GBU data & processes
Consumer Chemicals
Novecare at a Glance
Growth on inspired products

11 prod. Sites (+1 under construction)
12 R&I centers

5 prod. Sites (+1 under construction)
4 R&I centers

10 prod. Sites (+1 under construction)
5 R&I centers

2 prod. sites
1 R&I centers

Net sales
2013e
€ 1.6 bn
Sourcing and Supply chain security is key

Leading positions in Core Technologies

Solution provider in key end-use applications

Serve growing and strategic markets

Ethylene Oxide
Fatty Alcohol
Methanol
Synthetic Monomers
Cellulose Guar splits
Phosphate Rock

Surfactants
Amines
Synthetic and Natural Polymer
Phosphorous Chemistry

Dispersion
Foaming
Conditioning
Surface modification
Intermediate
Gelling
Rheology

Agro Food
Consumer goods & healthcare
Industrial Solutions
Energy & Environment

* P4, Amines
Coatis at a Glance
Leading Latin American player of Phenol and Oxygenated Solvents

Net sales
2013e
€ 0.6 bn

1 prod. site
1 R&I center

Net sales
20% 70%

1 R&I center
Coatis
Key transformation process

Raw materials
- Cumene
- Acetic Acid
- Ethanol
- Glycerin
  Long term supply contracts in place

Products
- Phenol
- Acetone
- Acetic Solvents
- Augeo Family
  Sole Phenol Producer and Largest Oxygenated Solvents Producer in LA

Applications
- Synthetic Resins & Molding Compounds
  Development and Application Laboratories in LA
- Solubilisation of Actives and Resins
- Inks, Adhesives, De-greasers, Film Formation Aids, Mining Frother

Markets
- Consumer goods & healthcare 15%
- Automotive 15%
- Building & Construction 10%
- Industrial Applications 45%
- Agro Food 15%
  Presence in a wide range of markets
Aroma Performance
Taste the Performance Solutions!

Net sales 2013e
€ 0.4 bn

1 prod. site

3 prod. sites
1 R&I center
(+2 Food application labs)

1 prod. site

2 prod. sites
1 R&I center
(+1 Food application lab)
Aroma Performance
Key transformation process

**Raw materials**
- Ferulic acid
- Phenol
- HF
- PER
- Adipic Acid

**Products**
- Natural vanillin
- Vanillin & Ethylvanillin
- Hydroquinone
- Triflic acid
- Cyclopentanone

**Applications**
- Flavors and Flagrances
- Monomers stabilizers
- Antistatic applications
- Food safety / Traceability & High purity

**Markets**
- Agro Food (55%)
- Consumer goods & healthcare (15%)
- Aeronautics & Automotive (15%)
- Industrial Solutions (15%)

Security of supply
Competitiveness
Growing consumer markets
Specialty Polymers
Inventing the future

Multiple end markets

Net sales
2013e
€ 1.3 bn

Net Sales
29%
33%
38%

7 prod. sites
2 R&I centers

6 prod. sites
4 R&I centers

2 prod. sites
4 R&I centers
Specialty Polymers
Key transformation process

**Raw materials**
- Basic petrochemicals
- Fluor precursors
- Chlorine precursors
- Nitrogen precursors
- Sulphur precursors

**Products**
- Aromatics
- Fluoropolymers
- High-barrier polymers
- Cross-linkable compounds

**Applications**
- Healthcare
- Automotive
- Advanced transportation
- Smart devices
- Electricals & Electronics
- Industrials
- Energy
- Water
- Construction

**Markets**
- Consumer Goods & Healthcare (20%)
- Aeronautics & Automotive (20%)
- Electricals & Electronics (20%)
- Industrial Applications (15%)
- Energy & Environment (10%)
- Building & Construction (10%)
Silica
Growth through innovation for sustainable mobility

HDS (Highly Dispersible Silica)

1 prod. site

2 prod. sites (+1 under construction)
2 R&I centers

3 prod. sites
1 R&I center

Net sales
2013e
€ 0.4 bn
Silica
Key transformation process

Raw materials
- Sand
- Soda ash
- Sodium silicate
- Caustic soda

Products
- HDS Highly Dispersible Silica
- Conventional silica

Applications
- Energy-efficient tires
- Polymer reinforcement
- Abrasive in Oral Care
- Additive in animal nutrition

Markets
- Aeronautics & Automotive
- Industrial Applications
- Consumer Goods & Healthcare
- Agro Food

Soda ash
Conventional silica
HDS Highly Dispersible Silica
Additive in animal nutrition
Pigment in color production
Antifogging in automotive interior
Adhesive in paper industry
Additive in soil conditioner
Lubricant in automotive industry
Coating in electronic industry

HDS
Highly Dispersible Silica
Sodium silicate
Calcium
Soda ash
Sand

- Soda ash
- Sodium silicate
- Sand
- Caustic soda

13
Rare Earth Systems
The best value capture business portfolio in rare earth chemicals

High performance inorganic pigment for plastic coloration

Ceria based abrasives for Semiconductor polishing

Mixed oxides and Alumina for Automotive Catalysts

Green and Red phosphors precursors for Linear Fluorescent Lamps

Fluorescent lamps recycling

Net sales 2013e
€ 0.3 bn
Rare Earth Systems
Key transformation process

Raw materials
- Rare earth concentrates
- Soda ash

Products
- Rare earths (light & heavy)
- Rare earth oxide formulations

Applications
- Automotive catalysts
- Energy-efficient lighting
- Semiconductor Polishing

Markets
- Aeronautics & Automotive (60%)
- Electricals & Electronics (40%)

Solvay has unique industrial set-up with rare earths separation batteries in China and in France
Special Chemicals
Leader in Fluor Chemistry and selected Electronic Application

- NOCOLOK® - Flux for aluminum brazing
- Foam for insulation
- crop protection products
- Fluorinated Solvents for Li-ion batteries
- Electronic and Coating additives

Net sales
2013e
€ 0.5 bn

- 47% of 5 prod. sites
- 29% of 12 prod. sites
- 3% of 1 R&I center
- 21% of 4 prod. sites
- 1 R&I center
Special Chemicals
Key transformation process for fluor-based specialty products

Raw materials
- Fluorspar
- Oleum
  Sulphuric acid

Products
- HF
  Hydrogen fluoride
- Fluor-based compounds

Applications
- Reﬁneries / steel & surface treatment
- High Voltage Engineering ... (SF6, IF5, F2)
- Wet chemicals for chip etching/cleaning;
  Chemicals for Li-batteries
- Insulation; Energy saving
- Brazing & Refrigerants
- Organic intermediates
  Broad range of specialty ﬂuorides,
  supported by our tech.service

Markets
- Industrial Applications 15%
- Electricals & Electronics 20%
- Building & Construction 20%
- Aeronautics & Automotive 20%
- Agro Food 10%

Own Fluorspar mining in Namibia and Bulgaria (raw material integration)
Distinctive production know–how backed by R&I
Distinctive application Know-how and development
Special Chemicals
Key transformation process for other products

Raw materials
- Limestone
- Barite (Barium mineral)
- Celestite (Strontium mineral)

Products
- PCC (Precipitated calcium carbonate)
- Barium compounds
- Strontium compounds

Applications
- Sealants
- Paints & coatings
- Ceramic capacitors
- Display and Photovoltaic glasses
- Ferrites

Markets
- Building & Construction (40%)
- Electricals & Electronics (40%)
Performance Chemicals
Soda Ash & Derivatives
A resilient cash generator for the Solvay Group

Net sales
2013e
€ 1.4 bn

Net sales
27%
58%
8%
7%

Flat glass
Soda ash
Container glass
Detergents
Pharma

2 prod. sites
7 prod. sites
3 R&I centers
1 prod. sites
Soda Ash & Derivatives

Soda ash key transformation process

**Raw materials**
- Limestone
- Salt brine
- Trona mineral

**Products**
- Na$_2$CO$_3$
- Soda ash

**Applications**
- Water softener in detergents
- Flux in flat glass
- Flux in container glass
- Metallurgy

**Markets**
- Building & Construction (35%)
- Energy & Environment (35%)
- Agro Food (35%)
- Consumer Goods & Healthcare (15%)
- Aeronautics & Automotive (5%)
- Industrial Applications (5%)

Solvay is vertically integrated with own mines
Solvay is largest soda ash producer worldwide
Soda Ash & Derivatives
Bicarbonate key transformation process

Raw materials
- \( \text{Na}_2\text{CO}_3 \) Soda ash
- \( \text{CO}_2 \) Carbon dioxide

Products
- \( \text{NaHCO}_3 \) Sodium bicarbonate

Applications
- Supplement in animal feed
- Supplement in food
- Flue gas cleaning agent
- Supplement in pharma

Markets
- Agro Food (40%)
- Energy & Environment (50%)
- Industrial Applications (5%)
- Consumer Goods & Healthcare (5%)

Solvay uses its own soda ash
Solvay is largest bicarbonate producer worldwide
Hydrogen Peroxide
Market & technology leader in global peroxides market

Pulp & Paper
Thai HPPO plant

Metals/ Mining

Aseptic packaging

Net sales
2013e
€ 0.4 bn

11 prod. sites (incl. 1 HPPO*)
2 R&I centers

2 prod. sites

5 prod. sites (incl. 2 HPPO) &
1 R&I center

1 prod. site &
1 R&I center

H2O2

PO

13%
41%
33%

Capacity
**

** Capacity includes all plants managed by Solvay (incl. JVs)

*HPPO Hydrogen Peroxide for Propylene Oxide

** Capacity includes all plants managed by Solvay (incl. JVs)
## Hydrogen Peroxide

### Key transformation process

**Raw materials**
- Natural gas/Hydrogen
- Quinone
- Catalyst
- Acetaldehyde
- Soda ash

**Products**
- $\text{H}_2\text{O}_2$ Hydrogen peroxide
- PAA Peracetic Acid
- PCS Sodium Percarbonate

**Applications**
- Bleach for wood pulp & paper industry
- Disinfection & Aseptic packaging
- Metals & mining
- Chemical Synthesis HPPO

**Markets**
- Consumer Goods & Healthcare
- Industrial Applications

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Solvay is largest peroxide producer worldwide

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Acetow at a glance
Leading the market with quality and innovation

Cigarette filter
Cellulose acetate tow
New application: Cosmetics

Net sales
2013e
€ 0.7 bn
Acetow
Key transformation process

Raw materials
- Wood pulp
- Acetic acid

Products
- Cellulose flakes
- Cellulose acetate tow

Applications
- Cigarette filters

Markets
- Consumer Goods & Healthcare

90%
Eco-Services
Best in Class Reliability to Customers

Net sales
2013e
€ 0.3 bn

7 prod. sites
Eco-Services
Key transformation process

Raw materials
- Spent sulphuric acid
- Hazardous waste
- Sulphur
- ATH

Products
- Regenerated $\text{H}_2\text{SO}_4$
- Sulphuric acid
- Oleum
- Alum

Applications
- Refineries Chemical industry
- Nylon & paper
- Mining
- Agriculture
- Water treatment

Markets
- Industrial Applications (40%)  
- Consumer Goods & Healthcare (5%)
- Energy & Environment (50%)
Emerging Biochemicals
Leading producer of bio-based Epichlorohydrine, Vinyls and Caustic Soda in South East Asia

- 1 prod. site
- 1 R&I center

Net sales
2013e
€ 0.4 bn

Emerging Biochemicals product areas:
- Film & Sheets
- Wire & Cables
- Vinyl
- Pipe & Fittings
- Coatings
- Composites
- Electronics

EpiceroL®
Emerging Biochemicals
Vinyl key transformation process

Raw materials
- Ethylene
- Salt

Products
- PVC

Applications
- Pipe, fittings & profiles
- Wires & cables
- Film & sheets

Multiple applications

Markets
- Building & Construction: 50%
- Consumer Goods & Healthcare: 35%
- Industrial Applications: 5%
- Agro Food: 5%
Emerging Biochemicals
Epichlorohydrine key transformation process

**Raw materials**
- Vegetable oil
- Glycerine (bio-based)
- Naphta
- Ethylene

Solvay only uses bio-based method
Competitors use other method

**Products**
- Epicerol® (bio-based ECH)
- ECH Epichlorohydrine

Both products are the same, only production method and raw materials are different

**Applications**
- Epoxy resins
- Other applications <15%

**Markets**
- Building & Construction 20%
- Electricals & Electronics 30%
- Consumer Goods & Healthcare 15%
- Aeronautics & Automotive 20%
Functional Polymers
Polyamide Materials
An integrated polyamide player

Polyamide & Intermediates

Engineering Plastics

Fibras

Net sales
2013e
€ 1.6 bn

8 prod. sites
1 R&I centre

4 prod. sites
3 R&I centres

Net sales

48%
18%
30%

5 prod. sites
1 R&I centre

8 prod. sites
1 R&I centre
P&I

Key transformation process

**Raw materials**
- Cyclohexane
- Cumene
- Butadiene
- Amomnia

**Products**
- Adipic Acid + Rhodiacid™
- HMDA + Rhodiamine™

**Applications**
- PA 6.6
  - Other products for polyurethane, plasticizer, coating applications

**Markets**
- Industrial Applications
  - 15%
- Automotive
  - 30%
- Consumer Goods (textile)
  - 40%
- Construction
  - 10%
- Electricals & Electronics
  - 5%
Fibras
Key transformation process

Raw materials
- Phenol
- Adipic Acid
- Nylon salt
- HMDA
- ADN

Integrated local upstream. ADN imported from France.

Products
- Textile yarns
- Staple Fiber
- Industrial yarns

Innovation and productivity for the entire textile chain.

Applications
- Apparel
- Abrasives
- Sewing Threads
- Tire
- MRG

Customer relationship with an eye on consumer expectations.

Markets
- Consumer Goods & Healthcare 75%
- Aeronautics & Automotive 20%
- Industrial Applications 5%

Main drivers: functional apparel, shoes, car and mining industries.
Engineering Plastics
Key transformation process

Raw materials
- Adipic Acid
- HMDA
- Caprolactam

Products
- PA 6.6
- PA 6

Applications
- METAL REPLACEMENT by TECHNYL
- FIRE PROTECTION by TECHNYL
- THERMAL MANAGEMENT by TECHNYL
- FLUID BARRIER by TECHNYL

Markets
- Aeronautics & Automotive: 60%
- Electricals & Electronics: 20%
- Consumer Goods & Healthcare: 20%

Raw materials: 20%
Products: 20%
Applications: 60%