

GEA Process Engineering

Whey and whey derivatives New drivers for a growing demand

3rd CLAL DAIRY FORUM (VR)

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GEA Process Engineering

Why and why derivatives

1 GEA Process Engineering in a nutshell

2 Definitions

3 Market trends and expectations

4 Engineering aspects

5 Projects drivers

6 Conclusion





The GEA Group is one of the largest providers for **equipment and process technology** particularly for the **food and energy industries** where it ranks among the market and technology leaders.

The GEA Group focuses on **demanding production processes** and supplies its customers with **efficient solutions** in various end markets.




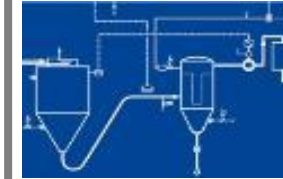






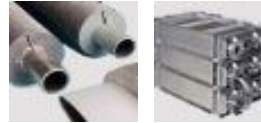












In 2012 the GEA Group employed some 24,500 people who generated revenue of EUR 5.7 billion.

GEA provides the world with innovative solutions for smart food processing and for a more efficient use of energy resources.

GEA is a global engineering group recognized for its excellent technologies, its dedication to provide best solutions to its customers, and its management principles.

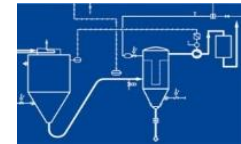
GEA Group structure: 6 segments



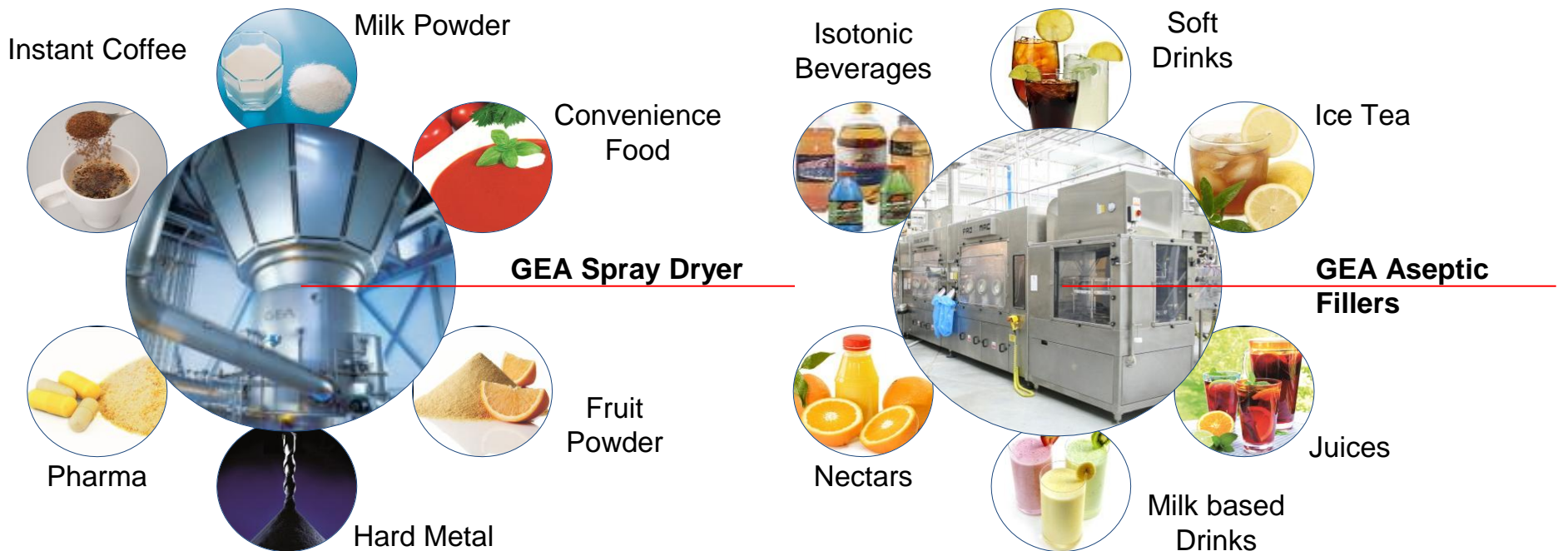
					
GEA Convenience-Food Technologies	GEA Farm Technologies	GEA Heat Exchangers	GEA Mechanical Equipment	GEA Process Engineering	GEA Refrigeration Technologies
<p>Bowl Choppers</p>  <p>Spiral Cookers</p>  <p>Slicers</p>  <p>Thermoformers</p> 	<p>Milking & Cooling</p>  <p>Farm Services</p>  <p>Farm Equipment</p>  	<p>Finned, Shell & Tube</p>  <p>Cooling Towers</p>  <p>Plate Heat Exchangers</p>  <p>HVAC Systems</p> 	<p>Separators</p>  <p>Decaners</p>  <p>Homogenizers</p>  <p>Valves</p> 	<p>Spray Drying</p>  <p>Evaporation</p>  <p>Brewery & Dairy Systems</p>  	<p>Compressors</p>  <p>Packages and Skids</p>  <p>Ice Machines</p>  <p>Freezers</p> 

Process technology

Design and installation of process lines for food and beverages, chemicals, pharmaceuticals, and cosmetics, as well as gas cleaning plants

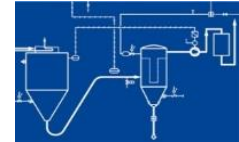


Examples of application



Dairy plants

Design and installation of process lines from milk reception to powder packing and canning.



Some examples :

- **Glanbia (Ireland)**
- **Fonterra – Darfield I and II (New Zealand)**
- **Laiterie de Montaigu (France)**
- **Danone Baby Nutrition (Ireland)**
- **Vinamilk (Vietnam).**



NO WAY ! YES WHEY

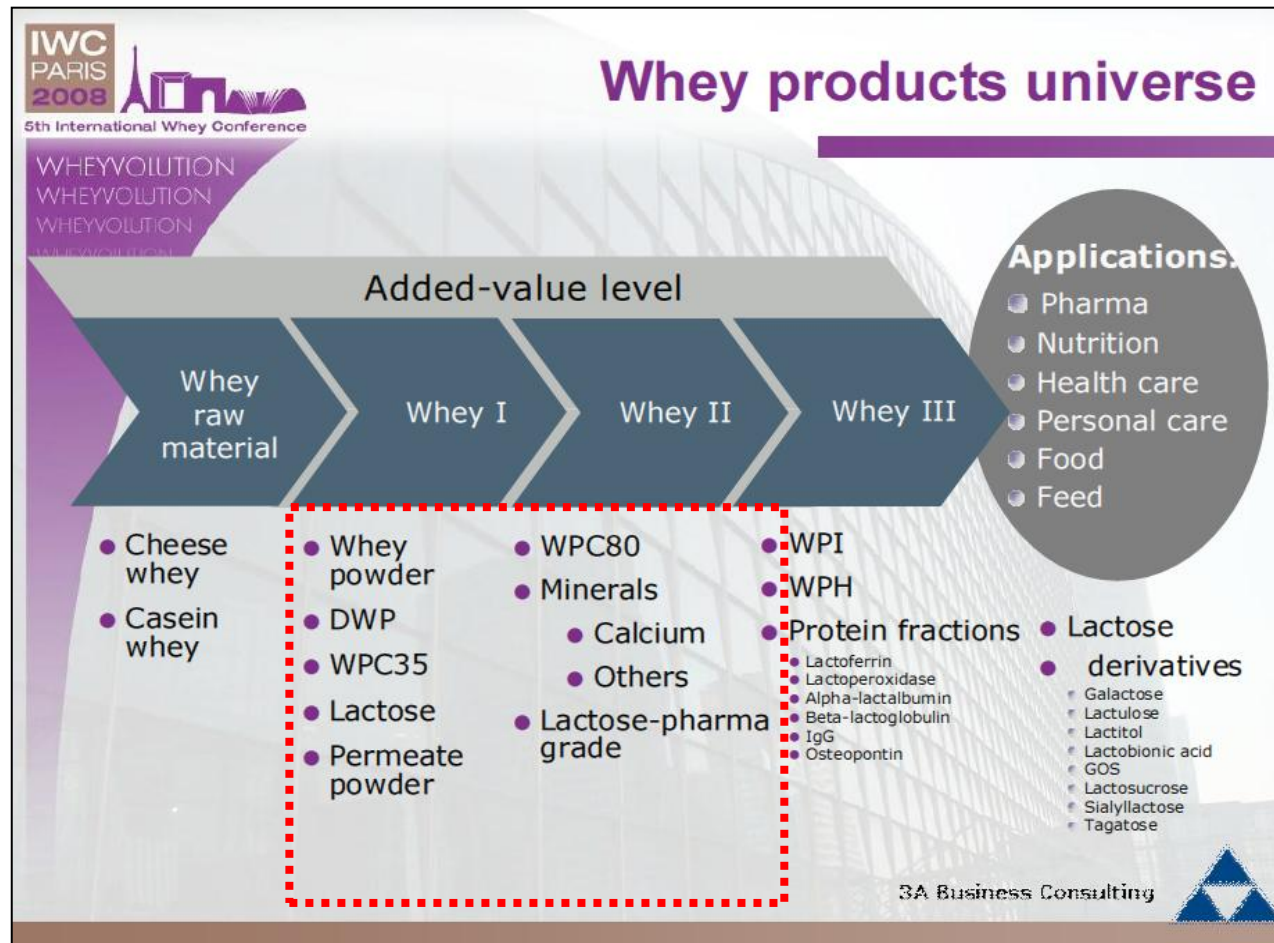


No longer a problematic by-product of cheese production but a highly valuable raw material for food ingredients

From animal feed (still) to filler in food products (bakery, confectionary ...) and to a promising stream of unique bioactive fractions: prebiotic BMO (Bovine Milk Oligosaccharides, lactoferrin, immunoglobulins ...)

Whey components will create novel foods, will affect brain function , help fighting malnutrition, improve body composition (young active adults and elderly)...

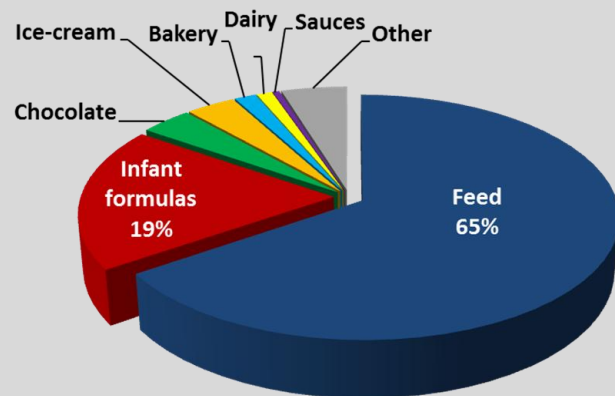
A wide range of opportunities, from commodities to niche markets



Market split of whey powders

Consumption of Whey Powder in Europe

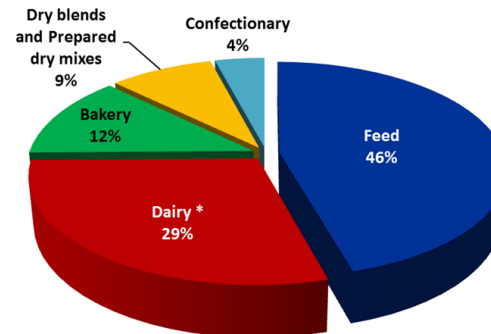
User segments of Whey Powder in 2010 in the EU
(WPC/WPI not included)



Source: Gira based on France Agrimer

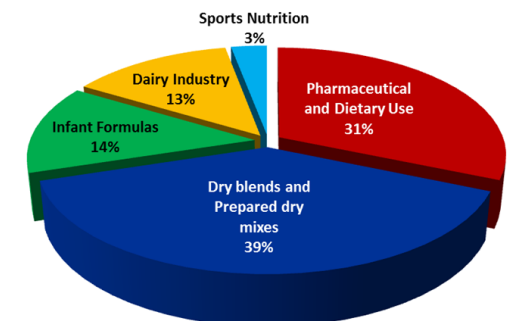
Consumption of whey products in the USA

User segments of Whey Powder



* cheese, yogurt, ice-cream

User segments of WPC/WPI



Source: Gira based on ADPI

- Feed is still the major use
- Infant Formulas : main portion of human consumption.
- Feed in the US is still representing 46 % of WP use
- WPC and WPI are key ingredients in pharma – nutrition.

3. Market trends and expectations

A fortunate configuration for the European Dairy Powder activity

A dairy powder consumption growth driven by a 5 % per year growth of the World 's Middle Classes

Jumping from 1,8 Billion people (2009) to 5 Billion people (2030) , mainly in ASIA (60 % in 2030)

Nutritional Formula (infant formula or elderly) is the major driver of growth : high value combined with large volume (China)

Increasing consumption of the required ingredients: whey powder, demin whey, WPC, WPI

Strong and promising development of whey functional fractions

Health care, nutrition , pharmaceutical.



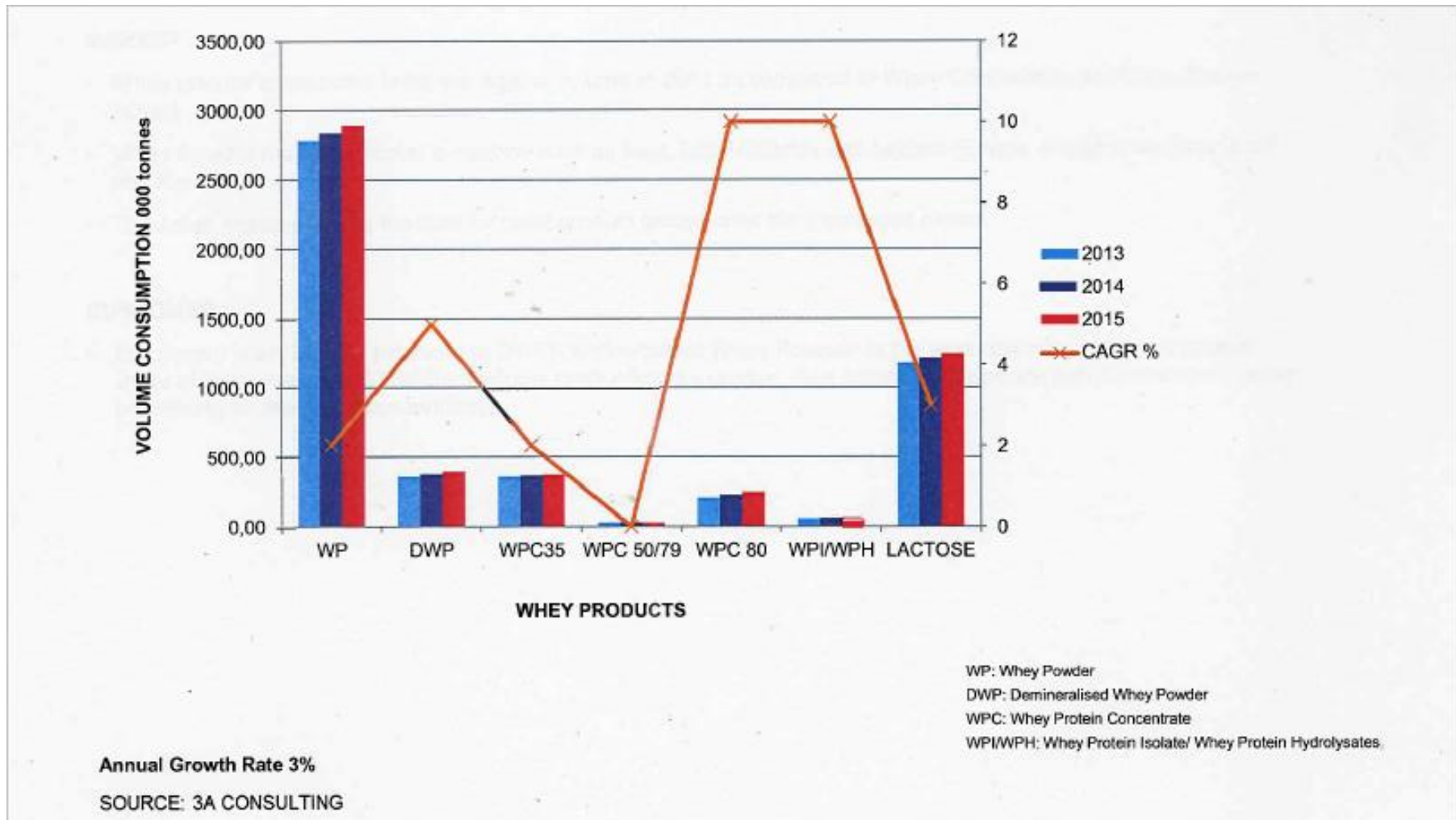
INCREASING DEMAND FOR WHEY & WHEY DERIVATIVES



3. Market trends and expectations

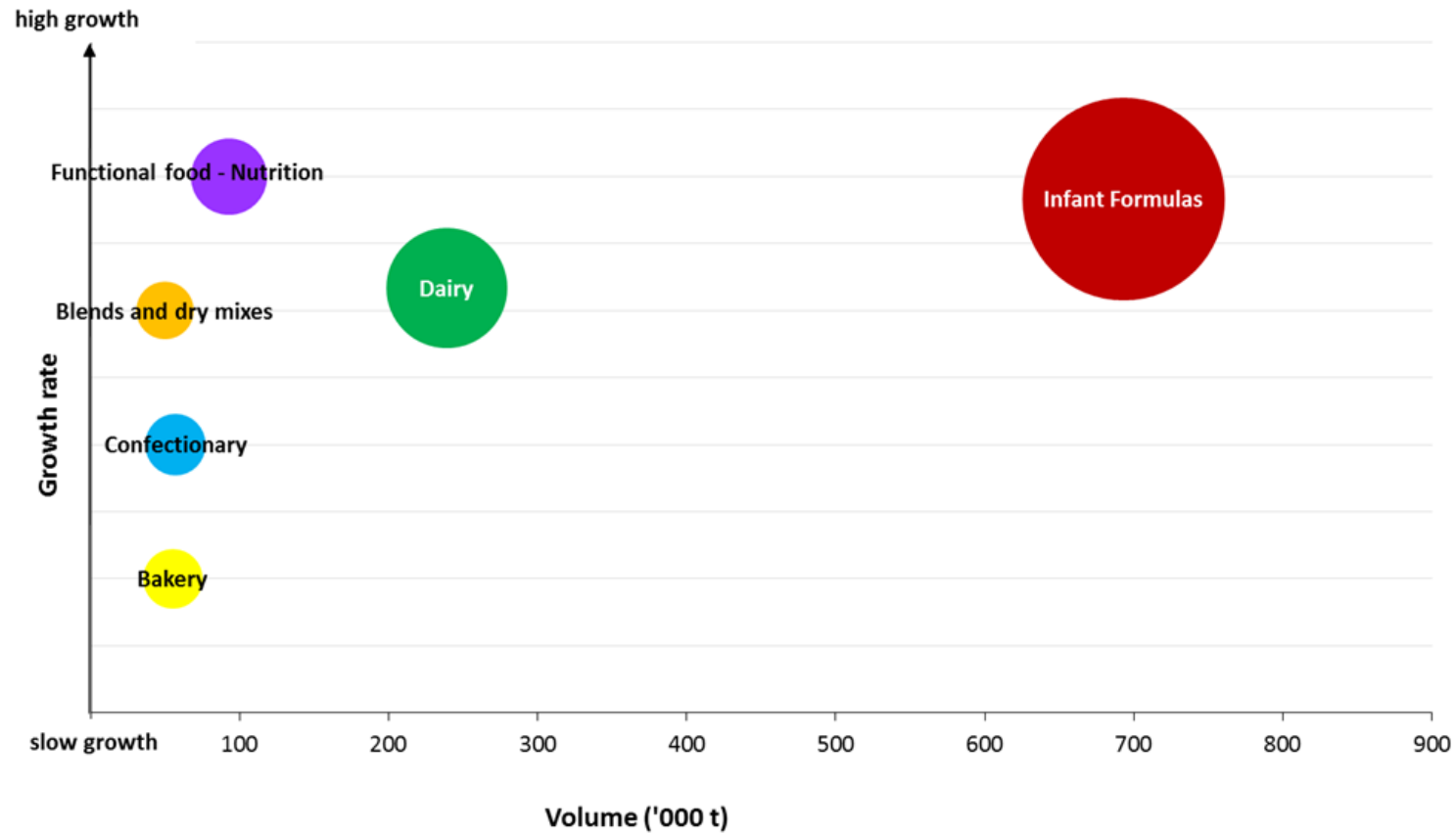


Whey and whey derivatives consumptions – 2013 - 2015



3. Market trends and expectations

Growth potential of WP, WPC, WPI



3. Market trends and expectations

A fortunate configuration for the European Dairy Powder activity

Deregulation of European milk production in 2015

Allows the increase of milk production (under debate) combined with a reduction of dairy farms, a major portion being processed into whey products (able to be stored and transported).

Reshaping & consolidation of the dairy processing companies with a large number of mergers , acquisitions, joint ventures

Rationalization, up-grading, economies of scale for many dairy plants are top-listed. Non European companies are investing in new plants in Europe. Till now , whey powder production is mainly located in Europe or USA.



THE SUPPLY SIDE IS ABLE TO SUPPORT THE DEMAND



3. Market trends and expectations

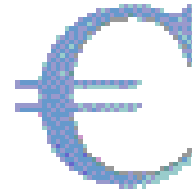
The positive market trends are generating a number of projects and massive investments

⇒ Green field plants to produce whey powder, WPC , WPI, SM, lactose ..(edible or pharmaceutical).

⇒ Growing require
The bigger 1
Processing large



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ational economical advantages

⇒ **World scale da**
Niro spray dryer l

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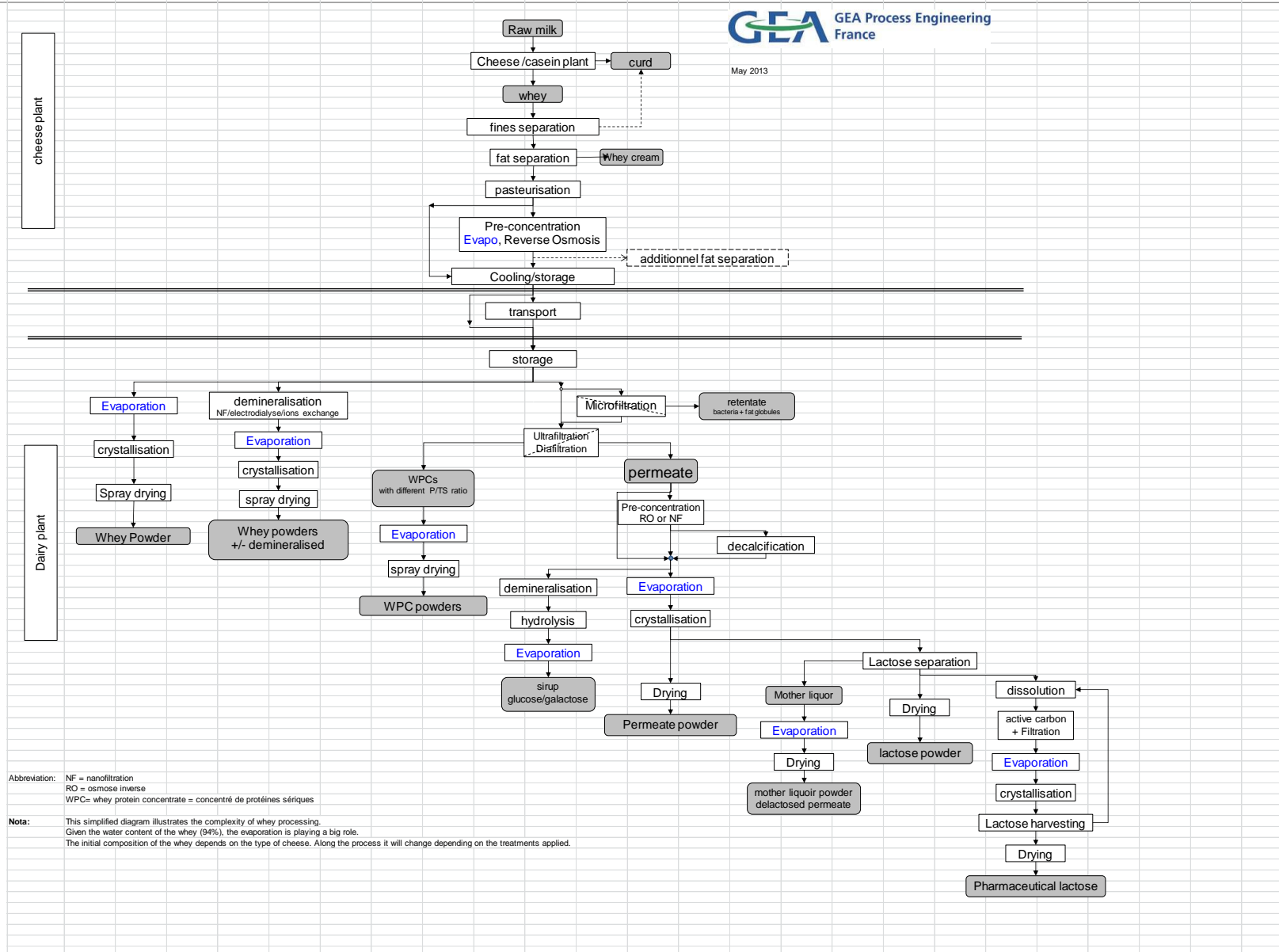
- today most of new plants are in the 8 – 15 tons par hour range

⇒ Milk producers, dairy processing companies and technology suppliers have to face a

MAJOR CHALLENGE

4 . Engineering aspects

clear enough ?



A booming area for process engineers facing the complexity of milk considered as raw material (content & biological properties)

To be covered by specialists

- **Large number of unit operations** (evaporation, drying, separation...).
- Revitalized focus on **crystallization** scientific foundations.
- **Novel technologies** (ion exchange , thermal processing ...)
- **New applications** : increasing use of membranes technology (RO, NF...) – whey proteins for medical field.
- Development of decalcification, demineralization and decolourization processes.
- **Food quality insurance system.**

Total Cost of Ownership ↓ - Overall Equipment Efficiency ↑

TCO driver : CAPEX + OPEX actions

- Computational fluid dynamics (CFD) modelling.
- Process lines optimization (seen globally and not as a succession of unit operations).

TCO driver : CAPEX + OPEX actions

- Energy management and energy recovery systems (Savings up to 20 % on an evaporation & spray drying plant equipped with heat recovery systems) .
- Process monitoring and control systems improvement (advanced versions).

5. Projects drivers : on the agenda for the customers



Total Cost of Ownership ↓ - Overall Equipment Efficiency ↑

Overall Equipment Efficiency (OEE) : 1ST STEP = MEASURING !

- Increasing production time : CFD , fouling risk evaluation (lab), process parameters control , increasing feed systems number ...

Overall Equipment Efficiency (OEE)

- Minimizing cleaning period and frequency (enzymatic cleaning ...).
- Minimizing product losses (air emission, liquid discharges, cleaning operations ...).
- Minimizing equipment breakdown.
 - All Total Productive Maintenance (TPM) issues.

Finally but not the least

FOOD SAFETY : a major business risk for the dairy industry (“Chinese lesson”)

- Product quality : a permanent challenge as new products qualities are required and as new products are launched on the market . Connection with technology providers is turning more and more important .

ENVIRONMENTAL SUSTAINABILITY

- It is clear for all of us that it is a major and a critical part of a new project (from noise to effluents treatment).

6. Conclusion : whey and whey derivatives

MARKET OPPORTUNITY



- Growing and sustainable market
- Significant added-value for customers
- Large range of products to face prices versatility.

JOINT APPROACH REQUIRED



- Clear challenge for dairy processing companies and technology providers.
- Cross development involving both players, Universities and R & D centers as well.

FROM COMMODITIES TO NICHE MARKETS



- An innovative step forward in the dairy business.

Grazie per l'attenzione.

Thank you.

The GEA logo is rendered in a bold, black, sans-serif font. The letters 'G', 'E', and 'A' are connected by a thick, black, curved line that loops under the 'E' and 'A', creating a sense of motion and integration. The logo is centered against a background of a blue-tinted world map with a radial light effect emanating from behind it.

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engineering for a better world

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