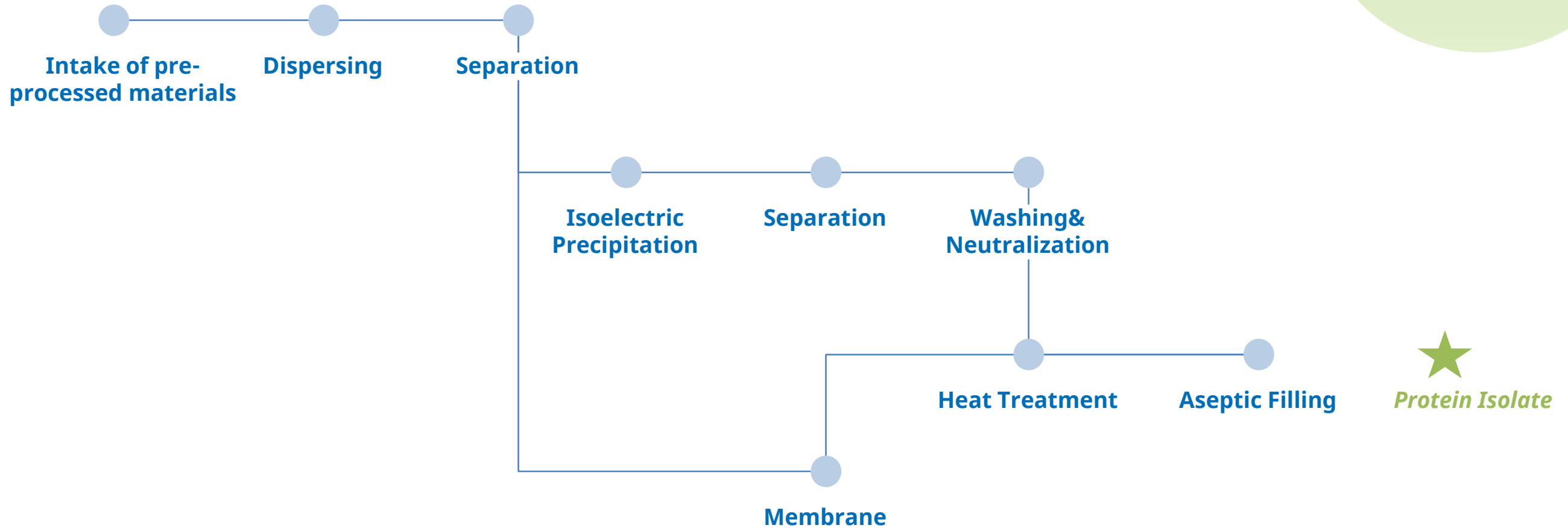


SMALL SCALE SOLUTIONS

- Process & Business Integration
- Reasonable CapEx
- Independency
- Quality Assurance

Lean Process

For varieties of
raw materials



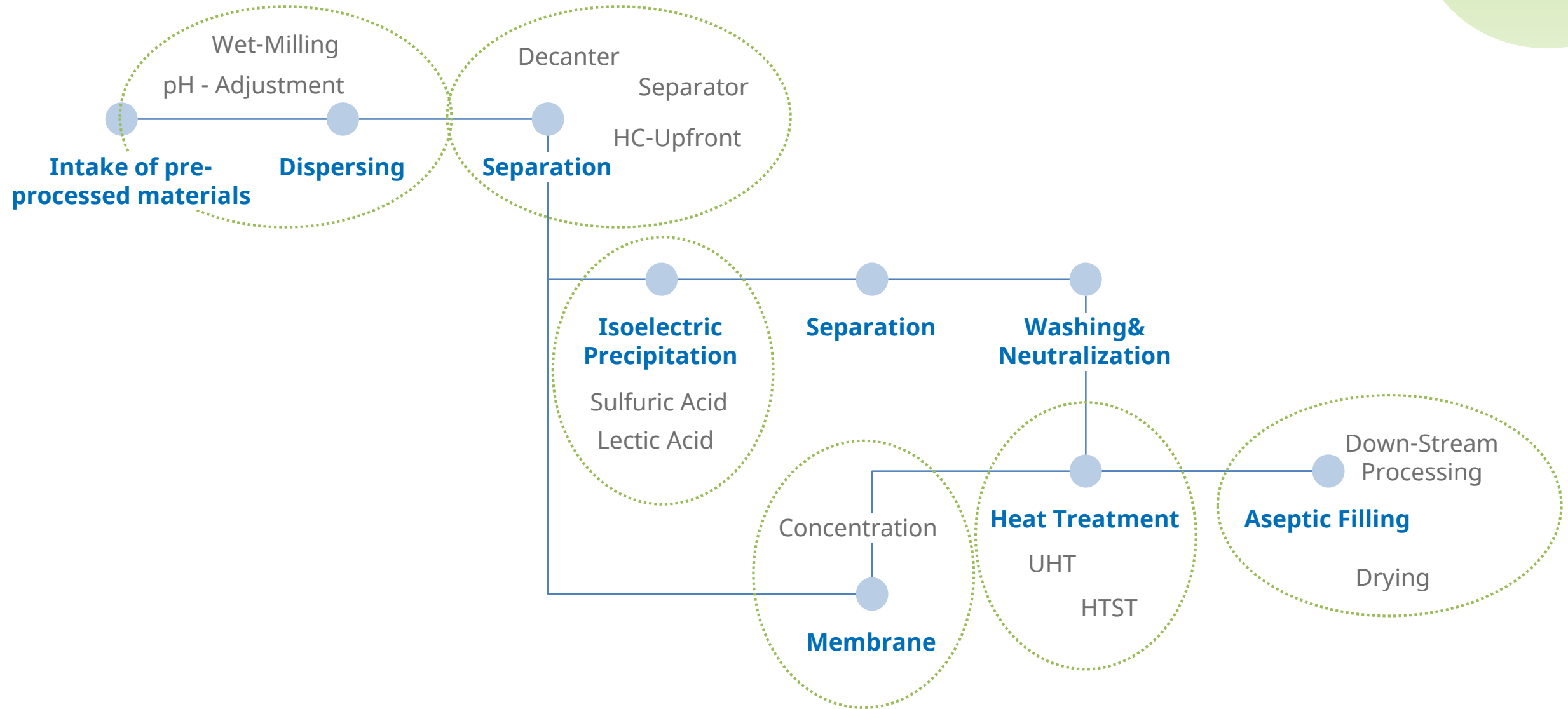
Applications



Customize the process according application requirements

Smart Process

Water Re-use



Side-Streams

STARCH & FIBER

3rd Party Solutions

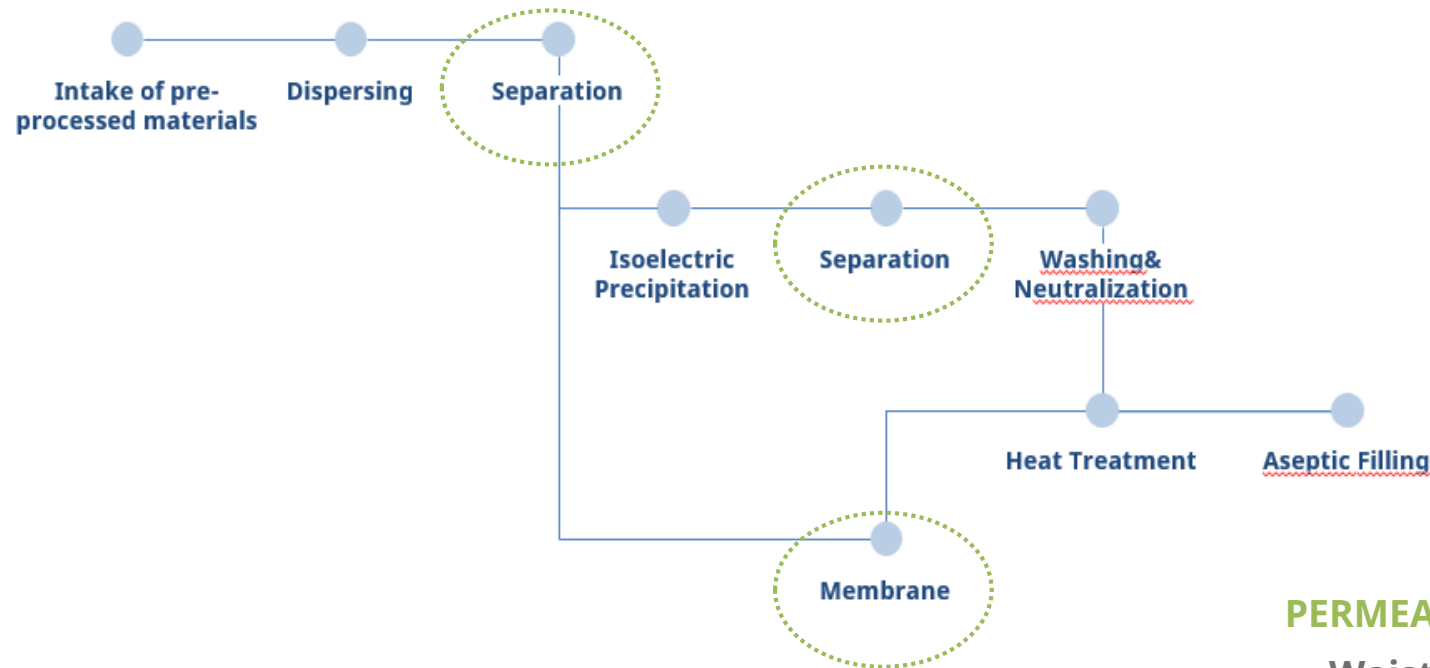
Bioethanol Biofuels | Biogas | Local Starch Plants

Drying

Mixed Powder for Special Market e.g. Pasta

Separation

Starch Milk | Bioethanol | Dried Starch & Fiber Pulp for Feed | Biogas | Dried Fibers



PERMEATE

Waist

RO

Water re-use

B-PROTEIN

Waist

3rd Party Solutions

Biogas | Local Potato Starch Plants

Heat Coagulation & Separation

Fermentation applications | Pet Food

Membrane Separation

Albumin recovery

Project Definition





ENGINEERING

- Covering different Engineering Stages
- Process Engineering
- Plant Engineering
- Piping Engineering
- Electrical Engineering
- Automation Engineering
- Risk Analyses
- Supporting Civil & Infrastructure Engineering

PROCUREMENT

- Procurement Schedule
- Requests for Quotation
- Bid Evaluation
- Bid Comparisons
- Technical Negotiations
- Preparing Technical Contract Documents
- Support Commercial Negotiations

CONSTRUCTION

- Supervision Assembly
- Commissioning
- Final Acceptance Tests

PROJECT MANAGEMENT

Interface coordination | Scheduling | Tracking Project Schedule | Cost Tracking | Project Documentation

About



ENGINEERING

From the 1st feasibility study to detail engineering

- Business Development
- Concept Verification
- Planning of new Systems & Processes
- Modification of Existing Plants
- Valorization of Side Streams
- Process Optimization

endeco is your engineering partner!



PLANT CONSTRUCTION

From individual units to complete customized systems

- Turnkey Solution
- Greenfield Projects
- General Contractor
- Installation and Commissioning
- Qualification Assurance

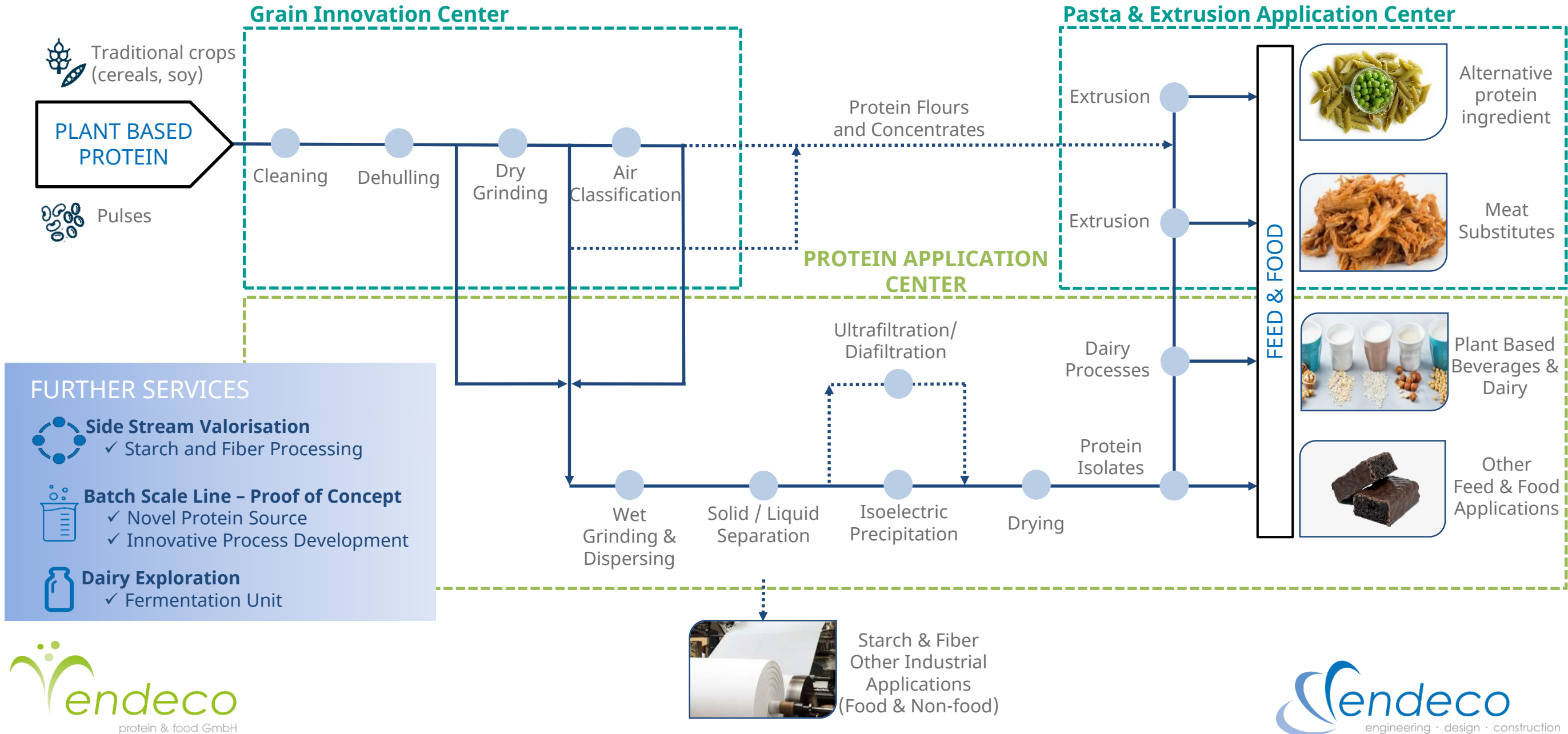
endeco is your partner for plant construction & turnkey solutions!

Protein Application Center

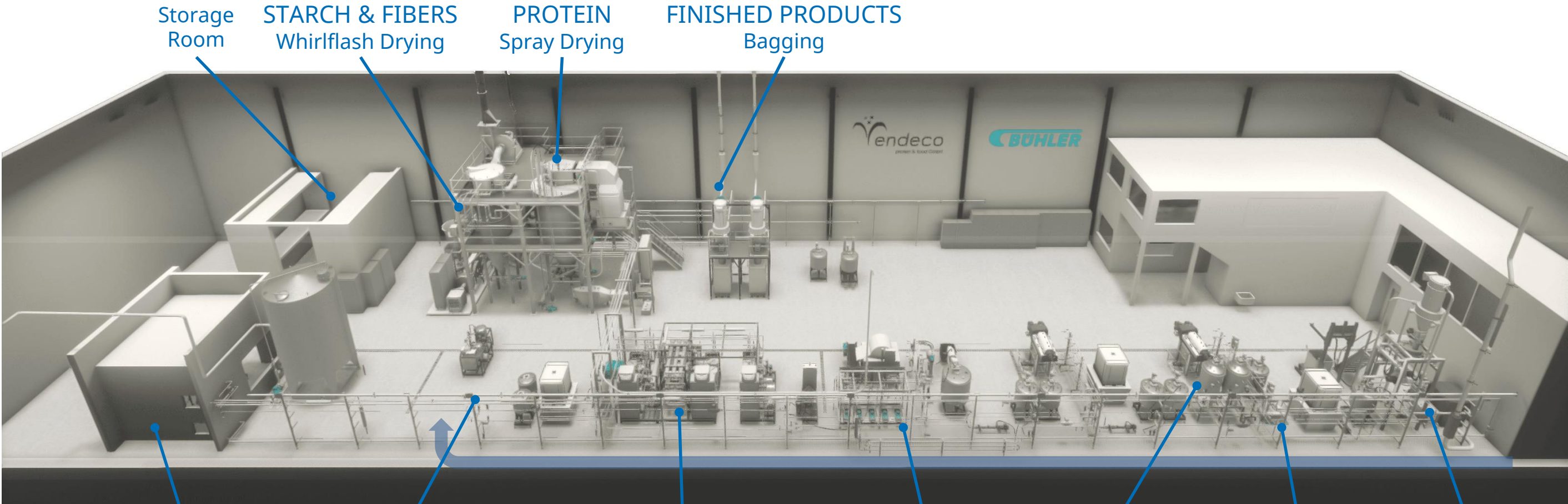
800m² of latest technology
in protein processing
> 10 technology solutions
> 15% CAGR for
alternative proteins



Application Centers along the Value Chain



Protein Application Center



Storage
Room

STARCH & FIBERS
Whirlflash Drying

PROTEIN
Spray Drying

FINISHED PRODUCTS
Bagging

CIP
room

BATCH PROCESSING
Proof of Concept
Side Stream Valorization
Dairy Processing

PROTEIN
Membran Separation
MF / UF / RO

STARCH & FIBERS
Separation
& Refining

PROTEIN
Centrifugal
Separation

RAW MATERIAL
Wet Grinding
& Dispersing

RAW
MATERIAL
Intake

Protein Application Center

1 – PROOF OF CONCEPT FOR YOUR IDEAS

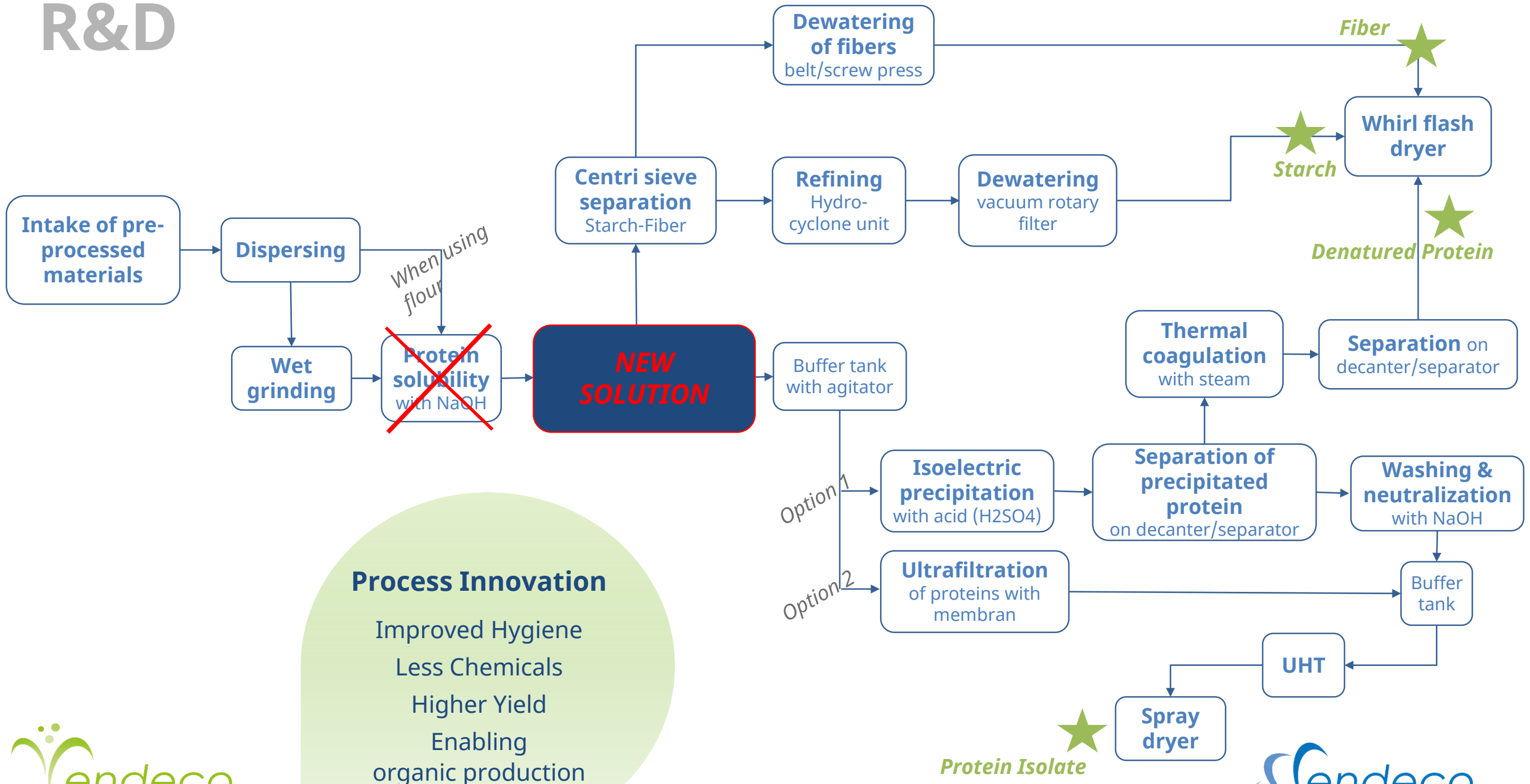
Batch scale line for protein isolate

- Feed around ~1 kg / h
- Batch scale processing for **highest flexibility**, e.g. membrane testing
- Including a **small scale extruder** for WetTex & DryTex production
- Additional equipment for **dairy alternatives** and **side stream valorization**
 - UHT unit
 - Homogenizer
 - Fermentation unit

2 – VALIDATE YOUR FUTURE PROCESS

Industrial processing line for proteins, starches & fibers

- Feed up to ~200 kg / h
or ~80 kg / h for pulse concentrates
- **Continuous** and **scalable** processing
- **High flexibility** in processing
- Plant design according to **food grade standards** (not food grade certified)
- Production of **considerable amounts** for further tests, e.g. in Extrusion Lab



Process Innovation

Improved Hygiene
Less Chemicals
Higher Yield
Enabling
organic production

Take aways

KEEP INNOVATING

BE PREPARED

STAY FLEXIBLE

COLLABORATE

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