



**SOLVAY**

asking more from chemistry®

MORE  
SUSTAINABLE  
FORMULATIONS

## TECHNOLOGY SOLUTIONS GBU

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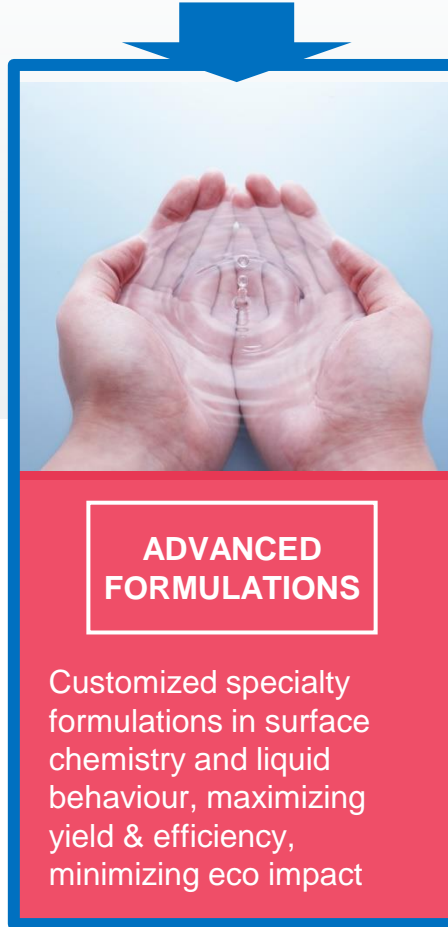
# TECHNOLOGY SOLUTIONS

## WITHIN ADVANCED FORMULATIONS SEGMENT



### ADVANCED MATERIALS

Providing solutions for sustainable mobility, lightweighting, CO<sub>2</sub> and energy efficiency



### ADVANCED FORMULATIONS

Customized specialty formulations in surface chemistry and liquid behaviour, maximizing yield & efficiency, minimizing eco impact



### PERFORMANCE CHEMICALS & FUNCTIONAL POLYMERS

Leading positions in chemical intermediates through scale and technology, developing innovative application and industrial innovation for optimized costs

# TECHNOLOGY SOLUTIONS AT A GLANCE

## TECHNOLOGY SOLUTIONS



€ 0.7 bn  
Net sales 2016



~ 1,500  
Head Count



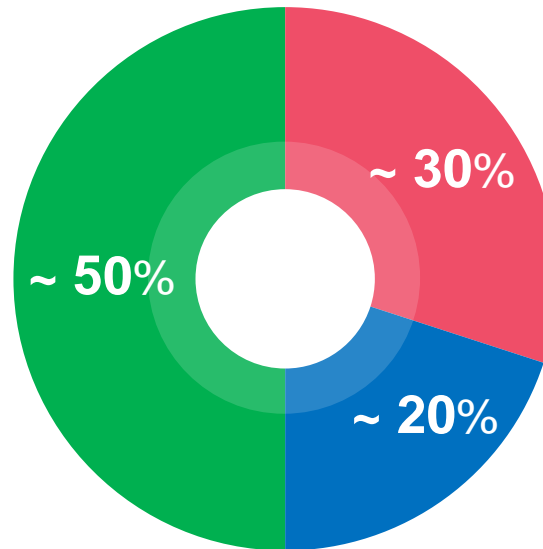
10  
Industrial sites

3

main market  
segments

### Mining solutions

Copper separation  
Alumina processing  
Other minerals separation



### Phosphorus specialties

Agro  
Pharma  
Electronics

### Additive technologies

Agro  
Building & construction  
Automotive

% of 2016 Net Sales

# WHAT WE DO IN MINING



2016  
Market ~ € 1 bn  
Sales ~ € 350 m  
↓



Copper  
~ 60%



Alumina  
~ 25%



Other minerals  
~ 15%

## OUR SOLUTIONS

- **Broad product portfolio**
- **Applications expertise**
- Constant stream of **innovative**, proprietary products & **technology**

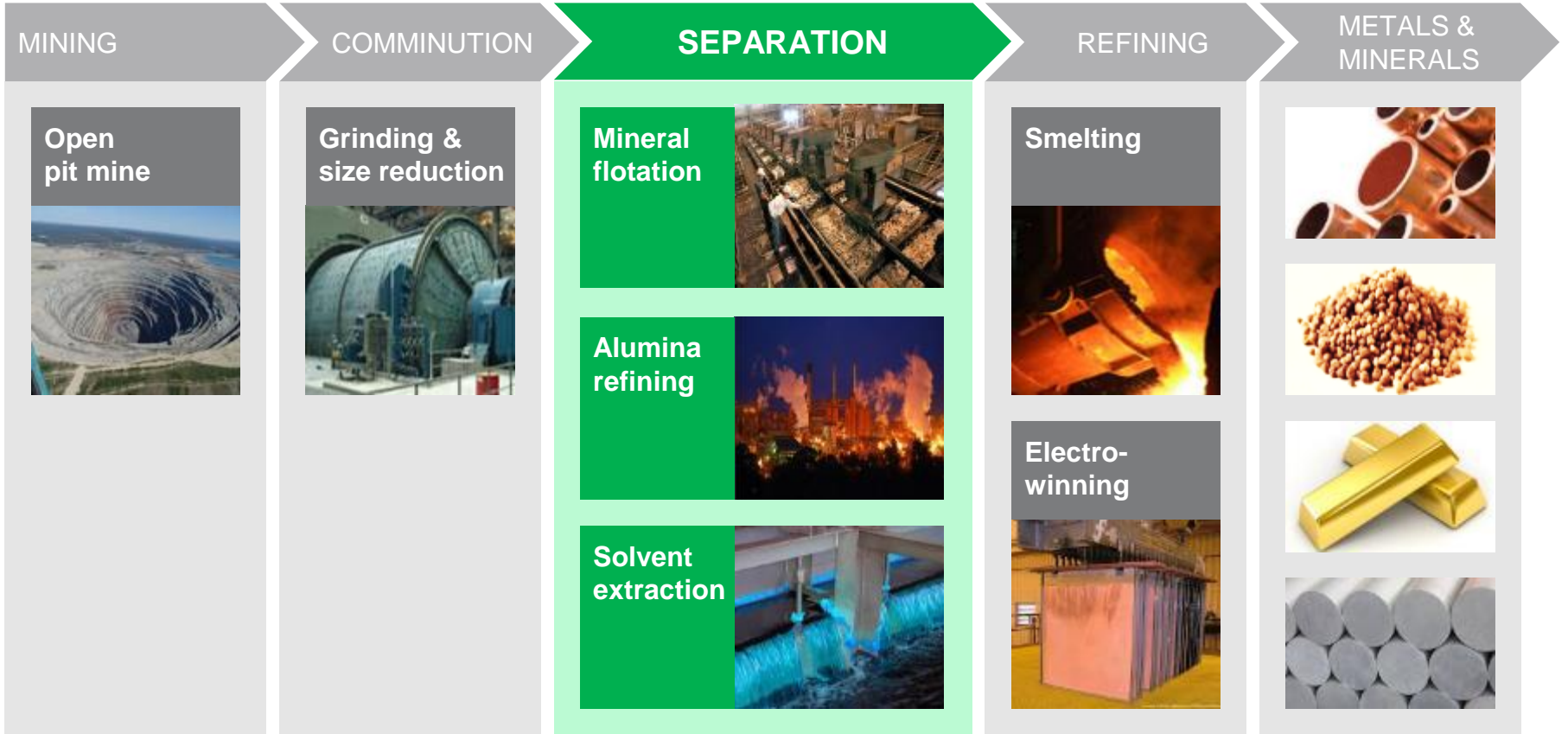
## IMPROVE YIELD & EFFICIENCY

- Increase **selectivity in separation** of metals/minerals, reducing total cost
- Enable **processing of declining quality** ore grades

## REDUCE ENVIRONMENTAL FOOTPRINT

- Improve **energy efficiency** of mine sites
- Reduce **fresh water** usage
- More **eco-friendly** reagents

# STRONGLY POSITIONED IN THE MINING INDUSTRY VALUE CHAIN



Optimize  
customer process



Maximize  
selectivity

Reduce  
process variability



Improve  
throughput & yield

# WHAT WE DO IN PHOSPHORUS SPECIALTIES

2016  
Market ~ € 500 m  
Sales ~ € 170 m



**Phosphine  
Specialties**  
~ 45%



**Sodium  
Hypophosphite  
(& byproduct)**  
~ 50%



**PROBAN**  
~5 %

## OUR SOLUTIONS

- **Broad Phosphorus product portfolio**
- **World scale, global production capacity** to deliver **customized** phosphorus chemistry
- **Innovation** with key partners

## IMPROVE EFFICIENCY and “P” DELIVERY

- Increase **processing capability** with custom catalysts, reducing total cost
- Enable **“P” utilization** for a variety of applications

## REDUCE ENVIRONMENTAL FOOTPRINT

- Improve **energy efficiency** with LED
- More **eco-friendly, low ozone depleting** fumigants
- Reduce **formaldehyde** for flame retardant textiles

# WHAT WE DO IN ADDITIVE TECHNOLOGIES



2016  
**Market** ~ € 800 m  
**Sales** ~ € 130 m



**Roto, Injection,  
Blow Molding**  
~ 30%



**Auto**  
~ 25%



**Other (Bldg &  
Construction,  
Ag film)**  
~ 45%

## OUR SOLUTIONS

- Global **technical leader** with a **specialties** product portfolio
- **Applications expertise**
- **Innovative** offerings of **proprietary** products & **technology**

## IMPROVE PERFORMANCE & EFFICIENCY

- Increase **UV durability** across range of polymers
- Enable **easier** polymer **processing**, reduced cost

## REDUCE ENVIRONMENTAL FOOTPRINT

- Support **light-weighting** and **energy efficiency**
- Reduce **plastics waste**
- Enhance Plastic Industry **sustainability**



Journal Pre-proof

SX and flotation reagents for improved recovery and processing for copper ores

UV stabilizers prevent loss of tensile properties and color for artificial turf

UV stabilizers satisfy critical performance requirements for siding and trim

Unique processing chemicals for all stages of the Bayer Process to make alumina for aluminum

Phosphines used as catalysts to make alcohols for household laundry detergents

High purity phosphine gas used in the manufacture of colored LEDs





# WHY WE WIN WITH CUSTOMIZED MARKET APPROACH

## TECHNOLOGY LEADERSHIP

<b>Innovation</b>	Strong history of valuable new technology
<b>Product line</b>	Broad product line Increasingly IP protected
<b>Formulation &amp; Application expertise</b>	Expert systems, modeling capability for unique blends supported by applications experts & tech service
<b>Global Footprint</b>	Multiple production locations to serve worldwide markets

Resulting in

## UNIQUE, LARGE VOLUME CAPABILITIES & SERVICES

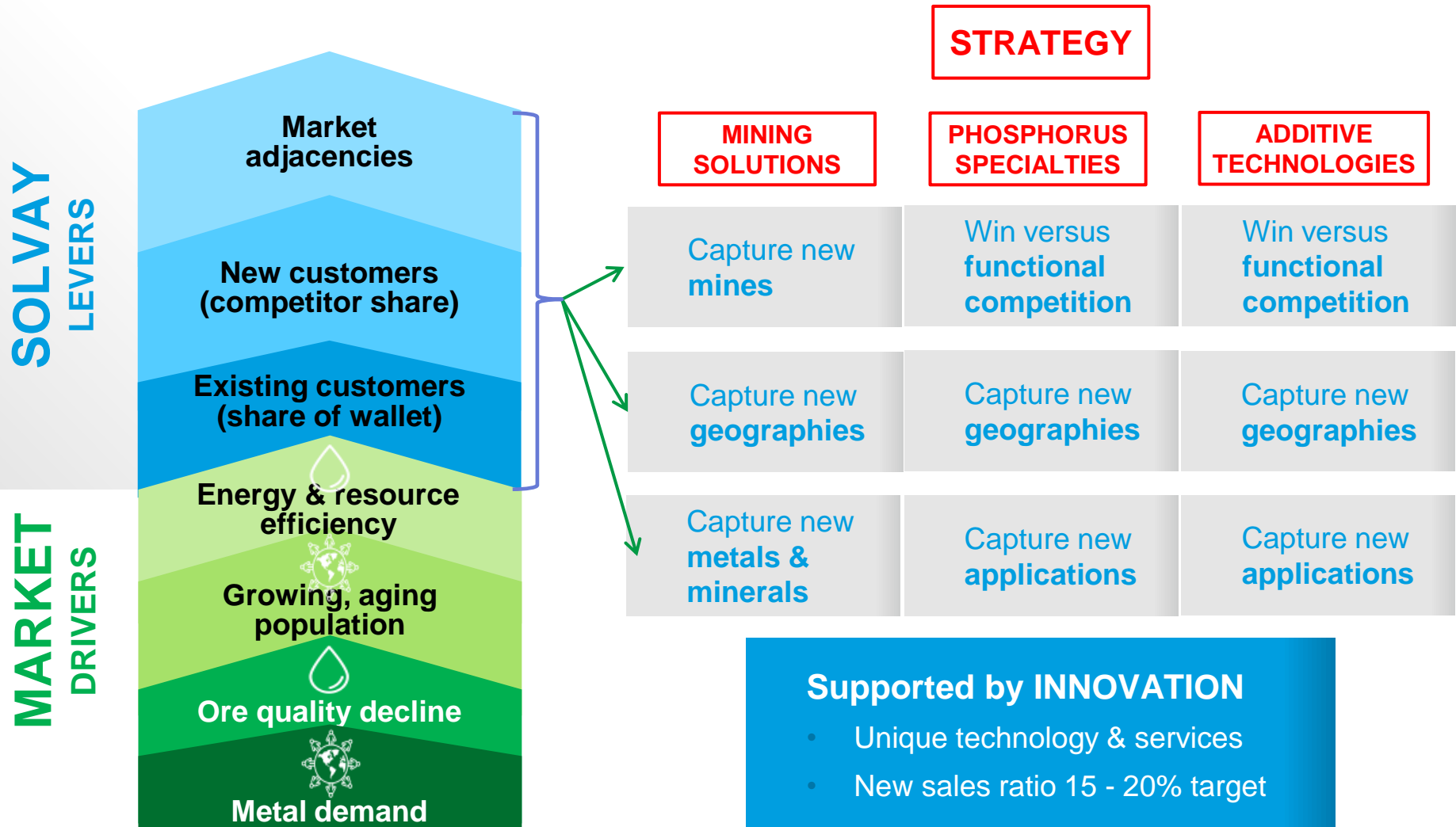
for key accounts and general marketplace

	INNOVATION	PRODUCTS	SERVICES
<b>Solvay</b>			
<b>Clariant (Mining)</b>			
<b>BASF (Mining)</b>			
<b>SNF (Mining)</b>			
<b>Nalco (Mining AI)</b>			
<b>NCI (Phosphine)</b>			
<b>BASF (PA)</b>			
<b>Chinese (All)</b>			

## CUSTOMER PARTNERSHIP

- Leadership position with full capabilities
- Strong position with majority of offerings needed
- Partial capabilities
- Lack of meaningful presence or offerings
- Market player participation in select areas

# OUR STRATEGY FOR ACCELERATED GROWTH



# BROAD TECHNOLOGY BASE SUPPORTS KEY INNOVATIVE SOLUTIONS



Evolving demography & consumer behaviors



Resource constraints &  
increased sustainability  
demand



## EMERGING METALS - LITHIUM

- Increase process speed & efficiency
- Reduce extraction cost

NEW  
METALS &  
MINERALS



## HIGH PURITY PHOSPHINES FOR QUANTUM DOTS

- Increased process efficiency
- Higher nanoparticle yield, lower overall cost

ADJACENT  
MARKETS



## CYNERGY PLATFORM

- Improved UV durability at lower cost
- Extended polymer life with low VOC emissions

ENVIRONMENTAL  
IMPACT

[www.solvay.com](http://www.solvay.com)

