



## Reverdia: Reliable Biosuccinium™ Supply

Building on the Innovative Strengths  
and Experience of Our Parents

**General Manager, Reverdia**  
Bio-World Congress, Orlando 2012  
April 30<sup>th</sup>, 2012



# Reverdia – Reliable Biosuccinium™ Supply

## Key points

- Biosuccinium™, offering sustainable solutions for bio-based materials
- Reverdia, powered by DSM + Roquette
  - A start-up with experience and a track record
  - Unique proprietary technology
    - Yielding best-in class carbon footprint
    - Best economics
    - High quality Biosuccinium™
  - Strong progress in commercialization
    - Technology development/validation: Lestrem demonstration facility
    - Large scale manufacturing: Cassano plant operational end of Q3 2012
    - Market development: increasing market demand
- Leadership in Sustainable Succinic Acid



# Global Megatrends

## Decreasing Oil Dependency

- Price volatility
- Scarcity
- Energy security

## Sustainability / Renewability

- Maintaining the planet's well being
- Driving economic and job growth

## Environmental Concern

- Consumer demand for green products
- Gov't regulation on climate change



**biosuccinium**<sup>™</sup>  
*sustainable succinic acid*

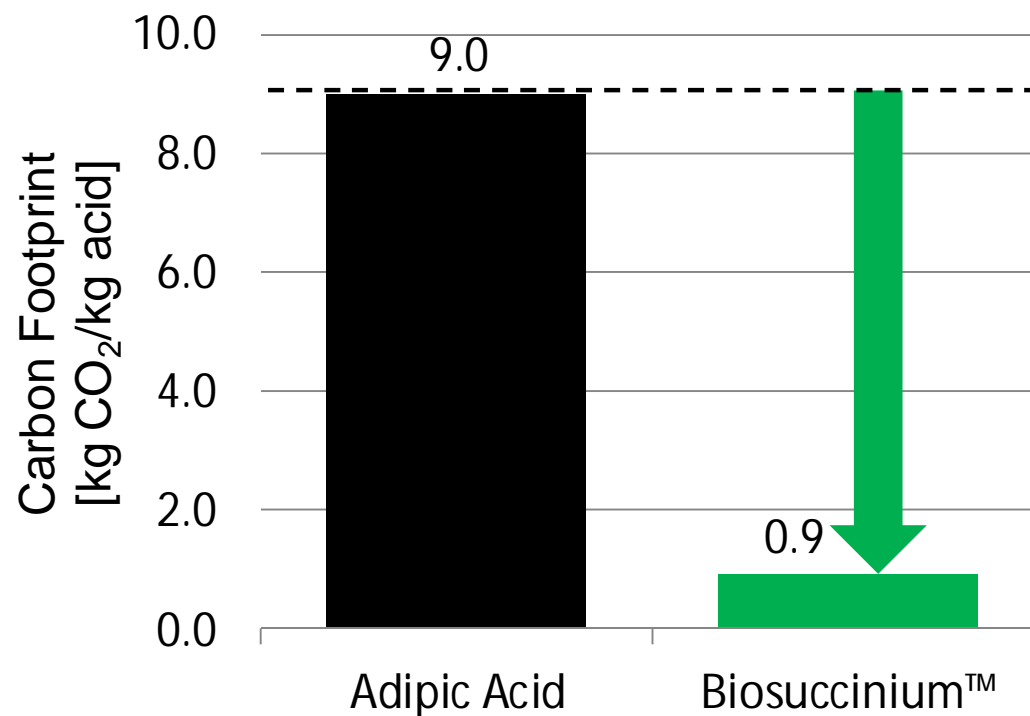
**From packaging to footwear markets,  
Biosuccinium provides a new non-fossil resource  
that allows customers to choose a bio-based  
material with an improved environmental footprint  
to develop superior sustainable products**



reverdia

# Large CO<sub>2</sub> Reduction Potential with Biosuccinium™

~8 kg CO<sub>2</sub> reduction by substituting adipic acid with Biosuccinium™



- Calculated Cradle-to-Gate
- The Biosuccinium™ study was executed by the Copernicus Institute of Sustainable Development at Utrecht University, the Netherlands
- Data pending publication
- The Adipic Acid study is executed by DSM for a best in class plant with 98% N<sub>2</sub>O abatement

# Biosuccinium™ CO<sub>2</sub> Reduction Potential

Example ski boots: ~8 kg CO<sub>2</sub> reduction per pair



# Reverdia - Powered by DSM + Roquette

Global leaders combine expertise to produce bio-based succinic acid



- Ranked among top global manufacturers of renewable raw materials (starch) for food ingredients & bio-based products
- Biorefinery expert
- €2.5 billion Euros turnover
- 6600 people in more than 100 countries worldwide
- Member of UN Global Compact



**Complimentary  
Competencies to make a  
Biosuccinium™ a market  
success**



reverdia



- Life Science and Material Science company
- Biotechnology leader
- 22,000 employees in 200 locations across all continents
- Annual net sales of around €9 billion
- Gold ranking Dow Jones Sustainability Index



# Outstanding Track Record in Bio-based Innovations

Recent examples of sustainable product development



Unlocking the cellulosic  
Bio-Ethanol opportunity



Novel bio-based high  
performance engineering



**Reverdia is building on the  
wealth of knowledge  
and experience of our parents**



**ROQUETTE**

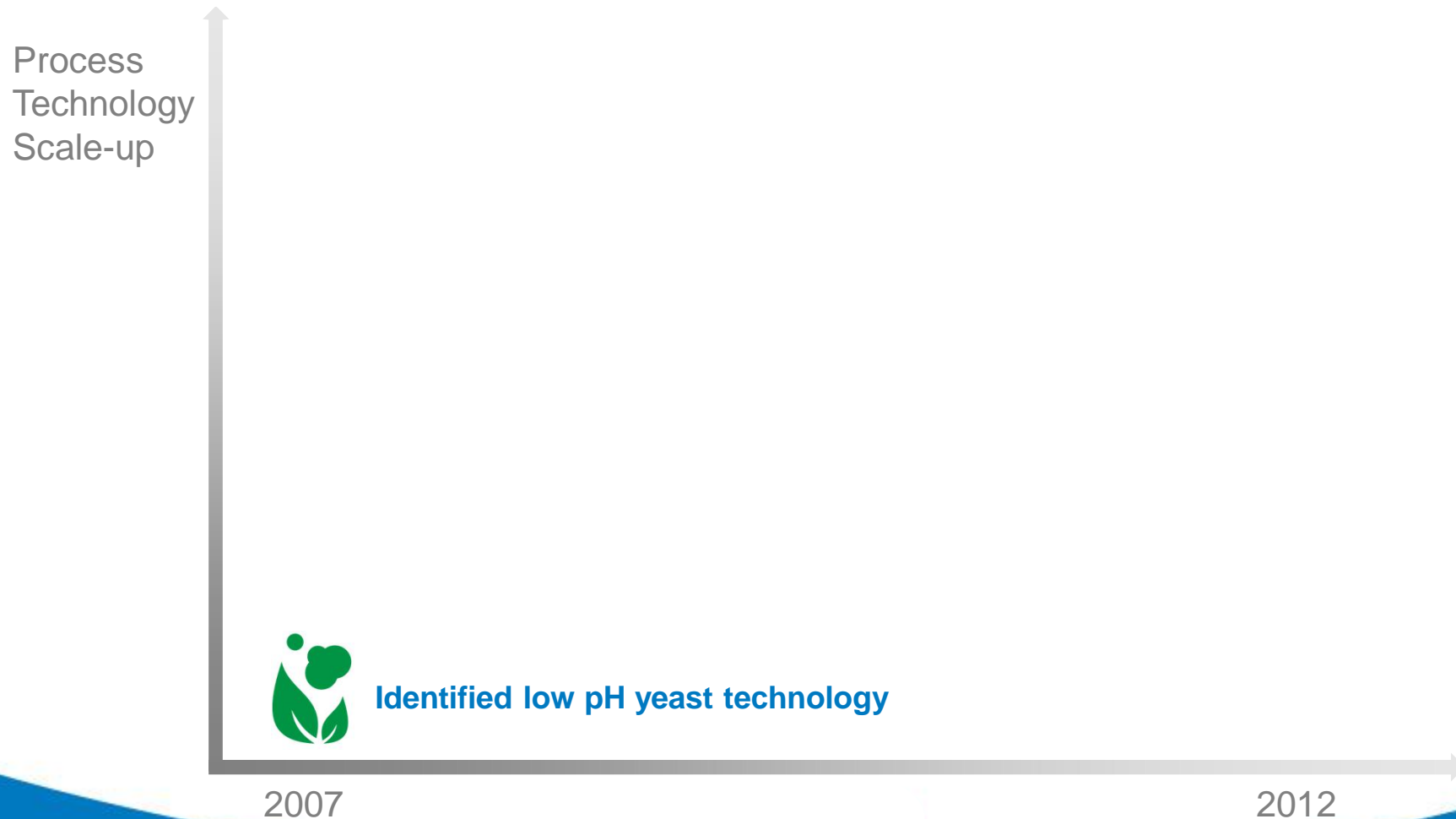
## **POLYSORB® P**

Isosorbide - a new green building  
block for resins and polymers



# Consistent, Superior, Unique Low pH Yeast Production Technology

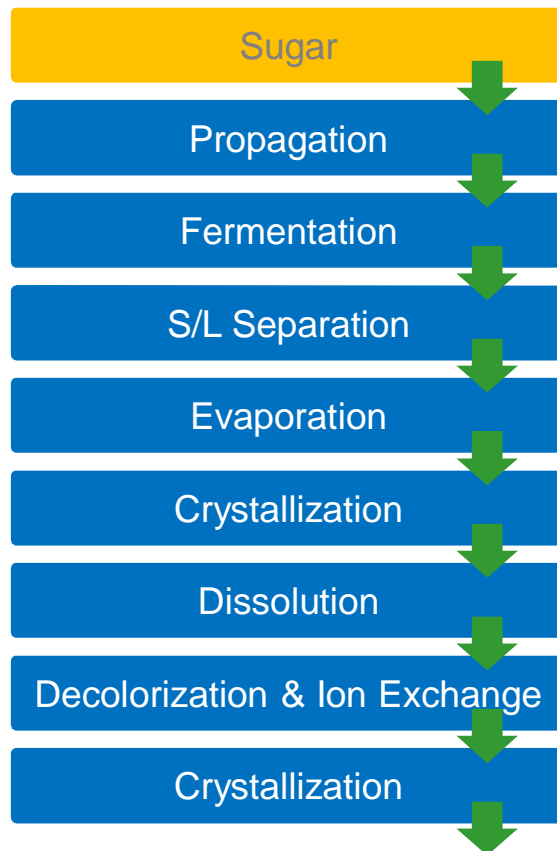
Same process used throughout scale-up with only quality improvements





# Identified Unique, Proprietary Low pH Process

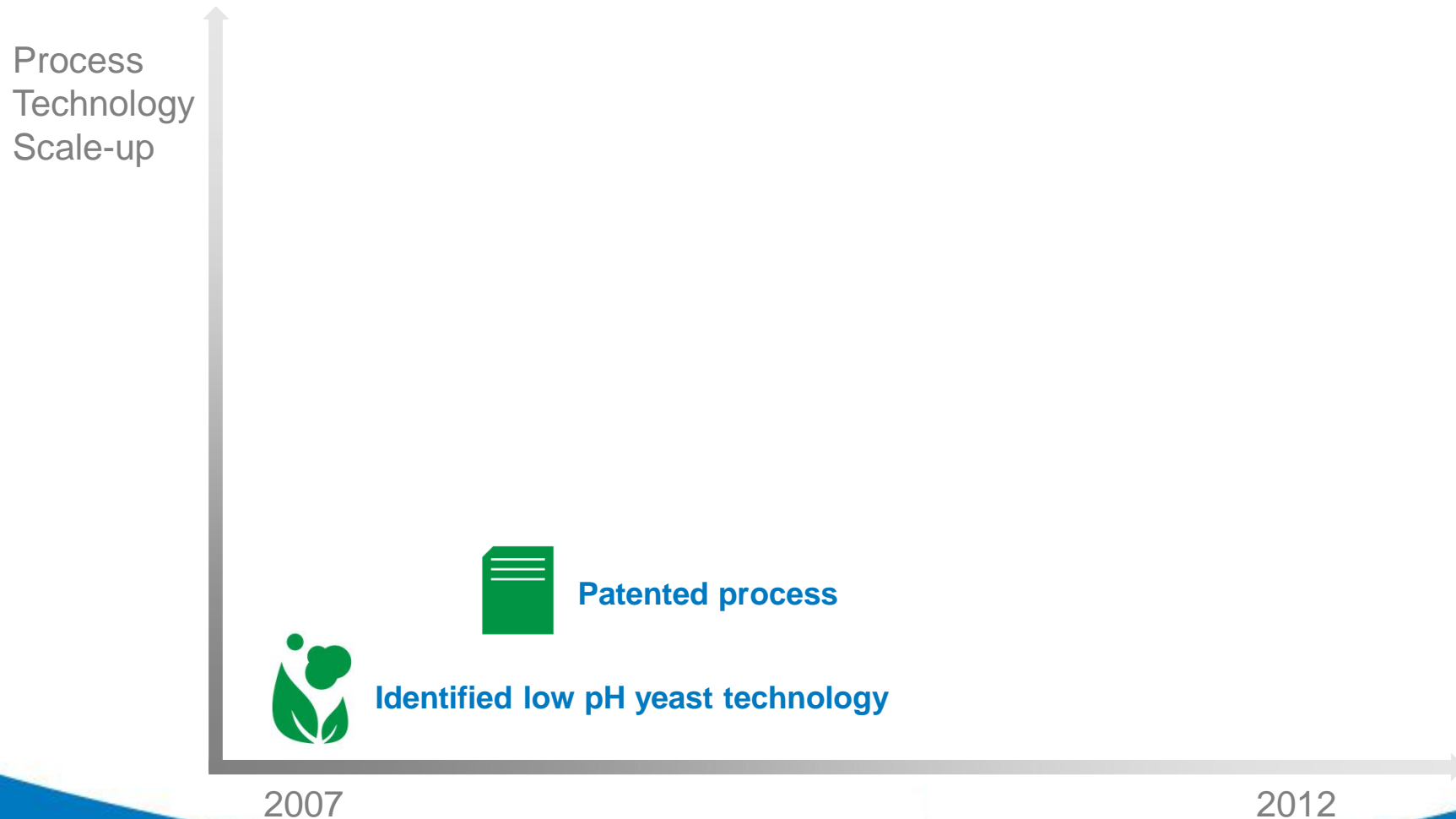
Preferred process over bacterial processes



- Yeast enabled low pH fermentation process: robust fermentation, no phage infection
- Simple overall process not requiring titration → no salt formation
- Consistent high quality product
- Best sustainability performance
- Bio-based with feedstock flexibility
- Best economics

# Consistent, Superior, Unique Low pH Yeast Production Technology

Same process used throughout scale-up with only quality improvements



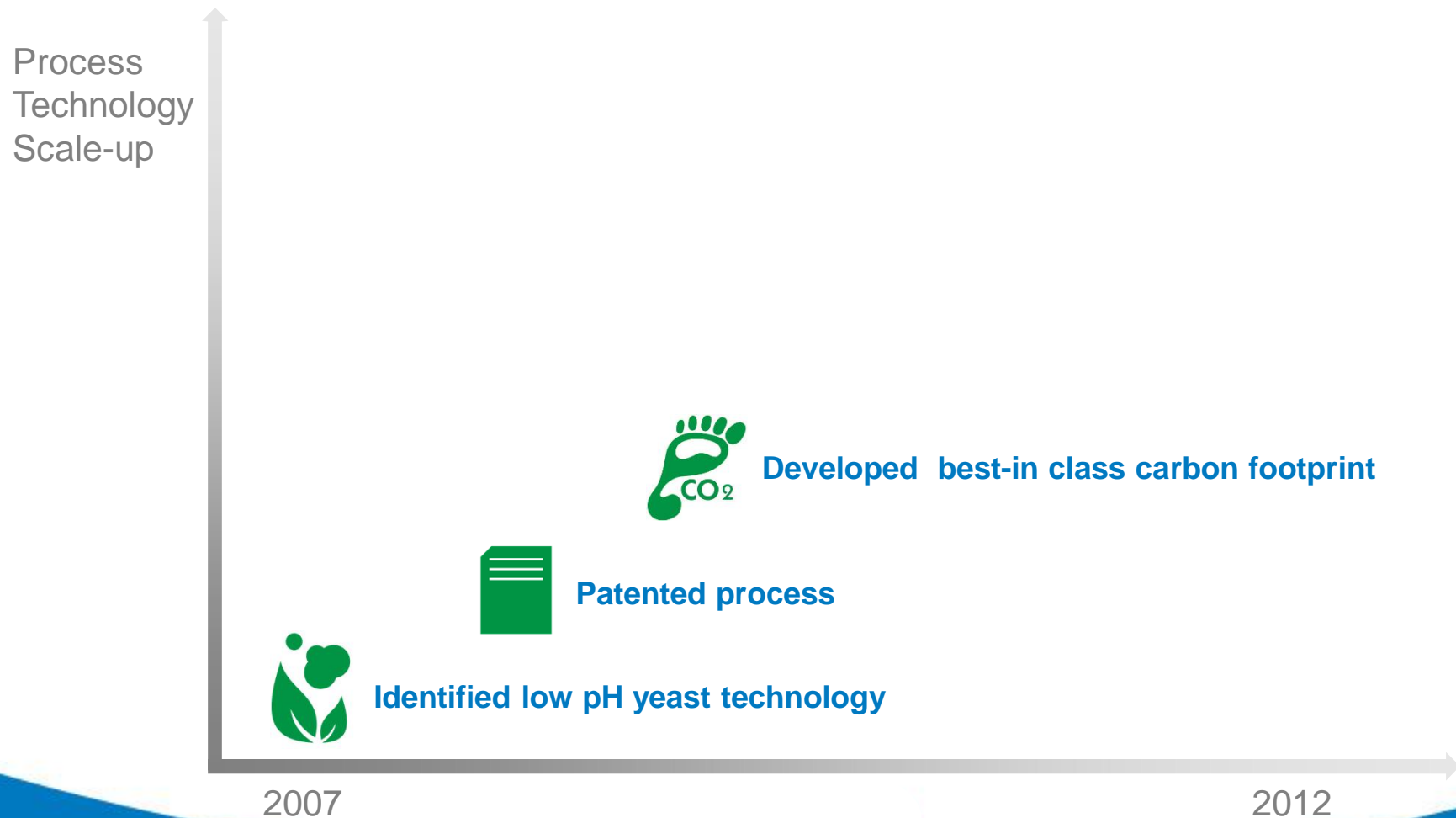
# Patented Proprietary Low pH Technology

- Proprietary technology, fermentation and recovery protection
- >15 Patent filings
- Freedom to operate



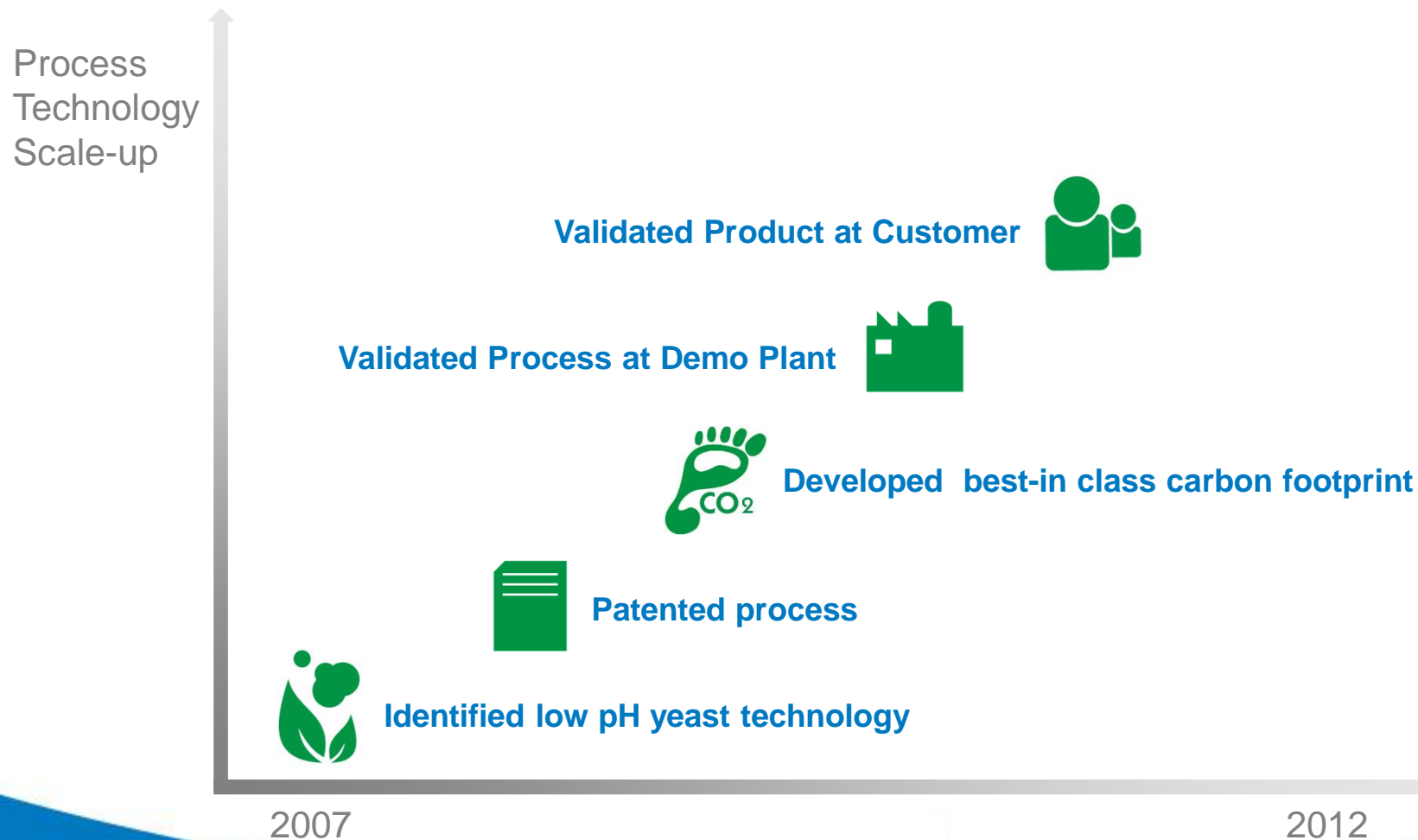
# Consistent, Superior, Unique Low pH Yeast Production Technology

Same process used throughout scale-up with only quality improvements



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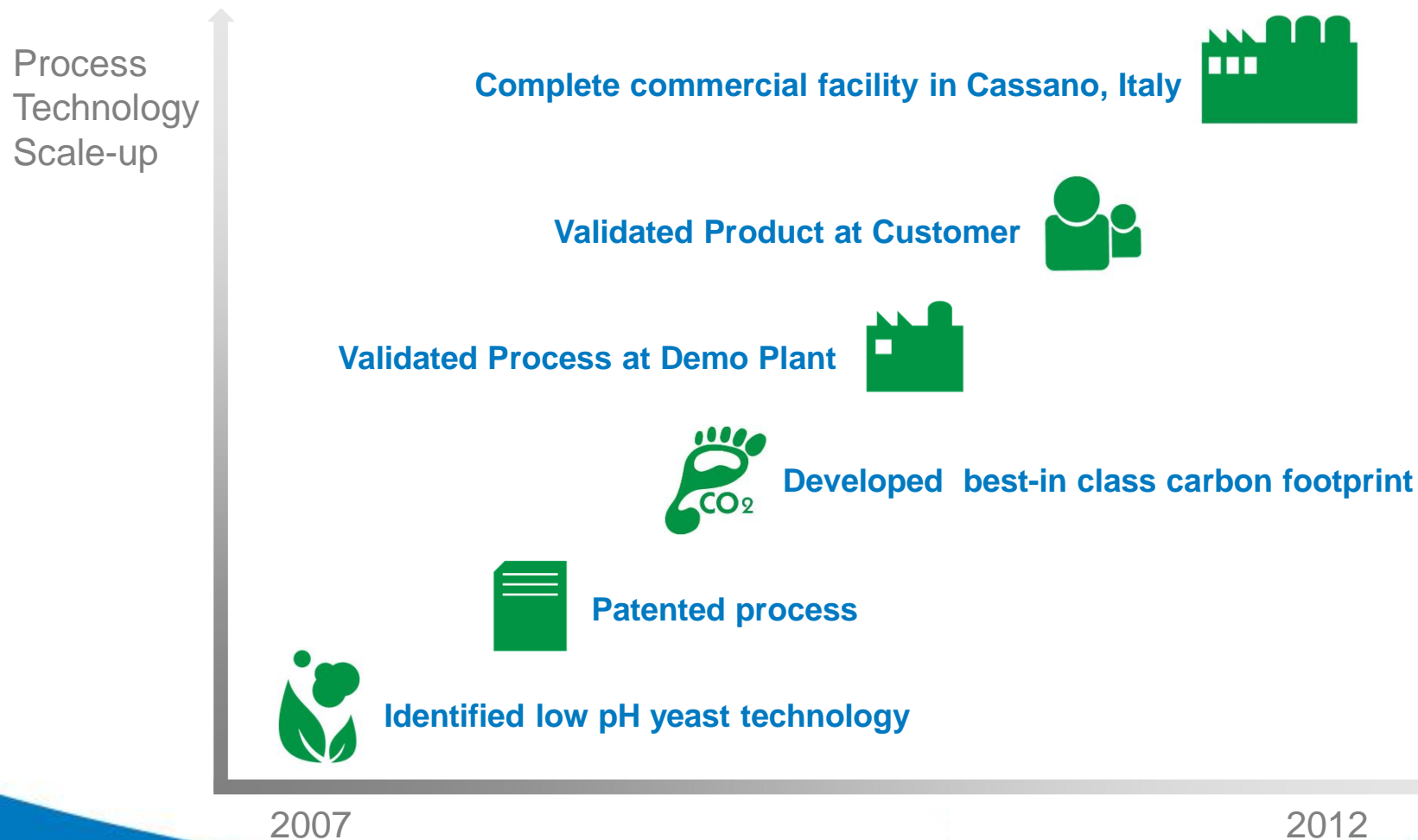
# Biosuccinium™ Qualified for Key Applications

Packaging	Industrial	Sports and Footwear
 <ul style="list-style-type: none"> <li>■ PBS                             <ul style="list-style-type: none"> <li>– Food packaging</li> <li>– Cutlery and utensils</li> <li>– Disposable cups and lids</li> <li>– Shopping bags</li> </ul> </li> </ul>	 <ul style="list-style-type: none"> <li>■ PU foams                             <ul style="list-style-type: none"> <li>– Insulation</li> </ul> </li> <li>■ TPU                             <ul style="list-style-type: none"> <li>– Building and construction</li> <li>– Mining equipment</li> </ul> </li> <li>■ Plasticizers</li> <li>■ Pigments</li> <li>■ Resins                             <ul style="list-style-type: none"> <li>– Coatings</li> <li>– Composites</li> </ul> </li> </ul>	 <ul style="list-style-type: none"> <li>■ TPU and PU                             <ul style="list-style-type: none"> <li>– Footwear</li> <li>– Outdoor garment</li> </ul> </li> <li>■ Spandex / Elastane                             <ul style="list-style-type: none"> <li>– Apparel</li> </ul> </li> <li>■ PBS                             <ul style="list-style-type: none"> <li>– Packaging</li> <li>– Buttons</li> <li>– Plastic parts</li> </ul> </li> </ul>
Non-wovens and Fibers	Automotive	Agricultural
 <ul style="list-style-type: none"> <li>■ PBS                             <ul style="list-style-type: none"> <li>– Diapers</li> <li>– Hygiene products</li> <li>– Fishing lines and nets</li> </ul> </li> </ul>	 <ul style="list-style-type: none"> <li>■ PU foams                             <ul style="list-style-type: none"> <li>– Seats</li> </ul> </li> <li>■ TPU                             <ul style="list-style-type: none"> <li>– Interior and sealing</li> </ul> </li> <li>■ PBS                             <ul style="list-style-type: none"> <li>– Interior</li> </ul> </li> </ul>	 <ul style="list-style-type: none"> <li>■ PBS                             <ul style="list-style-type: none"> <li>– Mulch films</li> <li>– Plant pots</li> </ul> </li> </ul>

TPU = thermoplastic polyurethane; PU = polyurethanes;  
 PBS = polybutylene succinate: new biopolymer; Spandex / Elastane = elastic fibers

# Consistent, Superior, Unique Low pH Yeast Production Technology

Same process used throughout scale-up with only quality improvements



# Reverdia Commercial Plant Cassano Spinola, Italy

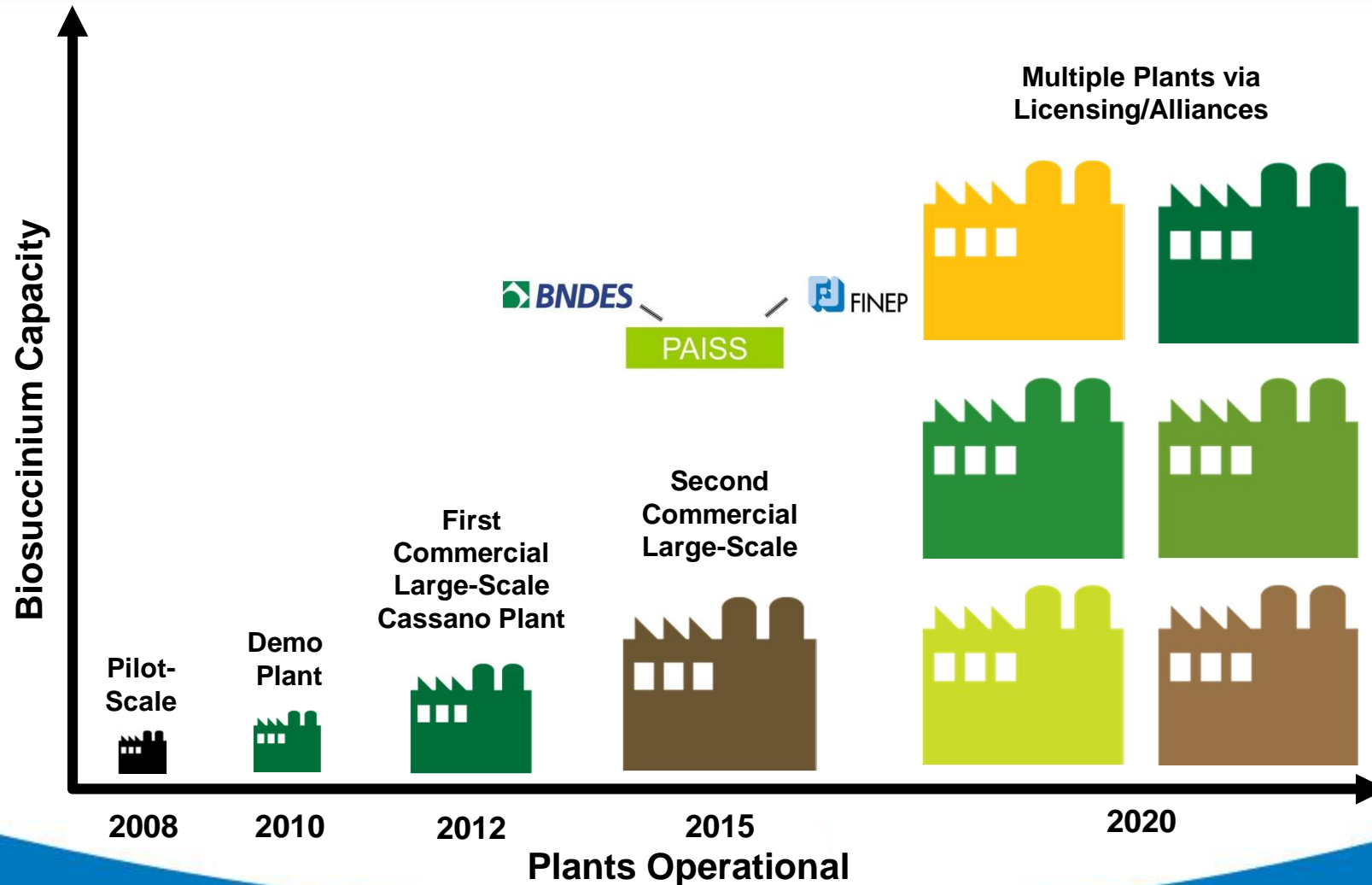
On schedule to be operational by end of Q3 2012





# Manufacturing Beyond Cassano

Site selection for second plant ongoing



# Unique Value Proposition

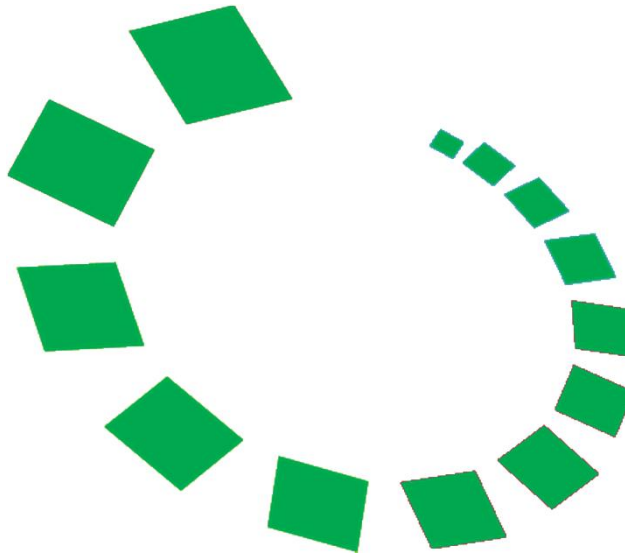
Leading to growing market interest

## Reliable supply

- Experienced
- Track record with integrated biorefinery

## Sustainable

- Renewable
- Best carbon footprint



## Proprietary Low pH Technology

- Stable performance
- Best costs efficiency

## High Quality Product

- Consistency
- Purity critical for various applications

# Market Development on Track

## Reverdia receiving bullish interest in Biosuccinium™

- Biosuccinium™ qualified in multiple applications from PBS to polyurethanes, as well as in end products
- Very positive feedback on quality and color
- Ton to multiple tons quantities shipped
- Various joint developments ongoing, e.g. on 100% biorenewable polyols with Dupont Tate&Lyle
- Product available from our Cassano facility in Q4 2012



# Reverdia - Biosuccinium™ Enabling a Brighter Future

## In conclusion

- Biosuccinium™ enables sustainable renewable solutions
- Reverdia
  - A start-up with experience and a track record
  - Commercializing an unique proprietary technology
  - Bullish market interest for Biosuccinium™
- Reverdia committed to establish a leadership position



# Our Commercial Team Looks Forward to Serving You – Thank You



Utech Conference, April 2012, Maastricht, NL



**Thank You**



## Safe Harbor Statement

This presentation contains forward-looking statements. These statements are based on current expectations, estimates and projections of Reverdia's management and information currently available.

The statements involve certain risks and uncertainties that are difficult to predict and therefore Reverdia does not guarantee that its expectations will be realized. Furthermore, Reverdia does not have an obligation to update the statements contained in this presentation.