# Let's Rethink Tomorrow and change the world together

novozymes®
Rethink Tomorrow

## Top lessons learned in delivering innovation to our customers…

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Sr. Mgr. of Process Innovation

# Novozymes in Numbers

**30+**
different industries

**24.7%**
EBIT margin

**700+**
products

**6,000+**
employees

**6,500+**
granted patents and pending patent

**50**
New products
In last 5 years

**48%**
MARKET SHARE
Within industrial enzymes

**DKK 11,746**
million sales

# Product Discovery through Production*

## Biotechnology Research (BTR)

- Protein Engineering
- High Throughput Screening

## Applied Discovery

- Assays
- Protein Chemistry
- Application tests
- Customer tests

## Development

- Strain development
- Pilot plant (SO)
- Safety/Toxicology
- Regulatory

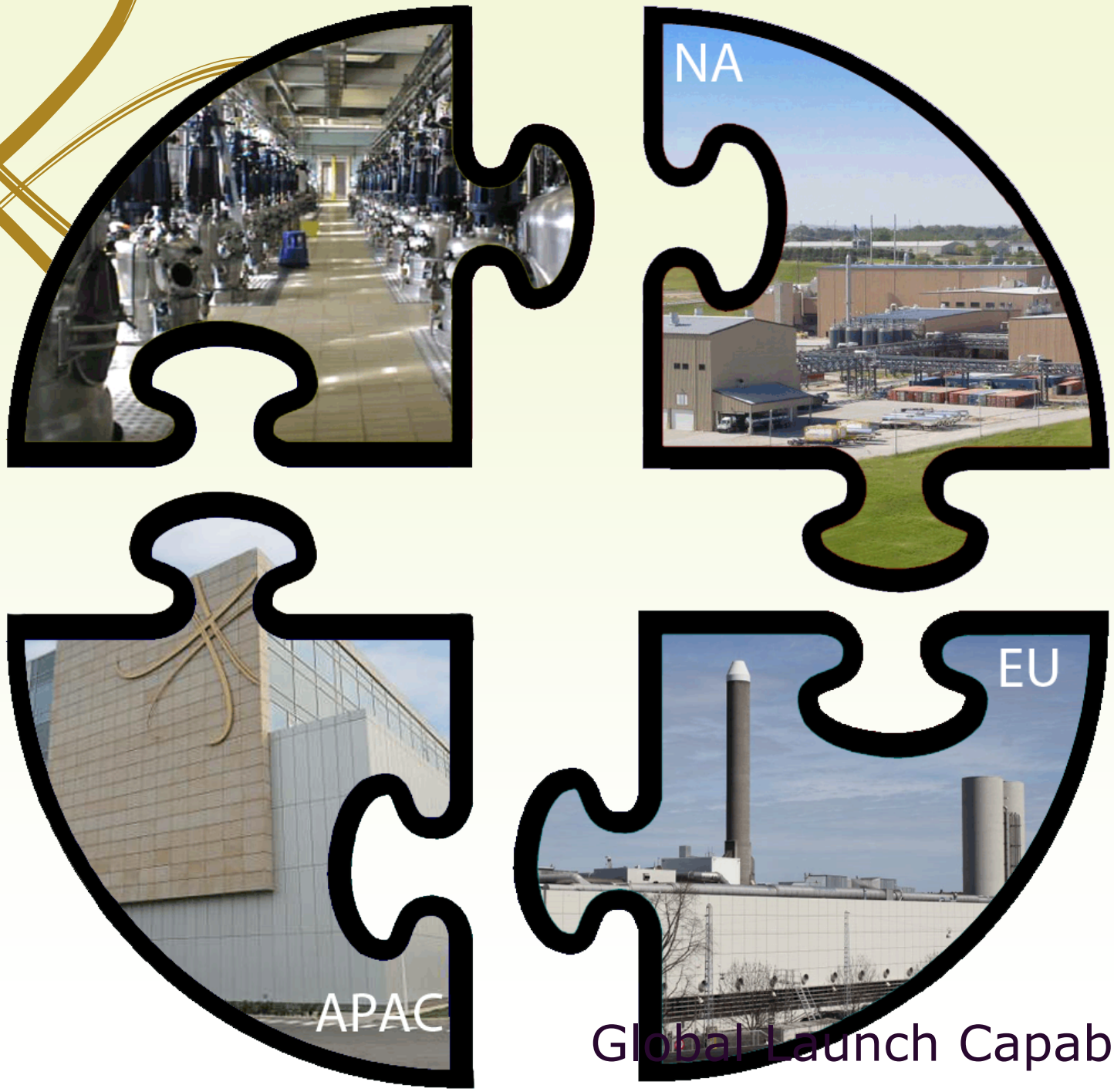
## Production

- Process/Product Qualification
- Customer Trials
- Daily Business
- Process Optimization

Business Development

Patents & Collaborations

** Illustrates a typical flow from Proof of Concept to Sales.*




Global Launch Capabilities

# One Set of Goals

Path to Product Commercialization involves many areas

System to define goals for areas and handover critical

Organizational support: Essential

Scientists → Lab technicians → Engineers → Operators

Development Managers → Manufacturing Managers


**Common goals for peer groups and commitment is critical**

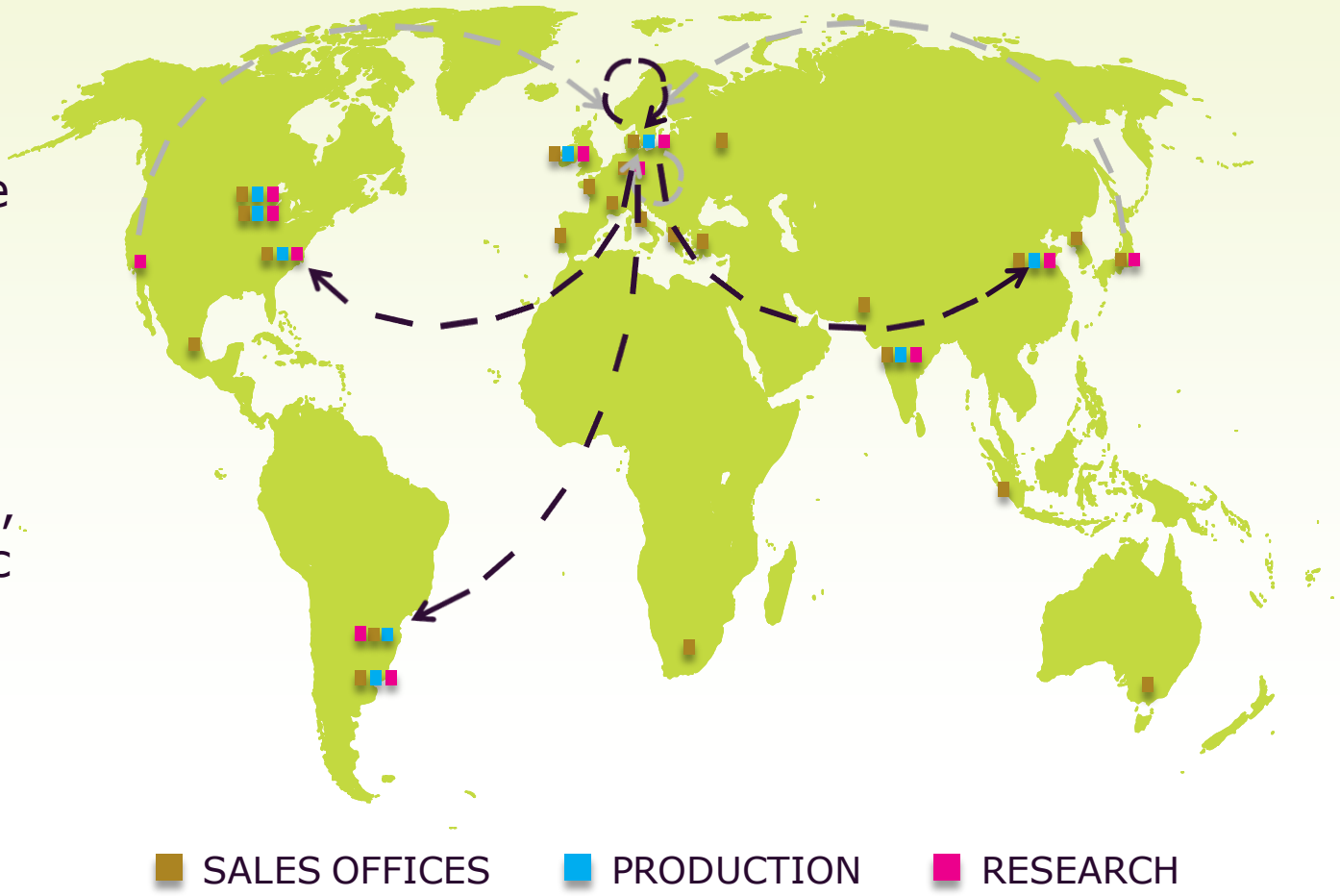
# Local Pilot Facilities are Critical

All major production sites have pilot facilities

Global marketplace drives multiple production sites

Every site has its local raw materials, and factory specific requirements

Requirement to deliver identical products to customers



# Minimize Risk and Cost in Product/Plant Development

Parallel projects:

- Develop the process
- Build the factory to produce it

Clearly define timelines and uncertainties for both processes

Identify path to best minimize risk/cost to manage uncertainties in process

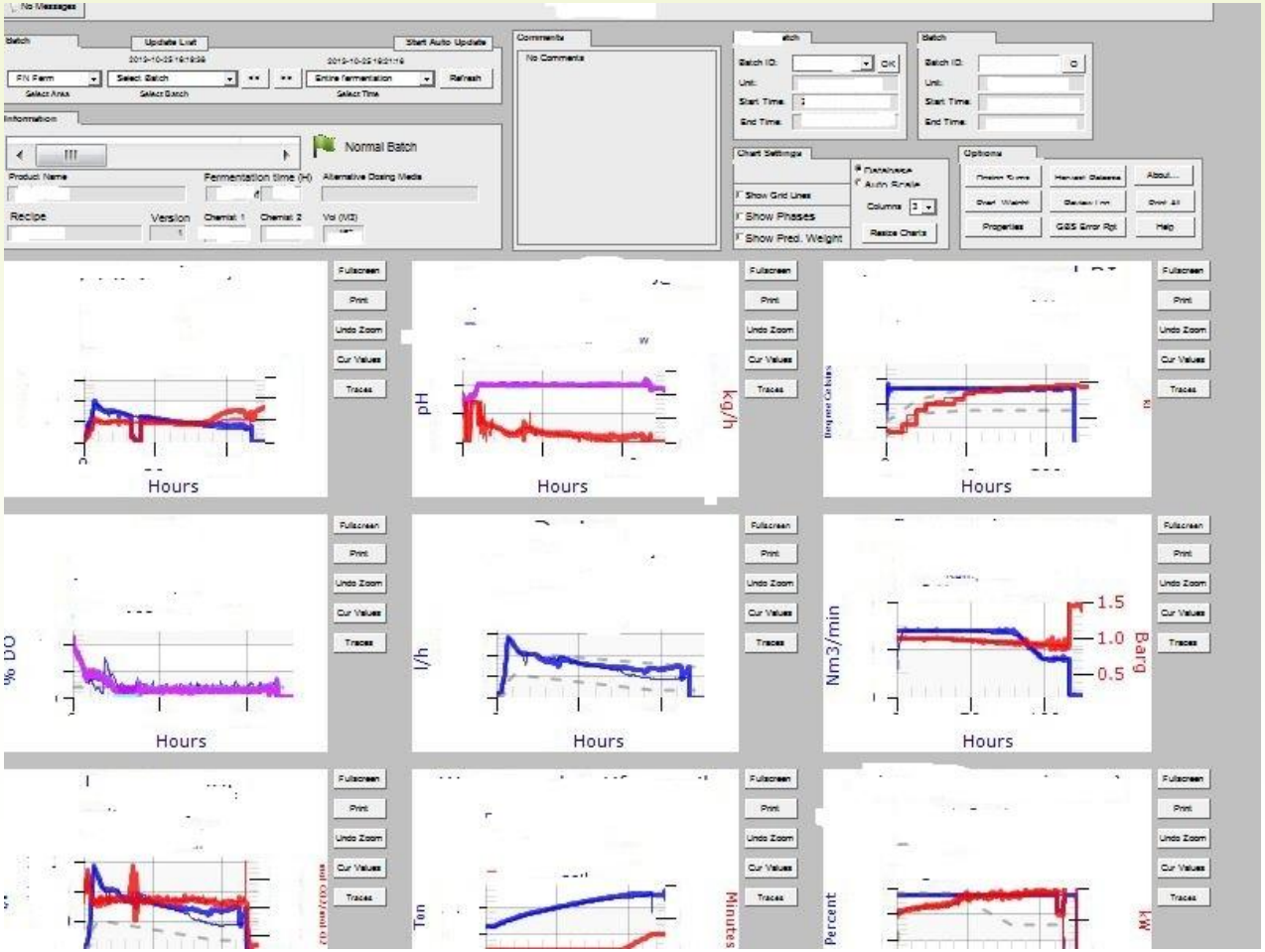
- How to best shorten critical path with least risk or cost

# Data Must Be Easily Comparable

Globally:
different units,
different scales,
different equipment

Data able to be
viewed objectively

Critical for site shifts,
process comparisons,
and upscaling



# Science in Manufacturing - Know the Baseline

## Shop floor

- Staff on site ~25% of the time
- Operations responsible for daily production


## Operator certification

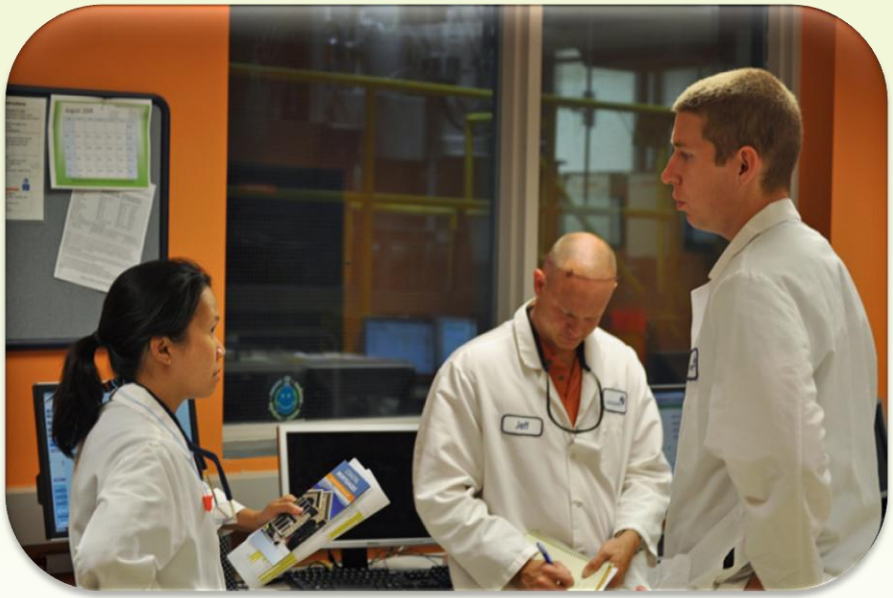
- Demonstrate skills operating unit operations
- Ensures consistency

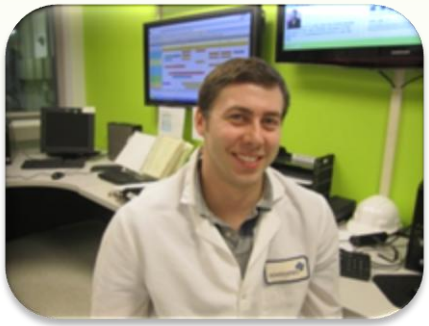
# Manufacturing Staff

Understand plant capabilities

Same certification program — operator before engineer

Identify gaps early and lead plant improvements





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# Questions?