

WACKER

CREATING TOMORROW'S SOLUTIONS

1st Chemical Day
February 15, 2016

Wacker Chemie AG @ Consortium für elektrochemische Industrie

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Chemical Day 2016



Dr. Hartel / Mr Willems: Welcome to WACKER

Mr Willems: WACKER SILICONES

Dr. Hartel: WACKER POLYMERS

Dr. Hartel / Mr Willems: The Common Ground - Chemicals



WACKER



CREATING TOMORROW'S SOLUTIONS



Chemical Day 2016 - Welcome to WACKER

Dr. Christian Hartel, Member of the Executive Board, Wacker Chemie AG
Auguste Willems, Member of the Executive Board, Wacker Chemie AG

Chemicals With High Contribution to Sales in WACKER's Portfolio

WACKER BIOSOLUTIONS

- ▶ High potential for future development

WACKER POLYMERS

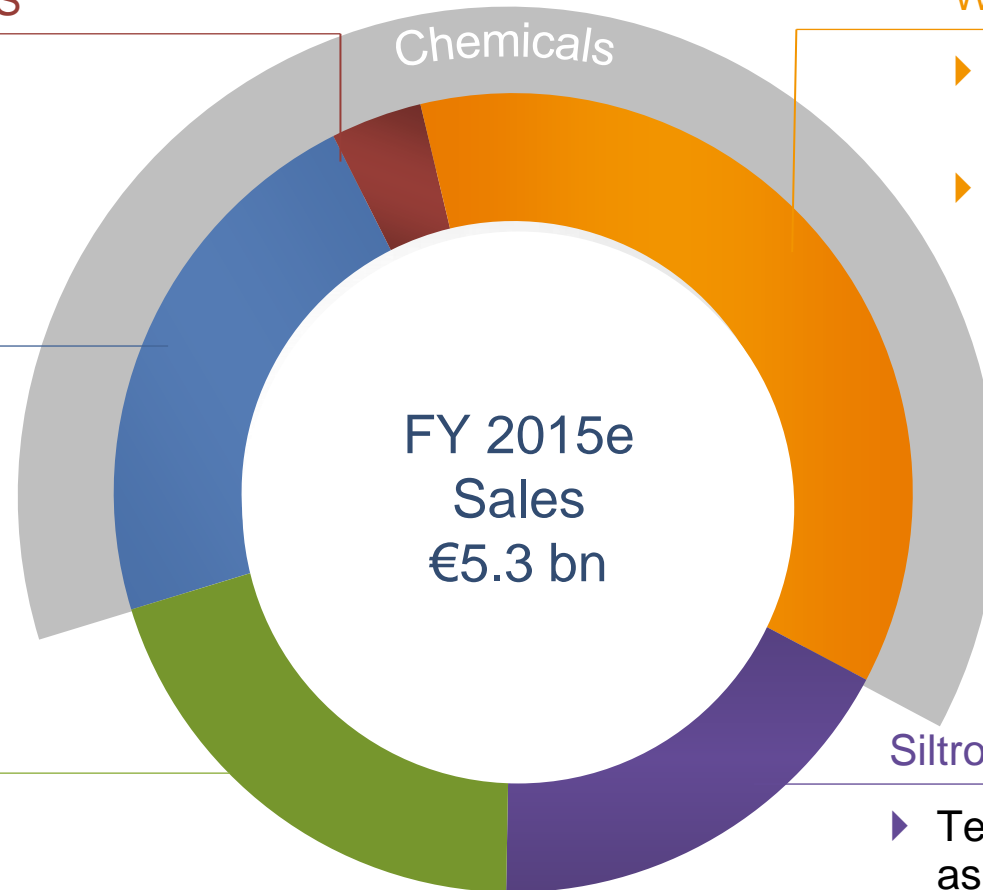
- ▶ No. 1 in dispersible polymer powders
- ▶ No. 1 in VAE dispersions
- ▶ Global footprint

WACKER POLYSILICON

- ▶ No. 2
- ▶ Cost and quality leader
- ▶ Enabling industry growth

WACKER SILICONES

- ▶ No. 2 with global footprint
- ▶ Leading positions in key growth segments



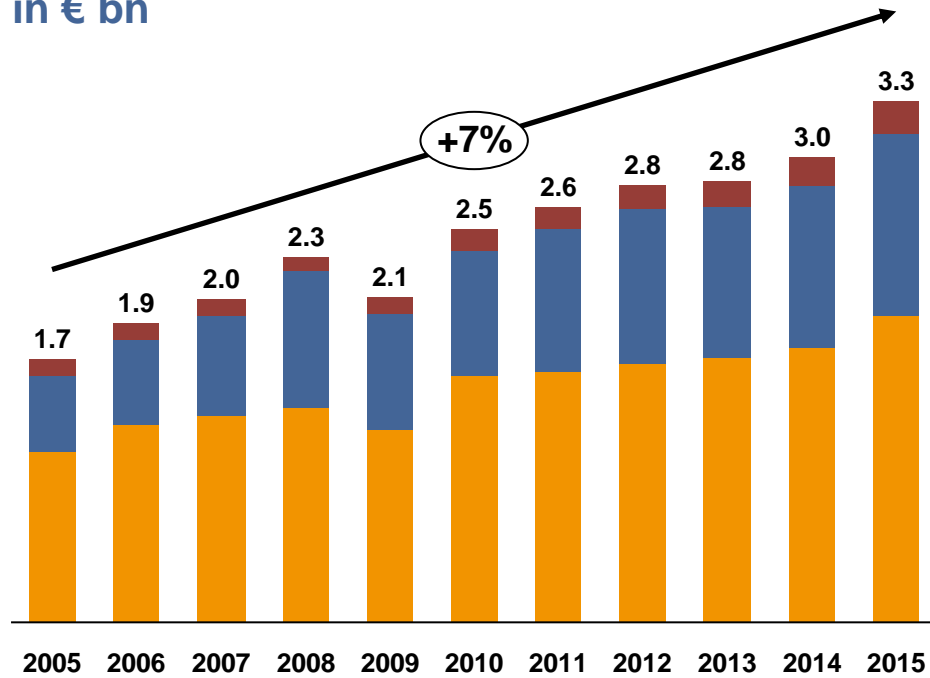
Siltronic

- ▶ Technology leader, ranking as no. 3
- ▶ Balanced base of customers

Note: Percentages based on external sales per segment

Chemicals with Strong Growth and Contribution to EBITDA

Sales Chemical Divisions
in € bn

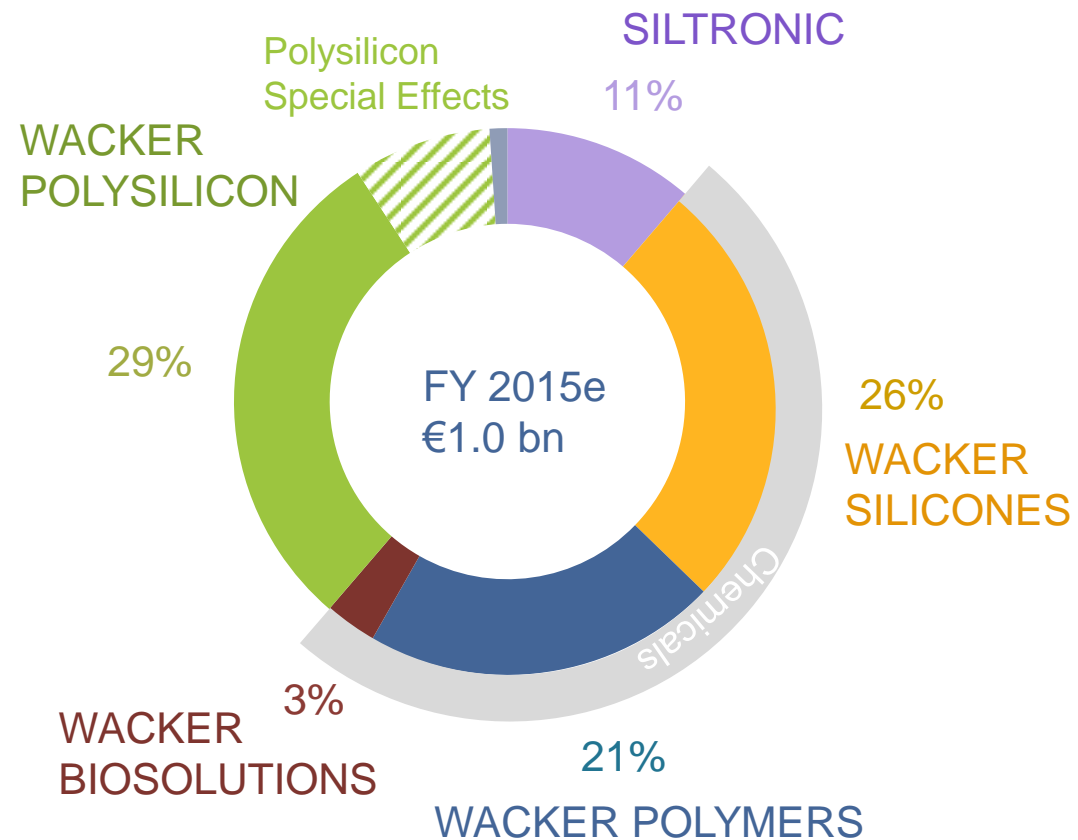


WACKER SILICONES

WACKER POLYMERS

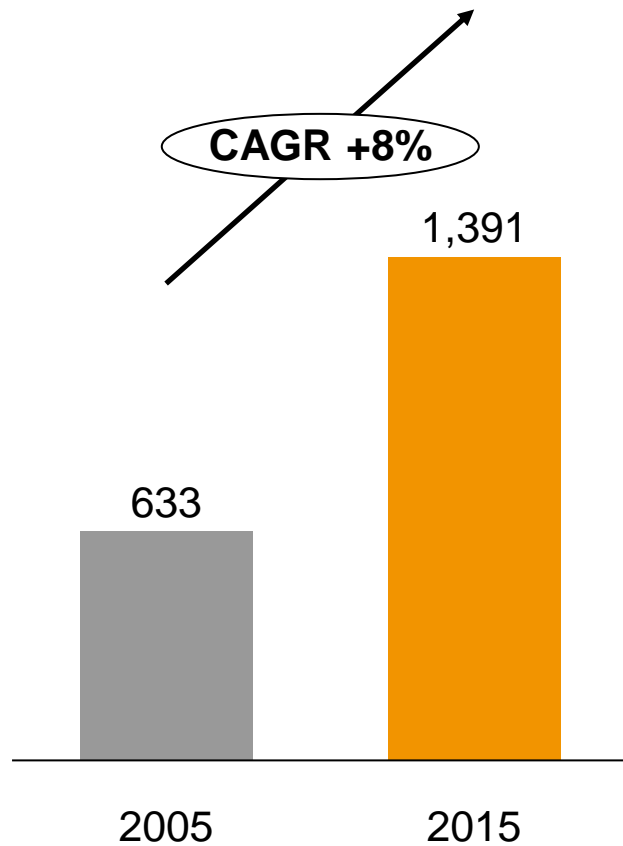
WACKER BIOSOLUTIONS

EBITDA FY 2015e

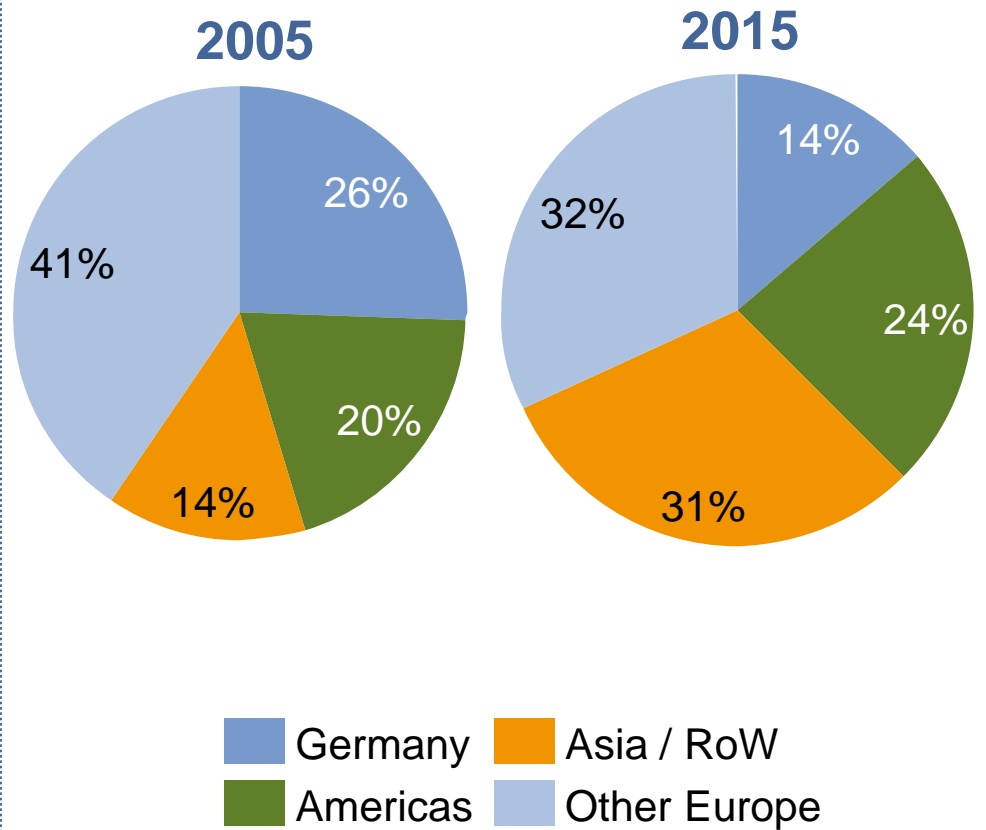


Chemicals: Shipments Grew 8% CAGR since 2005

Chemicals Shipments (kt)

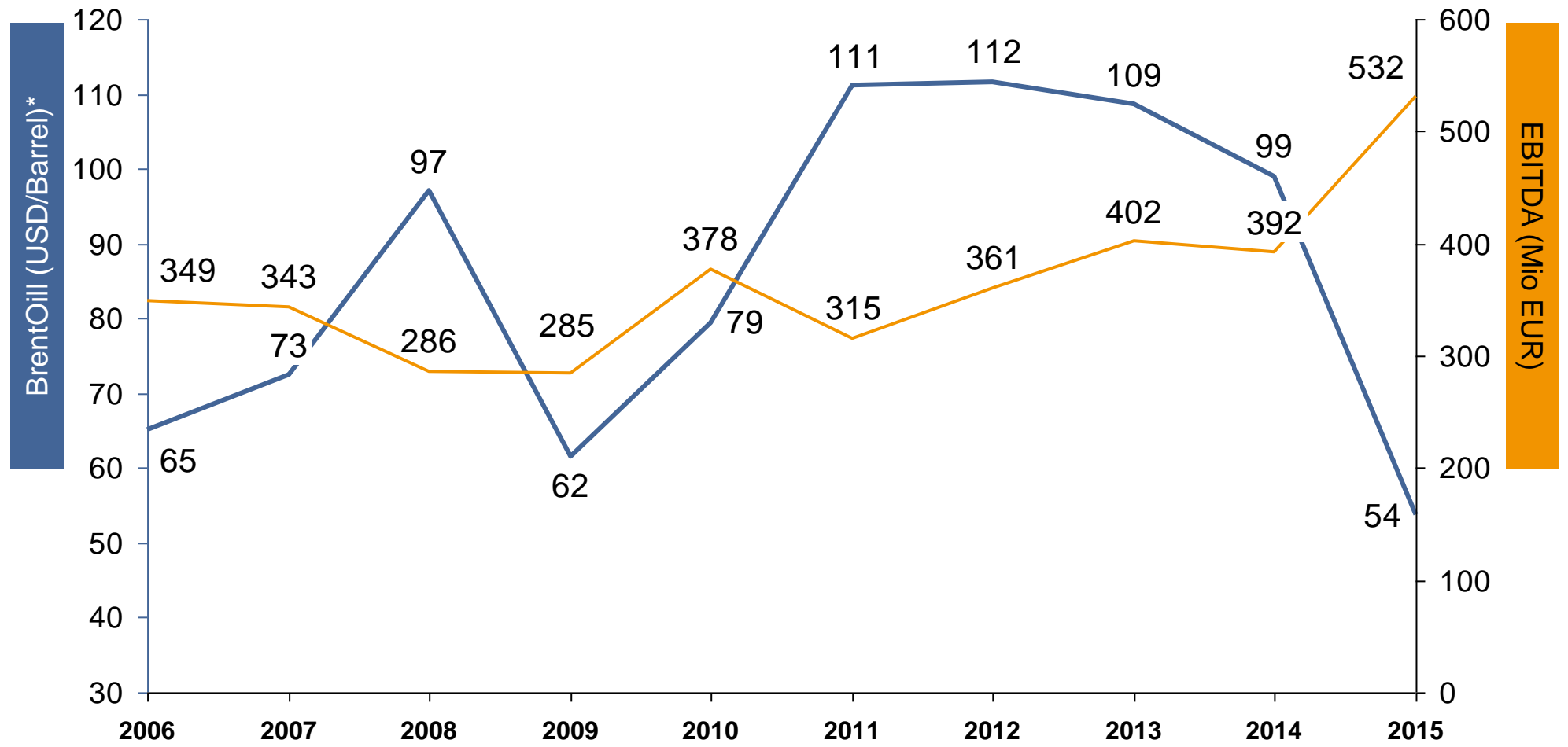


Regional Split



Chemicals EBITDA not Correlated to Crude Oil: $R^2=0,033$

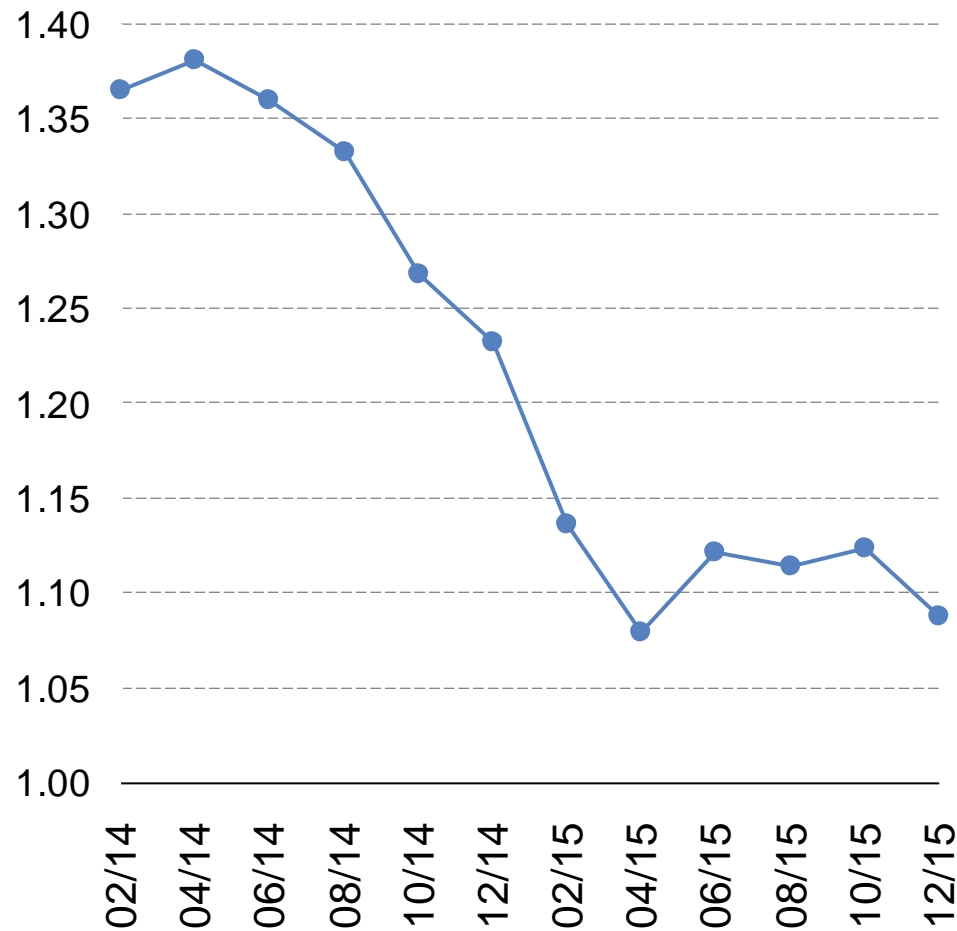
Chemicals EBITDA (mn €) & Brent Oil (USD/Barrel) 2006-2015



* Yearly Average

1 Cent Change in USD/€ Exchange Rate had an Impact of €5.3m* on FY-EBITDA 2015 – thereof ~ €2m Effect on Chemicals

USD/EURO Development

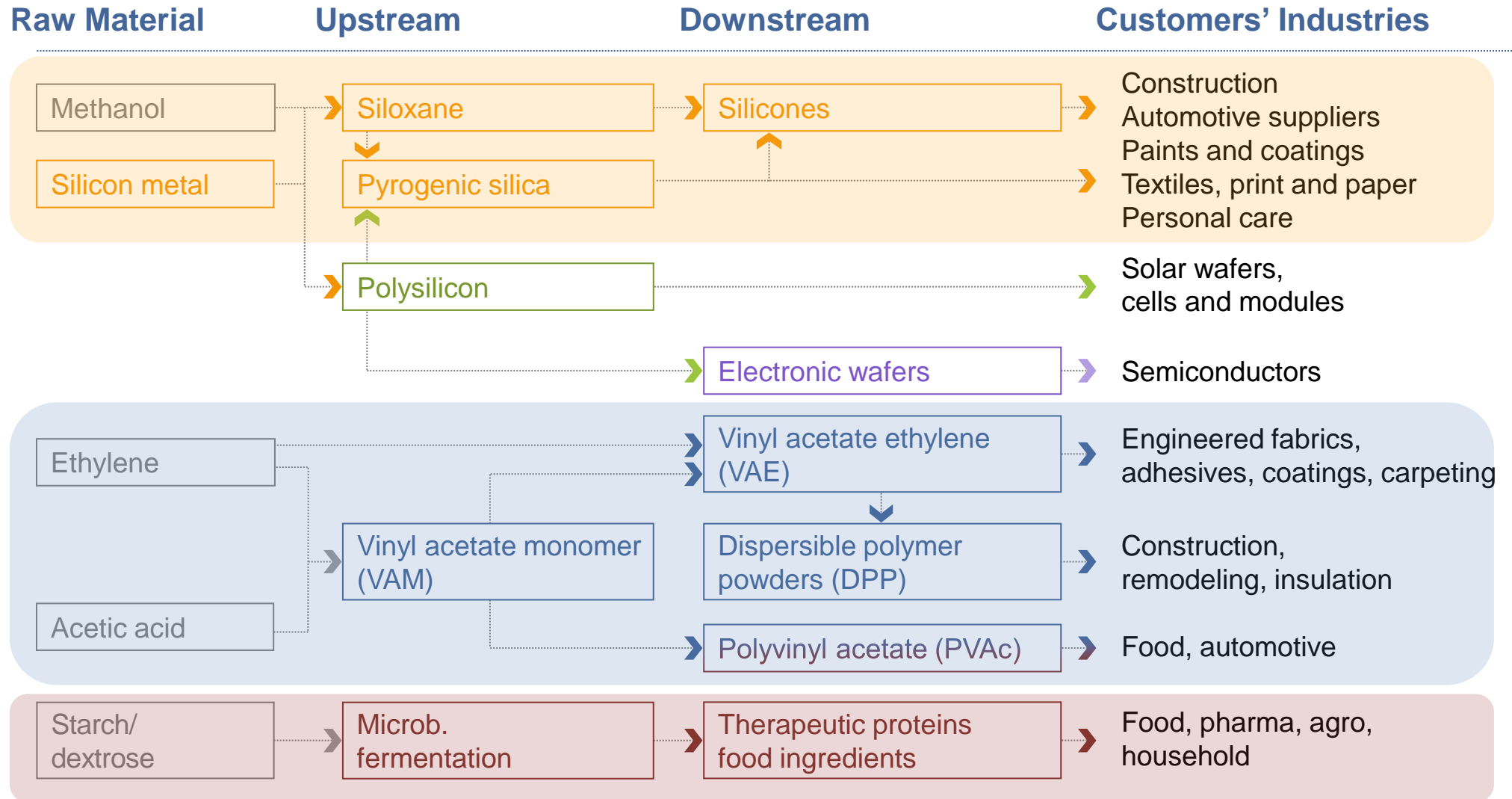


Net USD Exposure FY 2015e



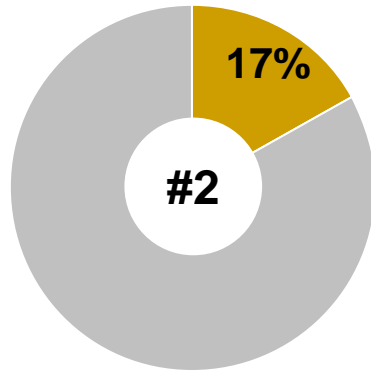
* unhedged

WACKER: Highly-Integrated Operations Based on Five Key Raw Materials

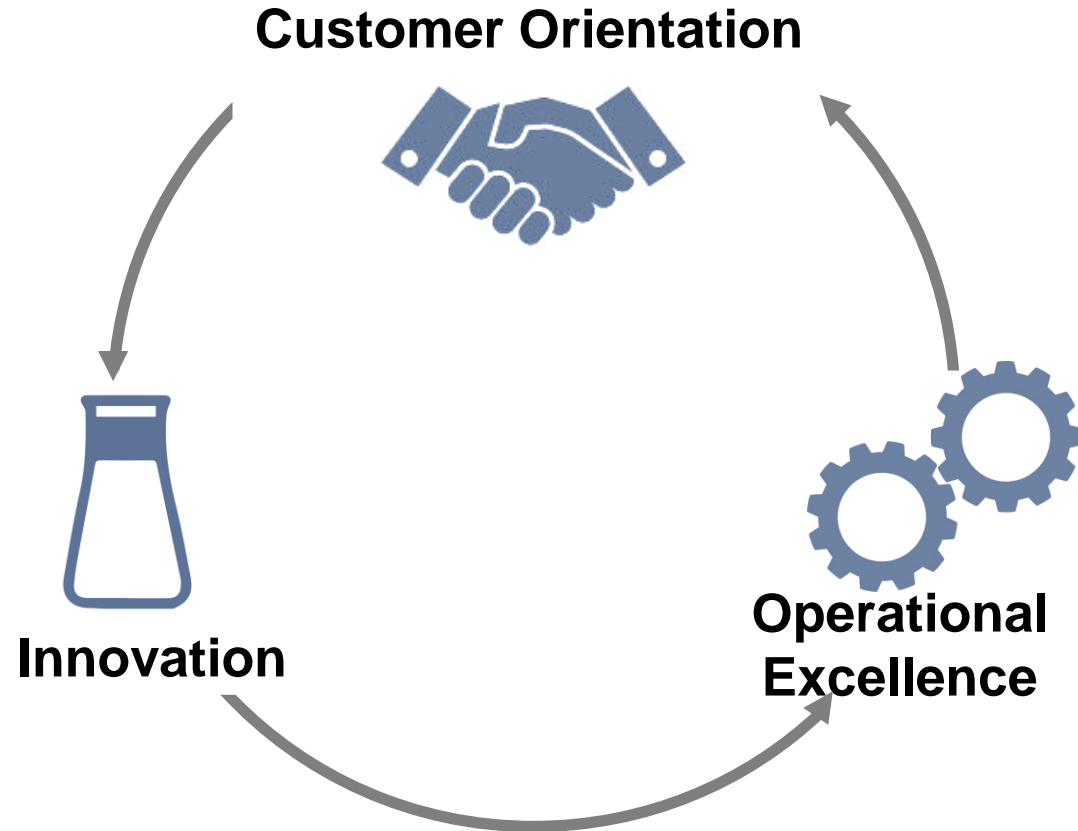
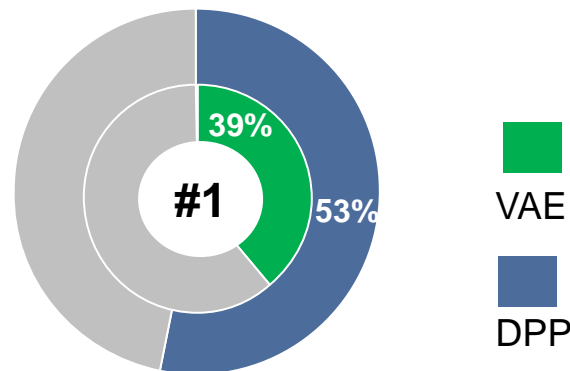


WACKER with Strong Market Positions in Chemicals Divisions Through Excellence in Operations, Innovation & Sales

SILICONES



POLYMERS



▶ WACKER – CREATING TOMORROW'S SOLUTIONS TODAY

Customer Orientation: WACKER Serves >8,000 Customers Directly with Technical Solutions

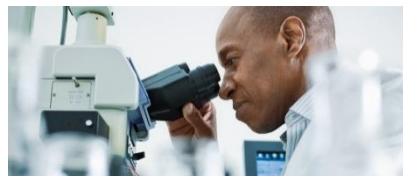


Technical Center

- ▶ 22 Technical Centers worldwide to service customers and develop products & applications

WACKER ACADEMY

- ▶ 13 WACKER ACADEMY sites provide training and product know-how tailored to our customers' needs



Technical Centers



WACKER ACADEMY

Innovation: Generating Growth in Chemicals: >10% New Product* Revenue

Strengthen of existing Business

- ▶ Secure and Extend Market Position

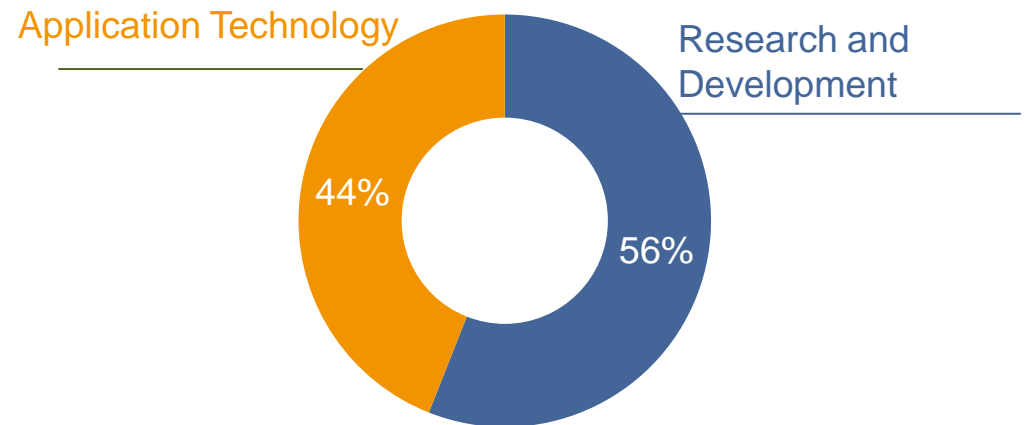
Optimization of Processes

- ▶ Leader in Technology and Cost

New Developments and Markets

- ▶ Development of new Segments and Markets

Expenditures in Chemical Divisions



Innovation Facts Chemicals 2015

- ▶ R&D and ADTS** Ratio: 4.4% of sales
- ▶ R&D employees: ~650
- ▶ Portfolio: >150 projects
- ▶ New product rate >10%

* New products are not older than 5 years
**Application Development Technical Services

Operational Excellence: Continuous Improvements through WACKER Operating System WOS

Continuous Expansion of WOS



- ▶ Global roll out



- ▶ Improvement of tools & methods

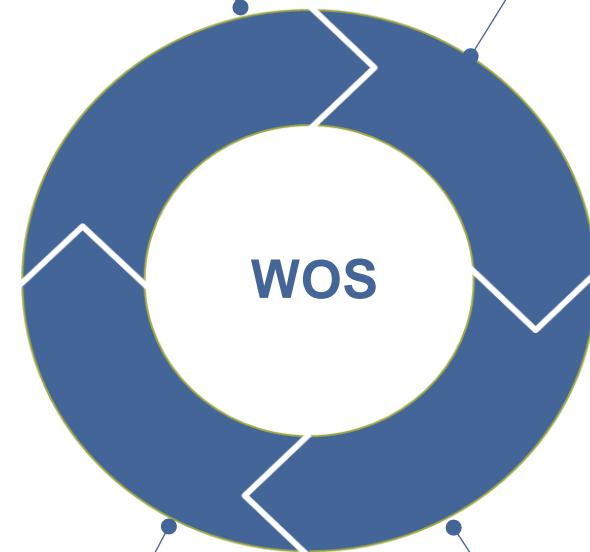


- ▶ Increasing number of topics

Systematic Approach in WOS

Ambitious Goals

Projects

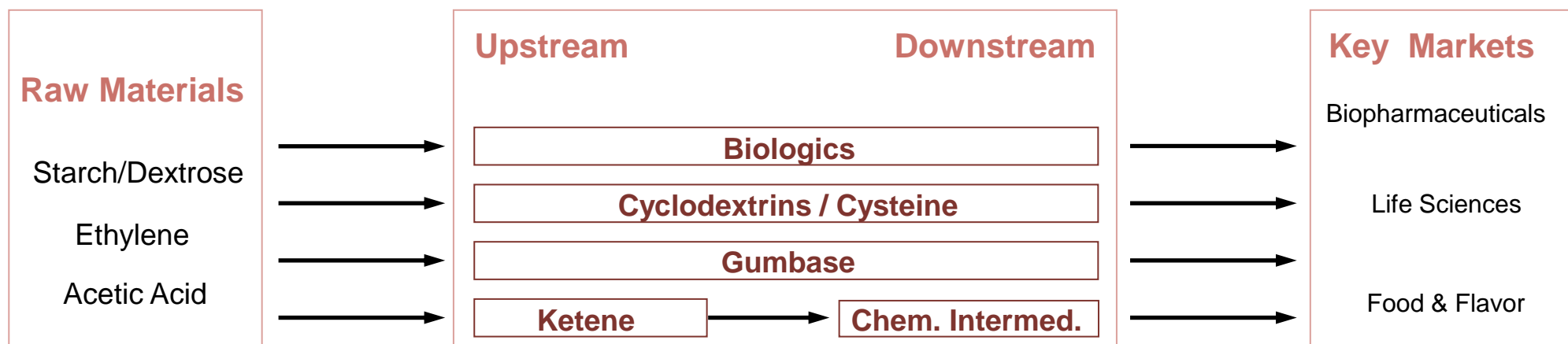


Employees

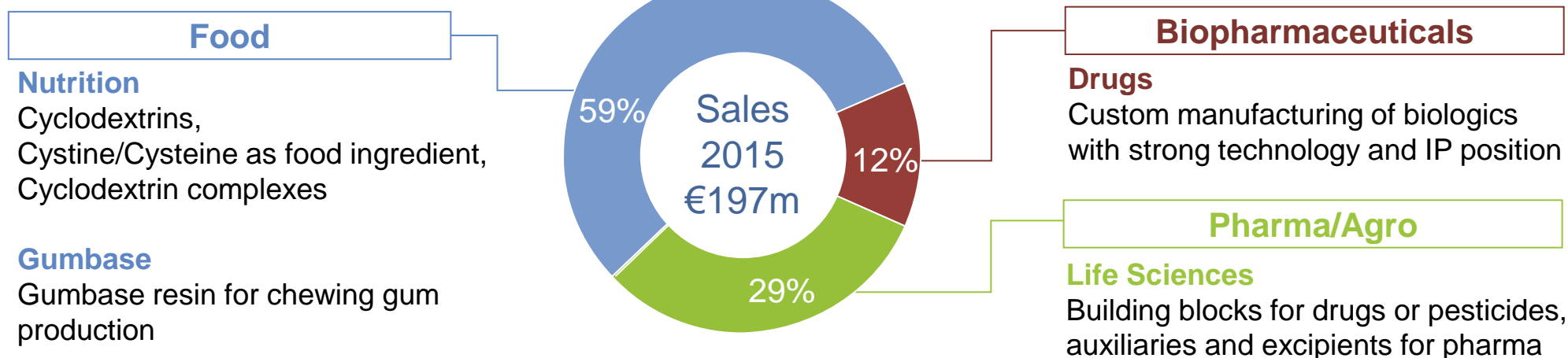
Tools

BIOSOLUTIONS - Focusing on Non-Cyclical Markets

Supply Chain

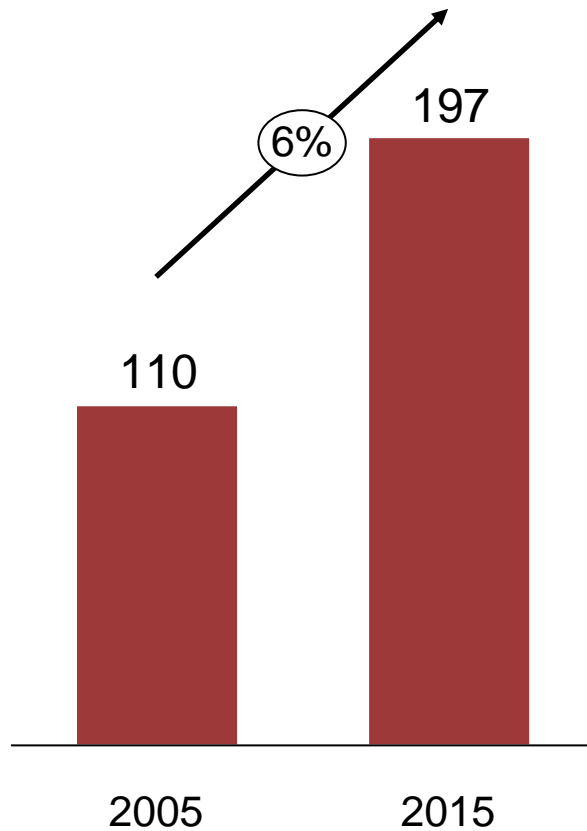


Business Structure

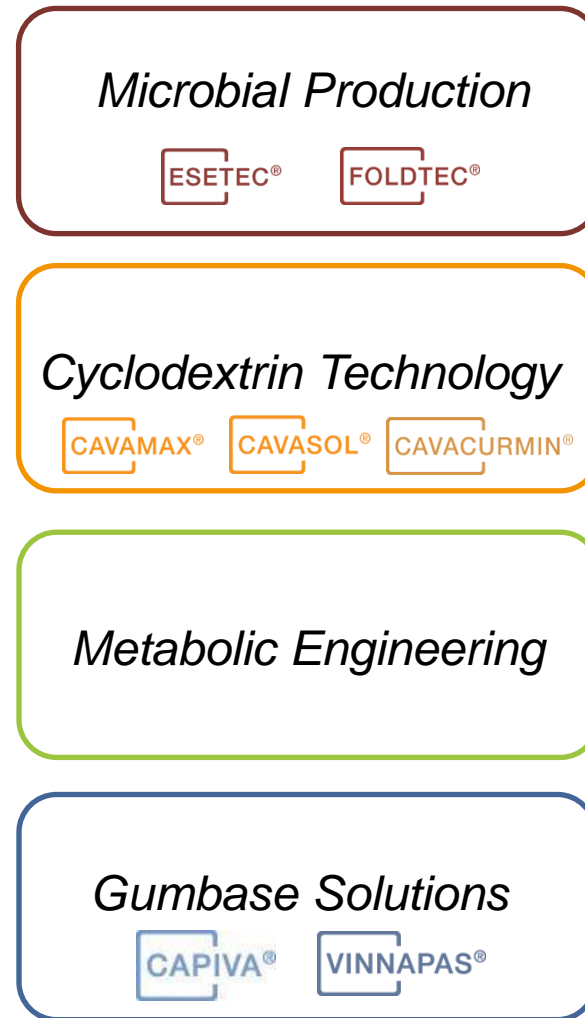


BIOSOLUTIONS – Our Technology Platforms Offer Solutions to our Customers in some of the most Promising Markets

Sales development
€ m



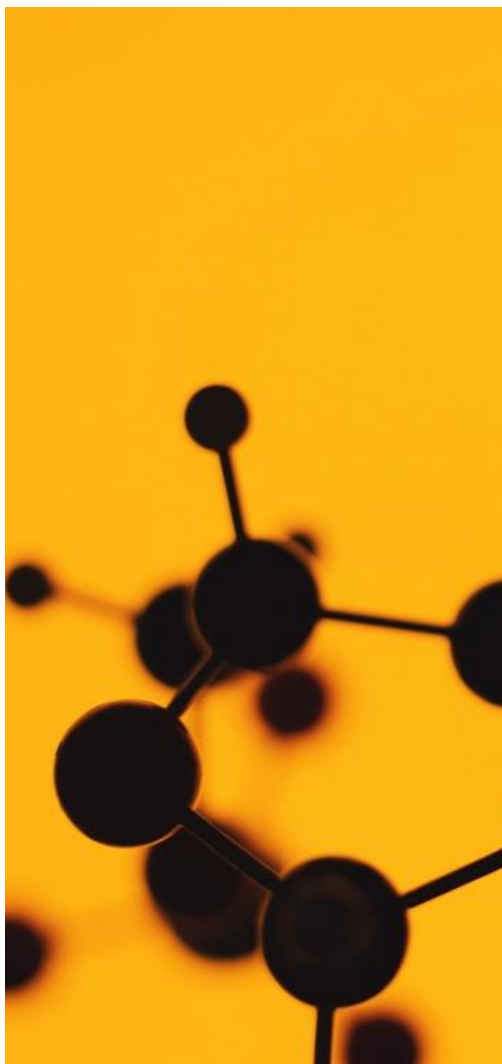
Technology Platforms



Main Markets served



Chemical Day 2016



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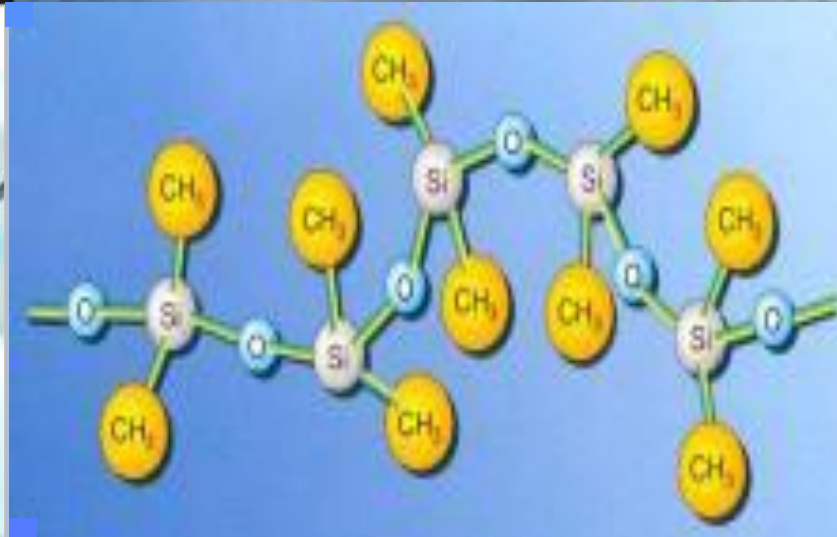
Mr Willems: WACKER SILICONES

Dr. Hartel: WACKER POLYMERS

Dr. Hartel / Mr Willems: The Common Ground - Chemicals

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Chemical Day 2016 – WACKER SILICONES February 15, 2016

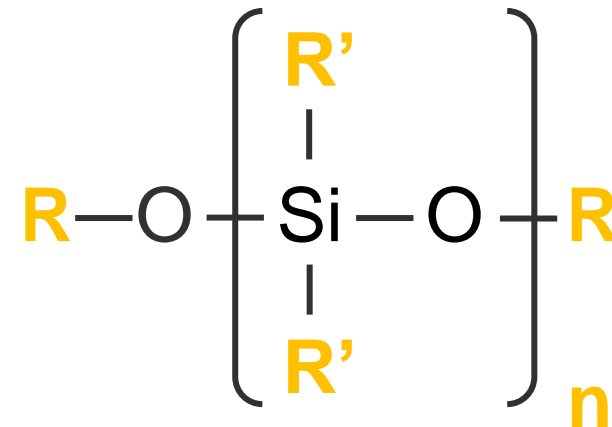
Auguste Willems, Member of the Executive Board, Wacker Chemie AG

The Chemical Structure of Silicones offers Multiple Options to Design Material Properties

Most significant benefits are:

- ▶ Excellent chemical resistance
- ▶ Thermal stability ~200° C and above
- ▶ Physiological compatibility
- ▶ Stable properties over wide T-range
- ▶ Versatile to modifications
 - ▶ from linear to branched network structures
 - ▶ different chain lengths **n**
 - ▶ different substituents **R**
 - ▶ ability to incorporate different fillers

Silicones



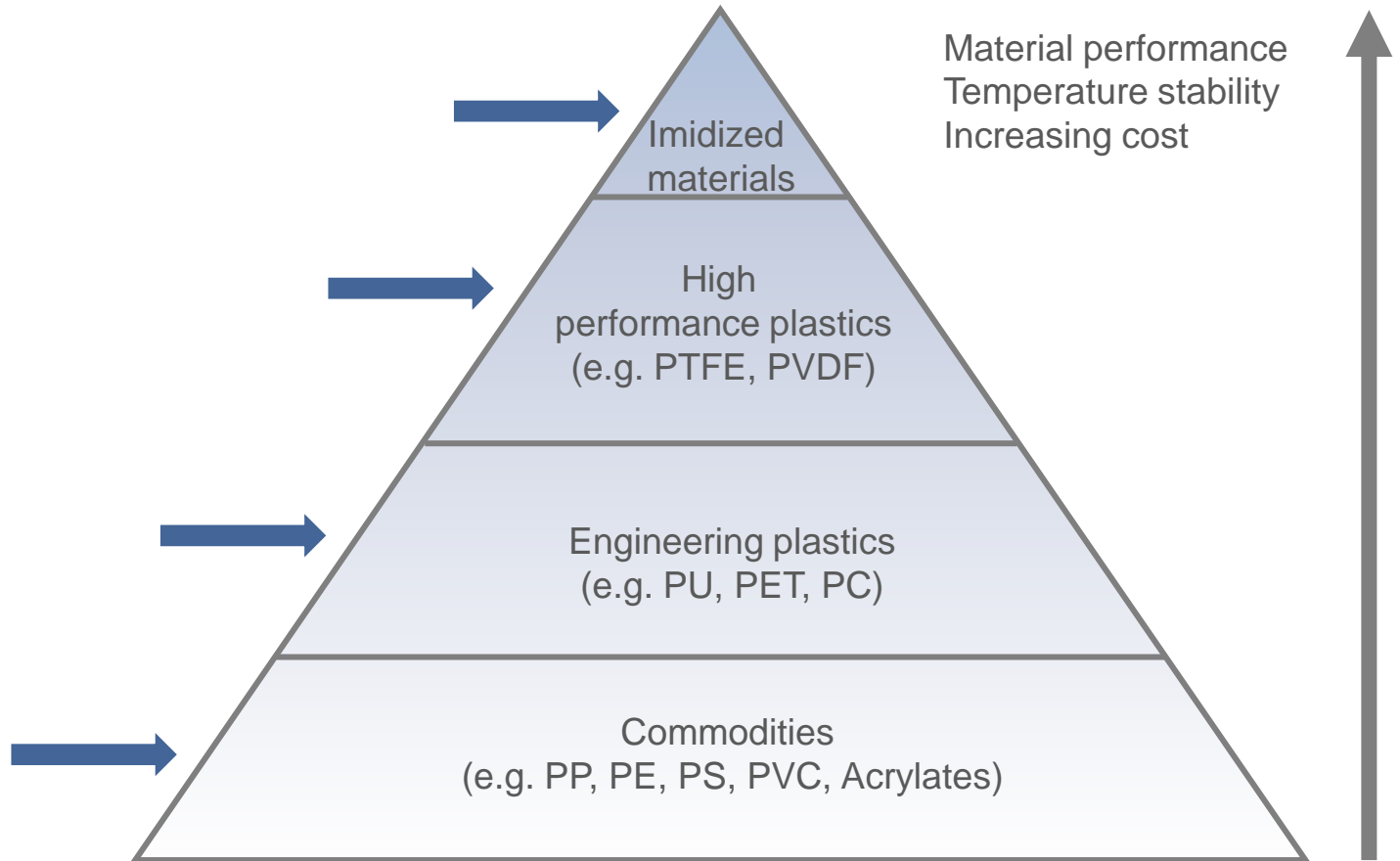
Siloxane-Polymer¹

¹PDMS (Polydimethylsiloxane) with R' = CH₃ (Methyl)

▶ **Silicones are the Chameleon within Plastics**

Large Substitution Potential with Increasing Requirements on Plastics

Superior heat stability
Inerthness
Lubricating properties
Insulating
Colourable
Optical transparent
Non yellowing
Excellent water repellency
Stress resistant

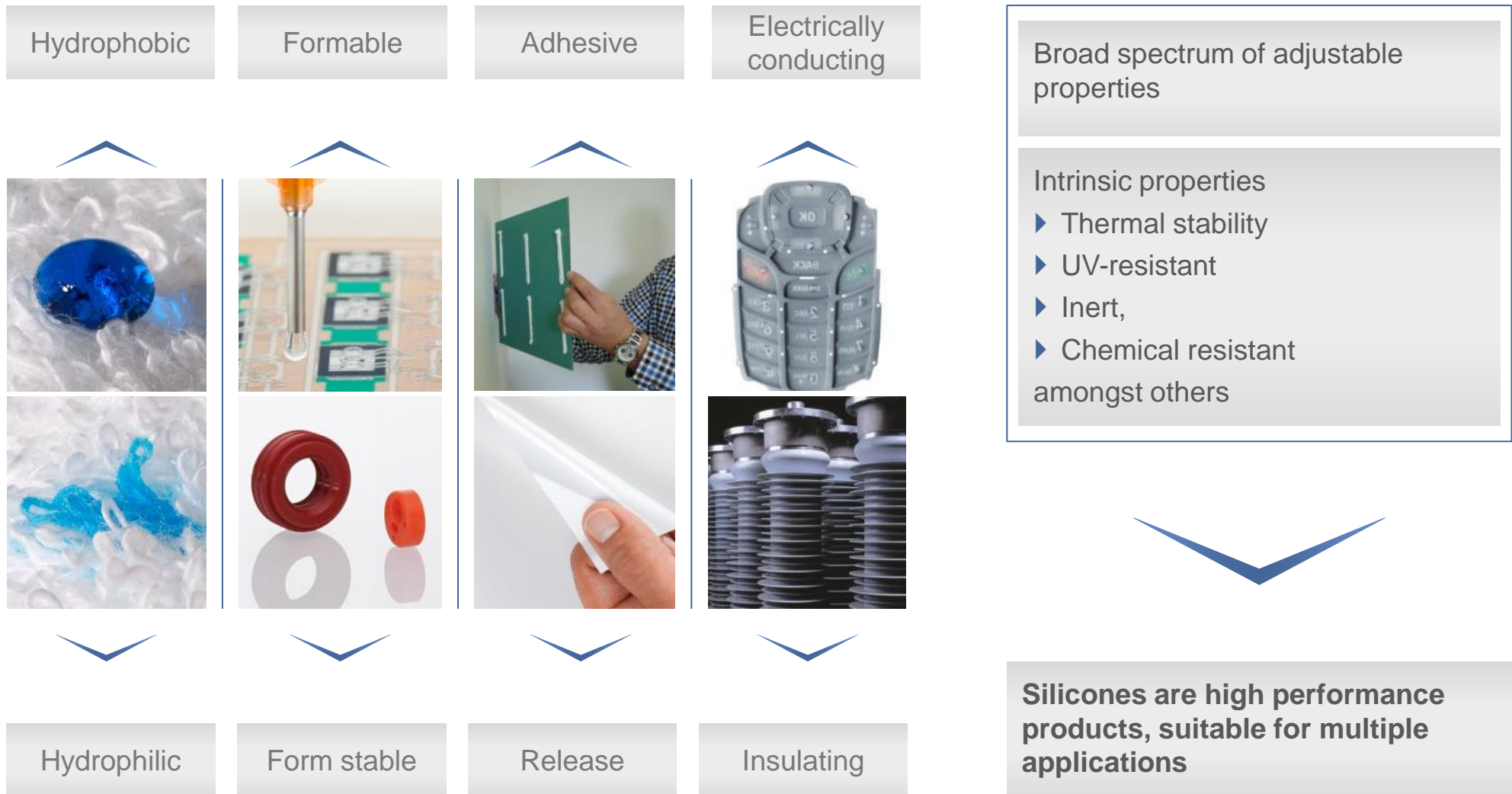


► **CAGR 2008-2014 by volume: Plastics¹ ~4%, Silicones² ~5%**

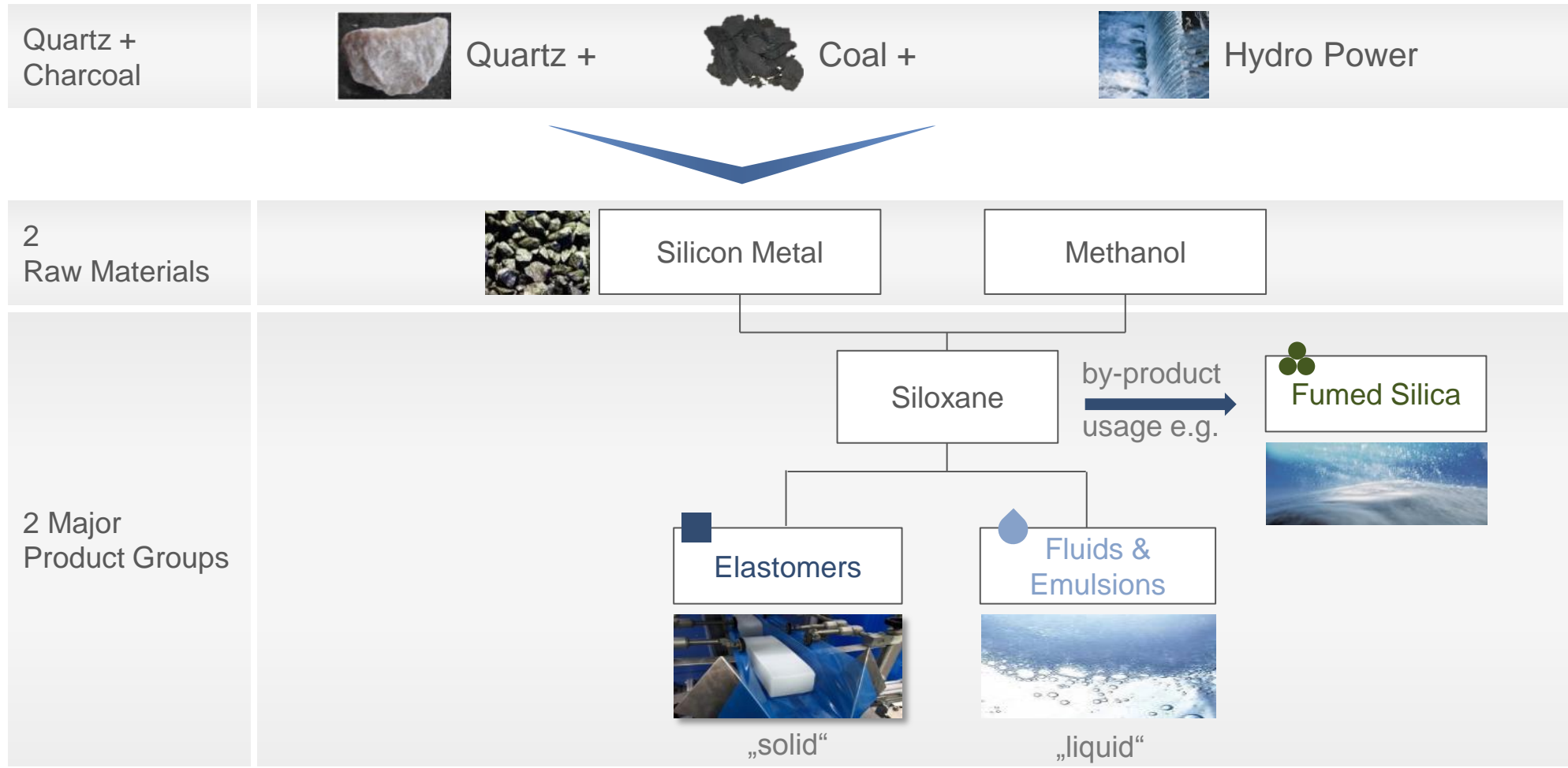
¹Plastics Europe, Consultic

²PDMS production volume reference, Market studies, Annual reports, Industry estimates

Customization - Combining a Unique Set of Properties



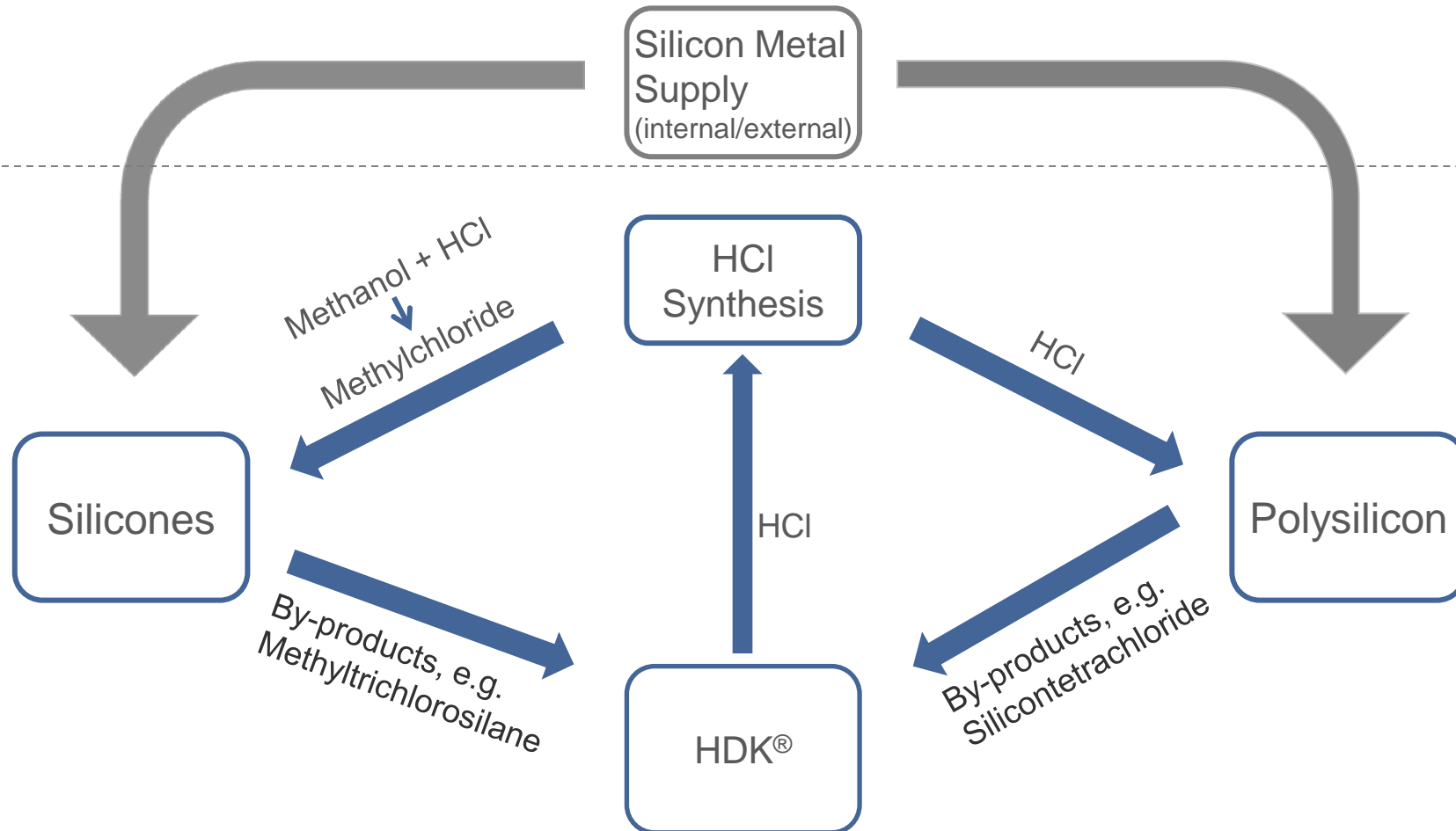
From Silicon Metal to Multiple Markets



>3,000 products in multiple applications and >15,000 direct and indirect customers

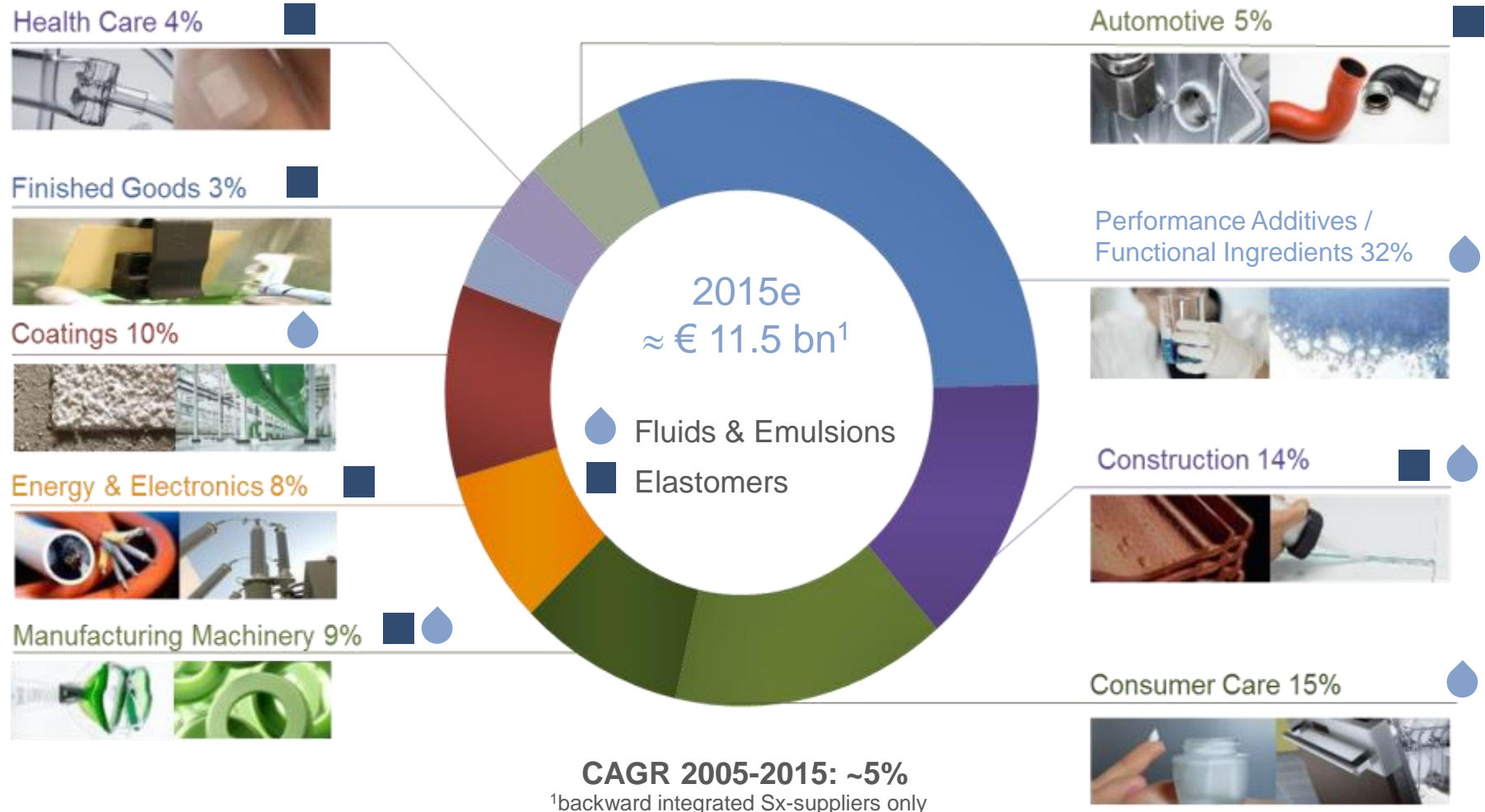
WACKER's Unique Strength - Highly Efficient Verbund Production of Siloxane, Poly and HDK* Combined with Inhouse Silicon Supply

Scheme for the WACKER Production "Verbund"



*HDK = Hochdisperse Kieselsäure (Fumed Silica)

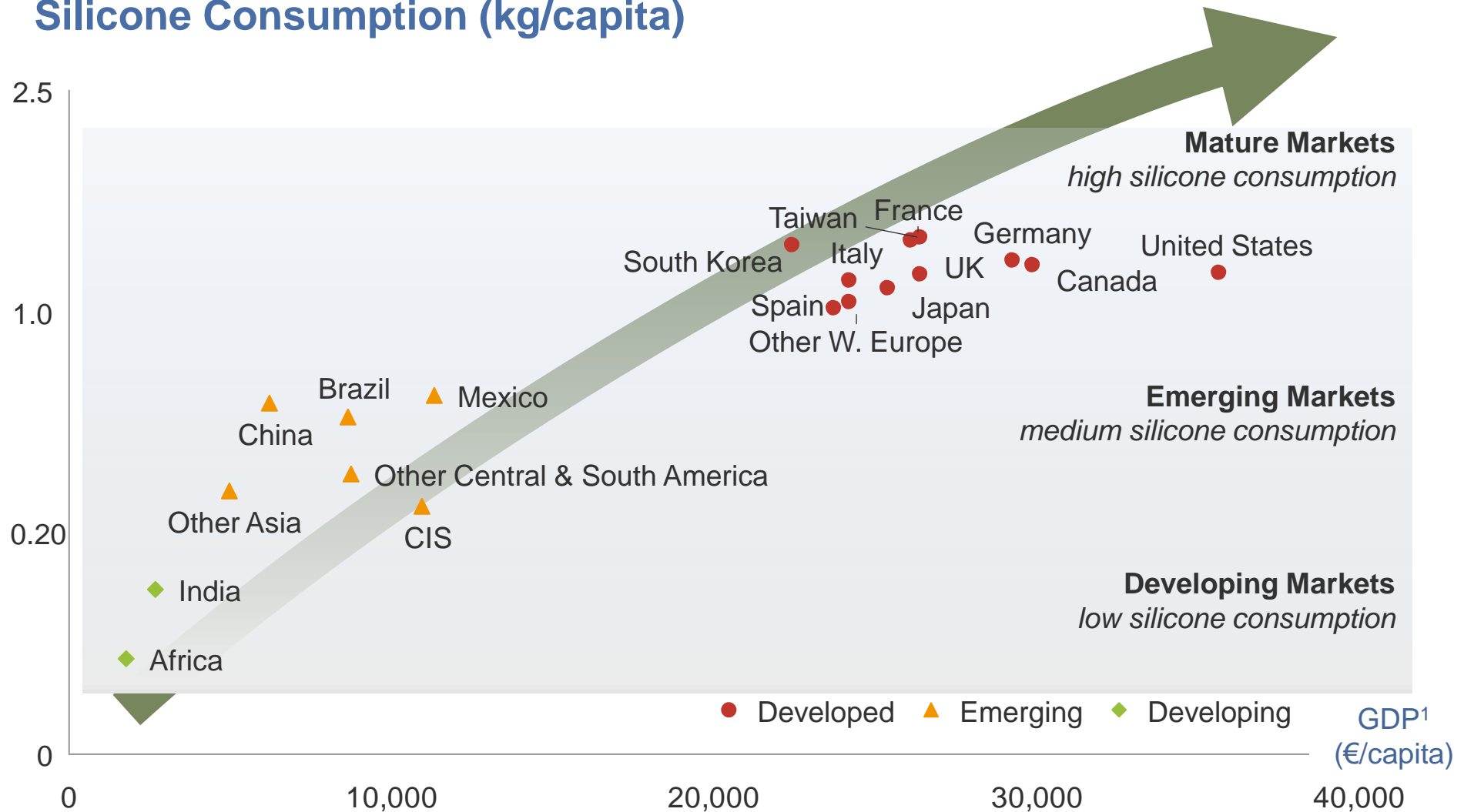
Silicone Market Diversified across Industries and Applications



Source: Market studies, Annual reports, WACKER estimates

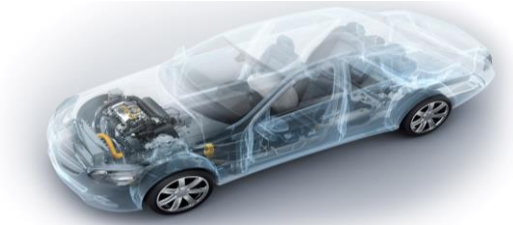
~85% of the Global Population will Catch up with their Silicone Consumption

Silicone Consumption (kg/capita)



Increasing Demand for Silicones in All Markets

Mobility



- ▶ Airbag coating
- ▶ Vibration control
- ▶ Turbo charger hoses
- ▶ Automotive lighting
- ▶ Protection of electronic control units (e.g. ABS¹, ESP², ACC³)

Digitization



- ▶ Optical bonding
- ▶ LED Backlighting
- ▶ Sealing
- ▶ Electromechanical shielding
- ▶ Thermal management

Medical



- ▶ Medical parts, e.g. Catheters
- ▶ Baby care
- ▶ Wound dressings
- ▶ Orthopedics
- ▶ Prosthetics

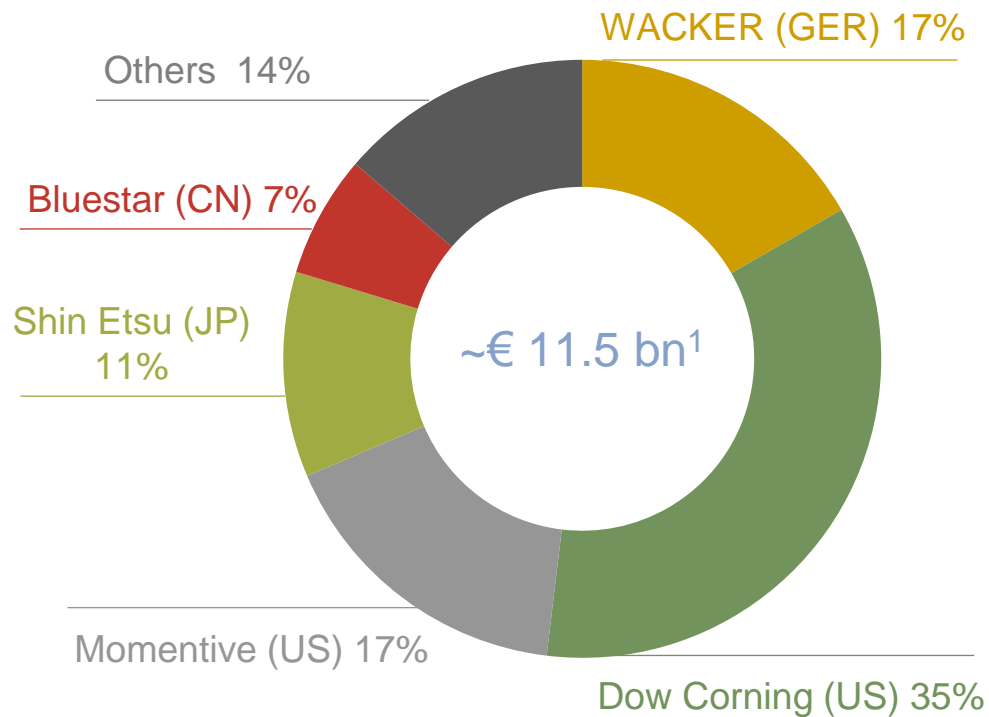
¹Antilock Braking System

²Electronic Stability Program

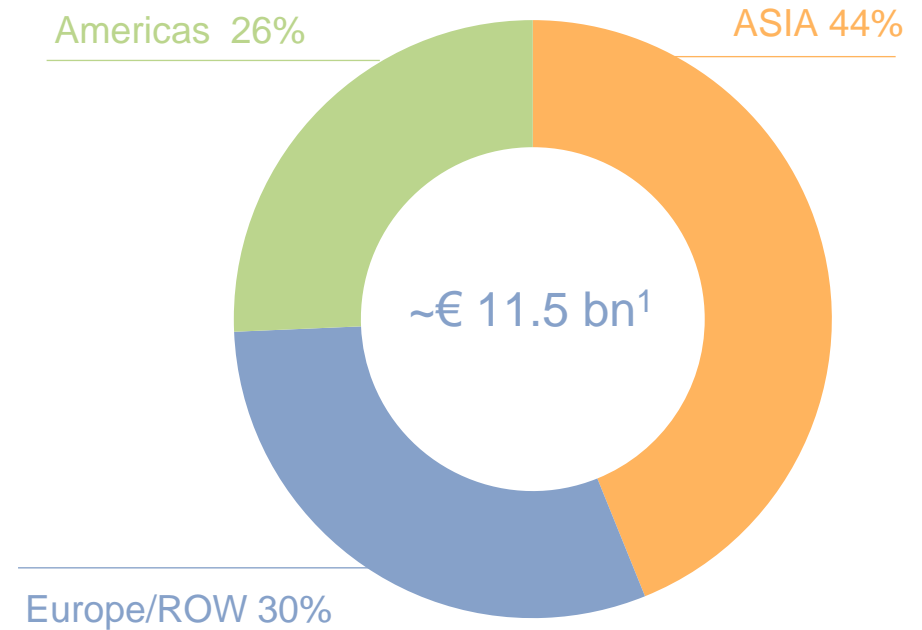
³Adaptive Cruise Control

WACKER as Global Player holds #2 Market Position Globally

Market by Competitor 2015e in %



Market by Region 2015e in %



¹Silane/Siloxane backward integrated suppliers only; WACKER data incl. HDK

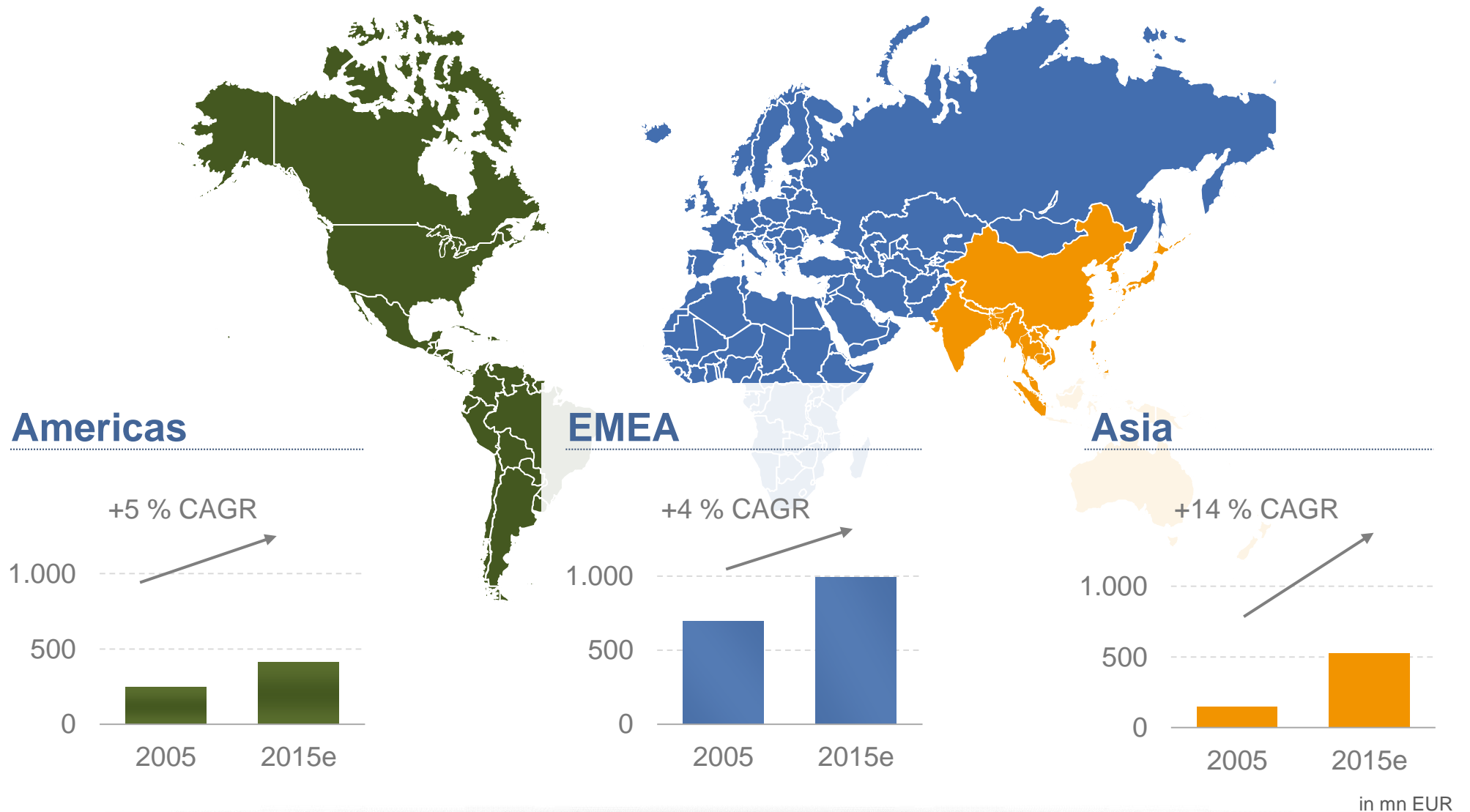
Multinational Competitors with Different Set-up

Overview on Competitor's Own Capabilities

	WACKER	Dow Corning	Momentive	ShinEtsu	Bluestar	Evonik
Silicon Metal	✓	✓		✓	✓	
Silanes	✓	✓	✓	✓	✓	✓
Siloxane production	Europe Asia	North America Europe Asia	North America Europe Asia	Asia	Europe Asia	
Fumed Silica Technology / Production	Europe Asia					North America Europe Asia
"Silicium Verbund-Site" ¹	✓					

¹Siloxane / Poly / HDK production incl. coupled material- and energy flows

Over the Last Decade WACKER SILICONES has grown at 6%



Strong Global Footprint with Local Presence

Technical Center & WACKER ACADEMY



22 Technical Centers worldwide to service customers and develop products & applications



13 WACKER ACADEMY sites provide training and product know-how tailored to our customers' needs.

✱ Tech. Center
 ✱ Tech. Center + ACADEMY
 ✱ Integrated Production Site
 ✱ Production Site

13 Production sites – Economies of Scale Upstream sites in Europe and Asia



Siloxane capacities

Burghausen >120 kt

Nünchritz >130 kt

Zhangjiagang-JV¹ >200 kt



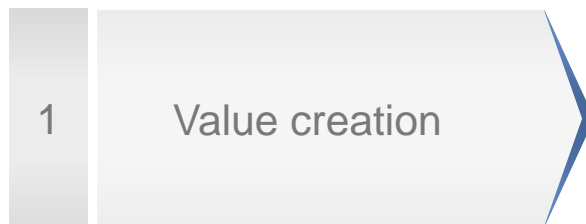
- ▶ Silicon Metal production at Holla in Norway (50 kt)
- ▶ 3 world scale upstream sites

- ▶ Global footprint of flexible downstream production units

¹WACKER: 25% Share

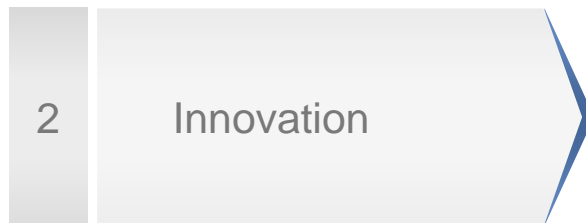
SILICONES Targets 6% Profitable Growth

Strategic Focus

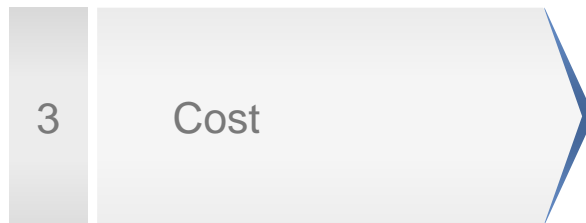


Our Roadmap

- ▶ Push our specialty business by investing in downstream production and service close to our customers

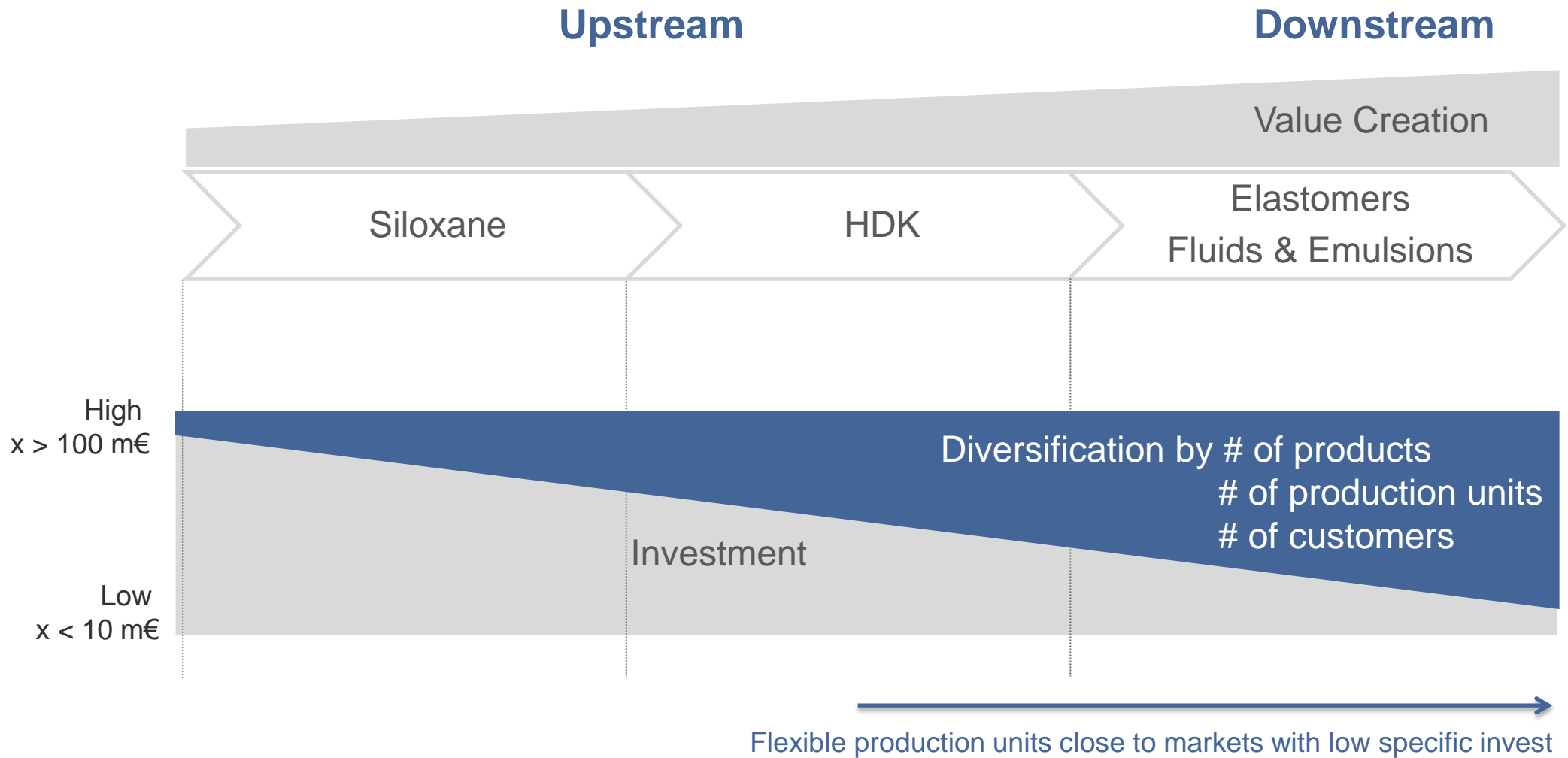


- ▶ Investigate opportunities for organic replacement and open up new markets for Silicones

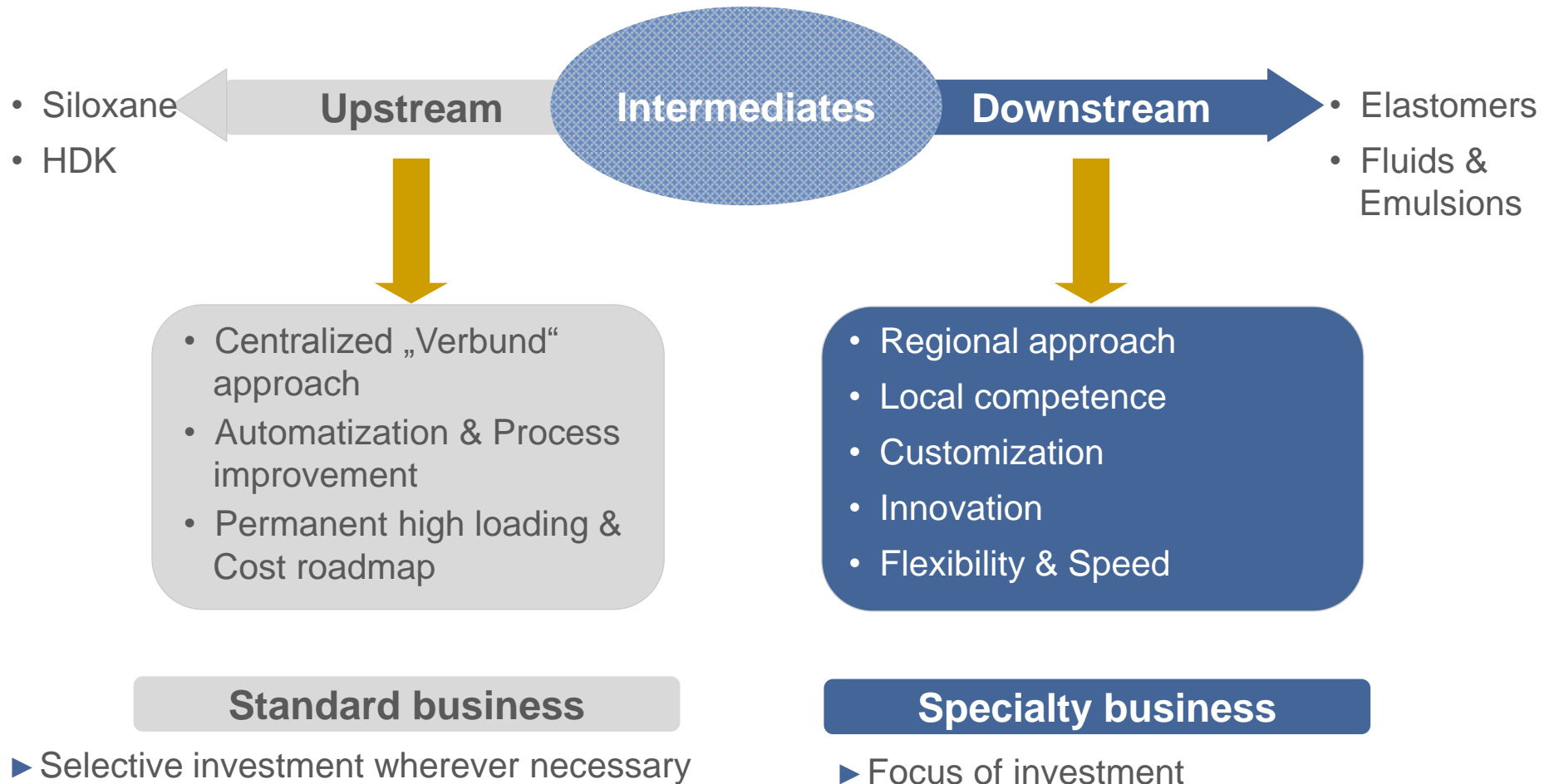


- ▶ Continuous cost improvement through operational excellence

Reduce Capital Intensity of Growth with Focus on Downstream Specialties



Master the Ambiguity – Up- and Downstream Challenges Are Different, Likewise the Key Elements for Success



Specialty Focus Creates Value

Standards Needed for Economies of Scale and New Market Entry

Standards

- ▶ Exchangeable
- ▶ Price elastic
- ▶ Low requirement for technical service

Specialties

- ▶ Specified properties
- ▶ Value based pricing
- ▶ Technical service is a key success factor

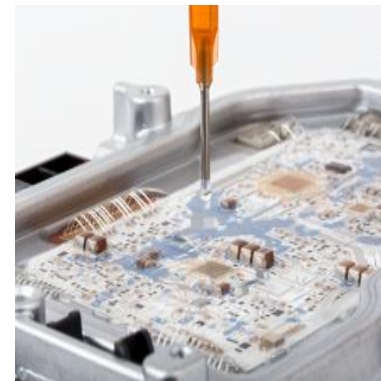
Standards



Customized solutions



Silicone Sealant in
DIY applications



Silicone Adhesive in
Automotive applications

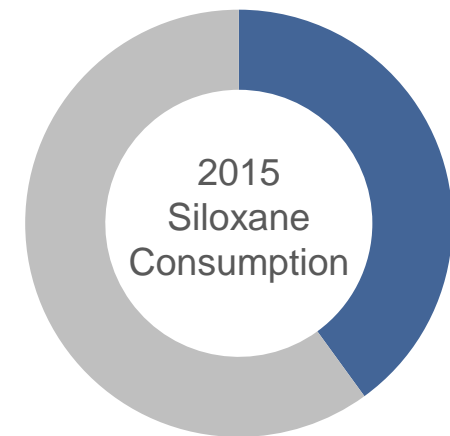
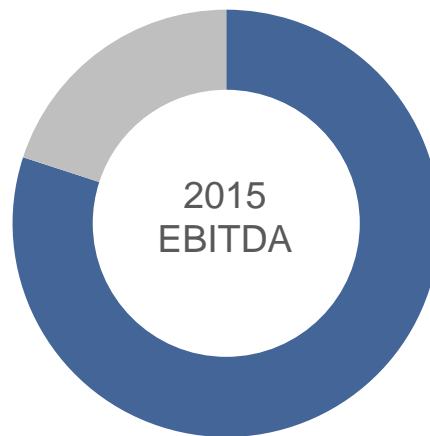
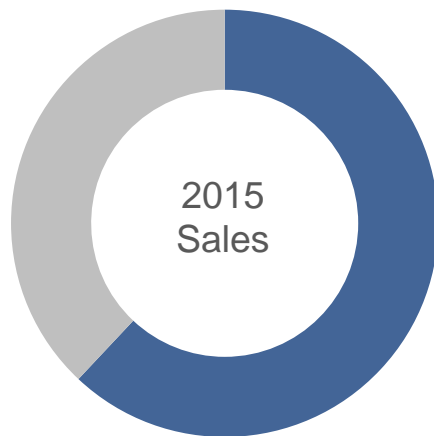
*Electronic Control Unit

High Leverage on EBITDA by Shifting Portfolio to Specialties

Share Specialties / Standards in Sales (€), EBITDA (€), Siloxane Consumption (tons)

■ Standards

■ Specialties



In 2015 Specialties....

- ▶ Generated 1.5 times higher sales compared to Standards
- ▶ EBITDA contribution was ~4 times higher compared to Standards
- ▶ Siloxane consumption was 36% of 2015 capacity (= 43% of 2012 Siloxane capacity)

Specialties Meet Increasing Performance Requirements

Basic solution



- ▶ Desired effects from Silicone fluids in hair care applications are
 - ▶ hair shine
 - ▶ soft silkness
 - ▶ wet- and dry-combing

WACKER Standard products: Silicone Dimethylfluids



Special solution



- ▶ Silicone emulsions with functional groups (e.g. amino) improve especially
 - ▶ dry- and/or wet-combing
 - ▶ soft silkness
 - ▶ durability of effects
 - ▶ ease of formulation
- ▶ Customized formulations provide benefits and support customer retention

WACKER Specialty products: Belsil® ADM, Belsil® DADM

Our Innovation Capabilities Support Our Specialty Strategy

Product Innovation

Over the last five years >10% of our annual sales came from new products

Substitution Drivers

Process efficiency & unique material properties



WACKER SiGel®

as alternative to acrylate films for optical bonding due to processing advantages

New Markets

Unique set of material properties is opening up new markets



ELASTOSIL® Film

Silicone film acting as dielectric electroactive polymer (EAP) thus allowing innovative smart sensor designs

Innovation in Automotive Requires Innovation in Silicones

Multibeam LED



LUMISIL® LR

- ▶ Silicones allowing new designs for luminaires like light guides for optimized illumination

Electric mobility – High voltage cables



ELASTOSIL® R, R plus and LR

- ▶ Requirements for alternative drive systems (hybrid/electric vehicles) require Silicone Elastomers
- ▶ very good longterm heat resistance
- ▶ low temperature flexibility
- ▶ excellent electrical insulation
- ▶ excellent adhesion of silicone connector to silicone cable and metal parts to ensure reliable sealing performance

SILICONES EBITDA Influenced by Various Parameters

Ranked Cost Structure of SILICONES

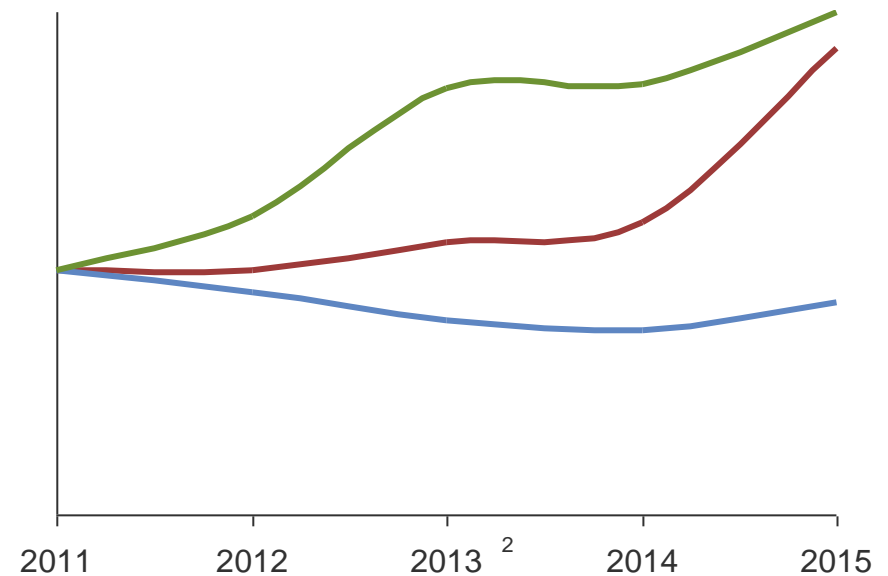
- ▶ Raw Materials
- ▶ Labor
- ▶ Logistics
- ▶ Depreciation

Our Strategy

- ▶ Value based pricing
- ▶ Portfolio shift to specialties
- ▶ High capacity loading
- ▶ Operational Excellence (WOS)
- ▶ Drive regionalization

EBITDA / Raw Material Price Development¹ Siloxane Output (2011 = Index 100)

- EBITDA Margin (in%)
- Raw material price development (Si-Metal, Methanol)
- WACKER Global Siloxane output



Raw Material Pricing: ICIS, IHS, BLOOMBERG

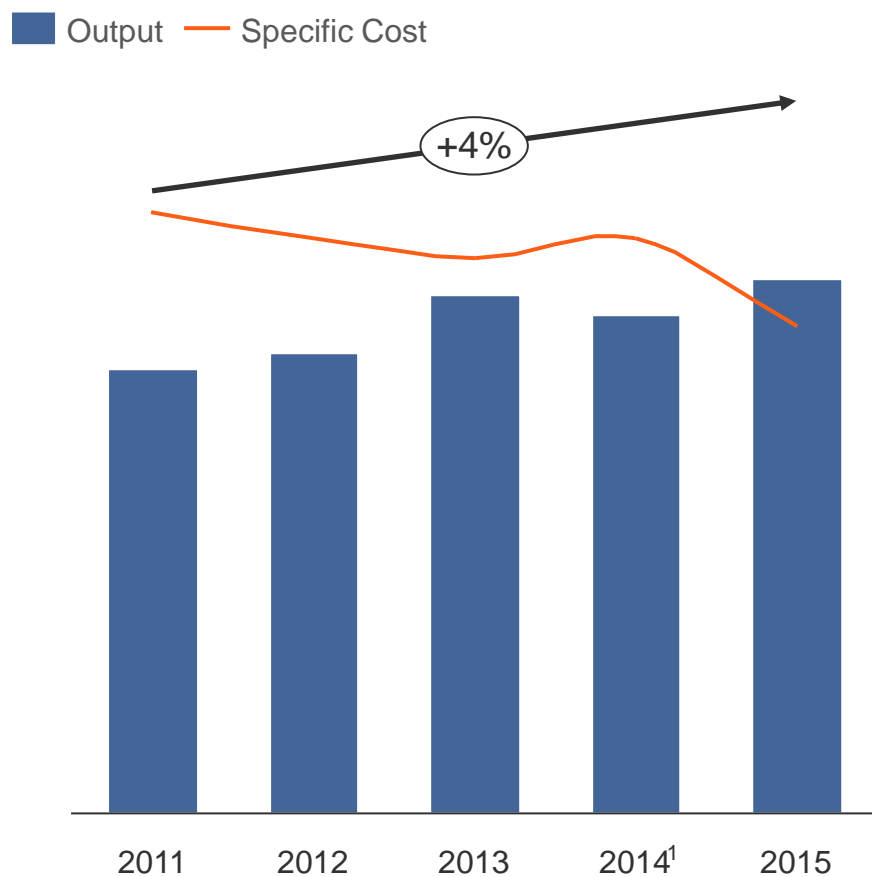
¹Weighted mixed price depending on recipe content in Polydimethylsiloxane

²EBITDA adj. excl. special effects

Operational Excellence is Key

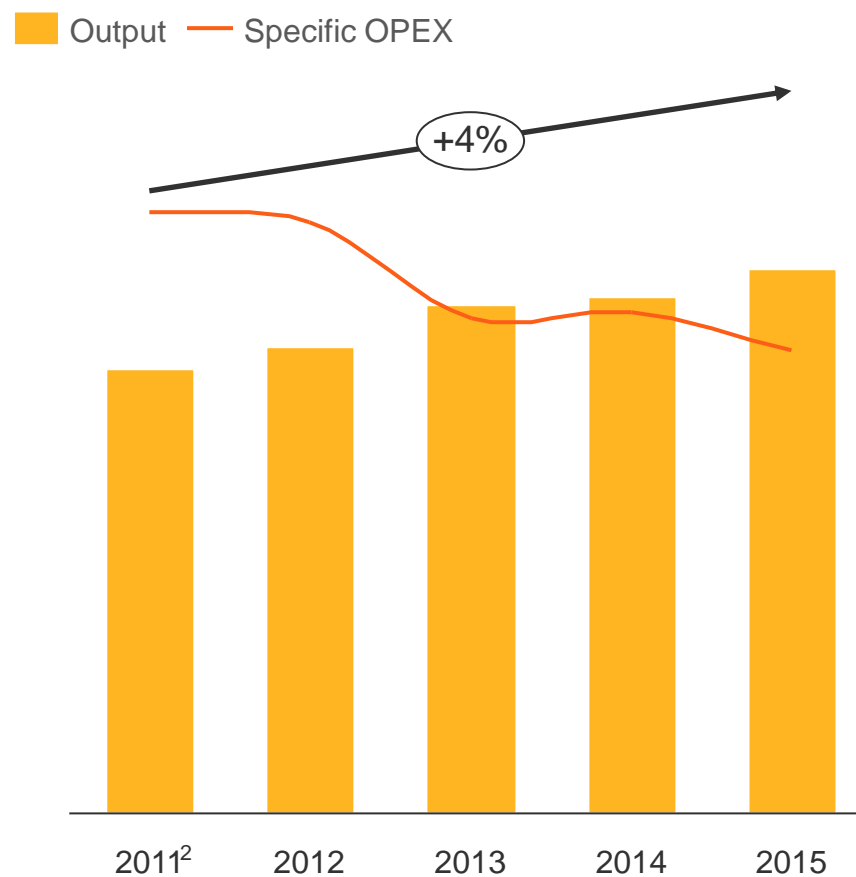
Leverage Existing Capacities and Maximize Output

Siloxane Output & Specific Cost Development
Burghausen & Nünchritz (Index 2011 = 100%)



¹Siloxane plant shutdown in Nünchritz for technical revision

HDK[®] Output & Specific OPEX Development¹
Germany & China (Index 2011 = 100%)



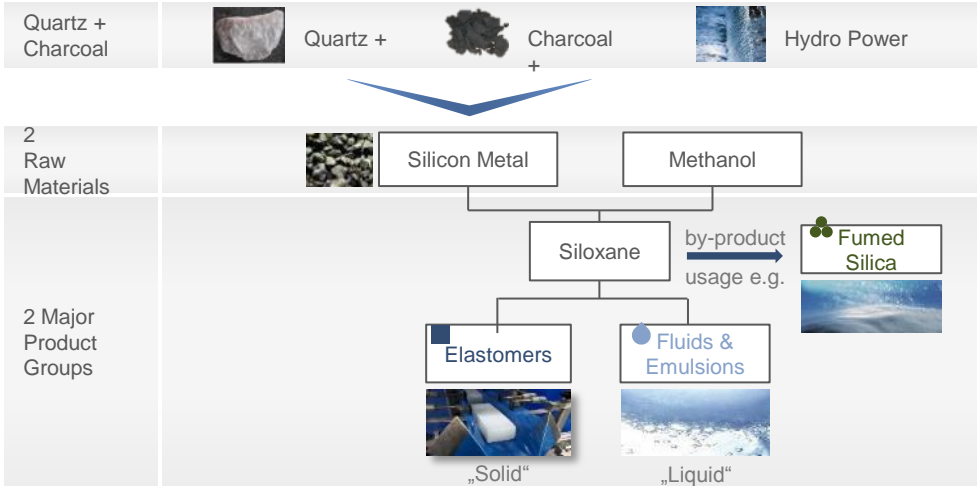
¹w/o Afa and based on 2011 FX CNY/EUR

²w/o Kempten

WACKER SILICONES

An Integrated Global Player in a Leading Market Position

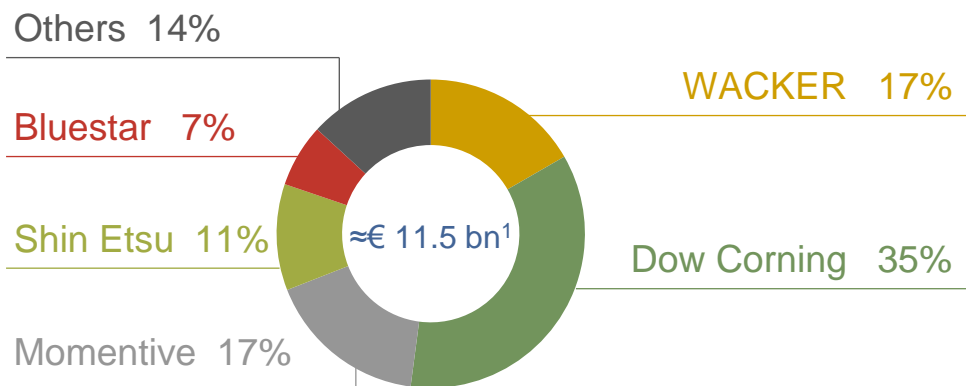
Supply Chain



Strong Global Footprint



Competitive Landscape 2015



Market Characteristics

- ▶ Reduced cyclical vulnerability through broad market penetration and wide customer base
- ▶ Historic growth rates above worldwide GDP¹
- ▶ High entry barriers (capital and technology)
- ▶ Key drivers spur sustainable market growth
- ▶ Innovation broaden scope of applications

¹Silane/Siloxane backward integrated suppliers only; WACKER data incl. HDK

¹GDP = Gross domestic product

Chemical Day 2016



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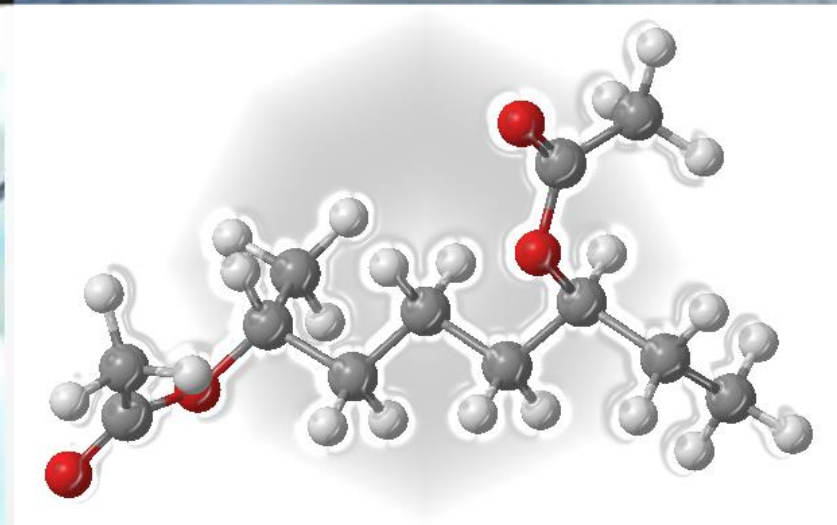
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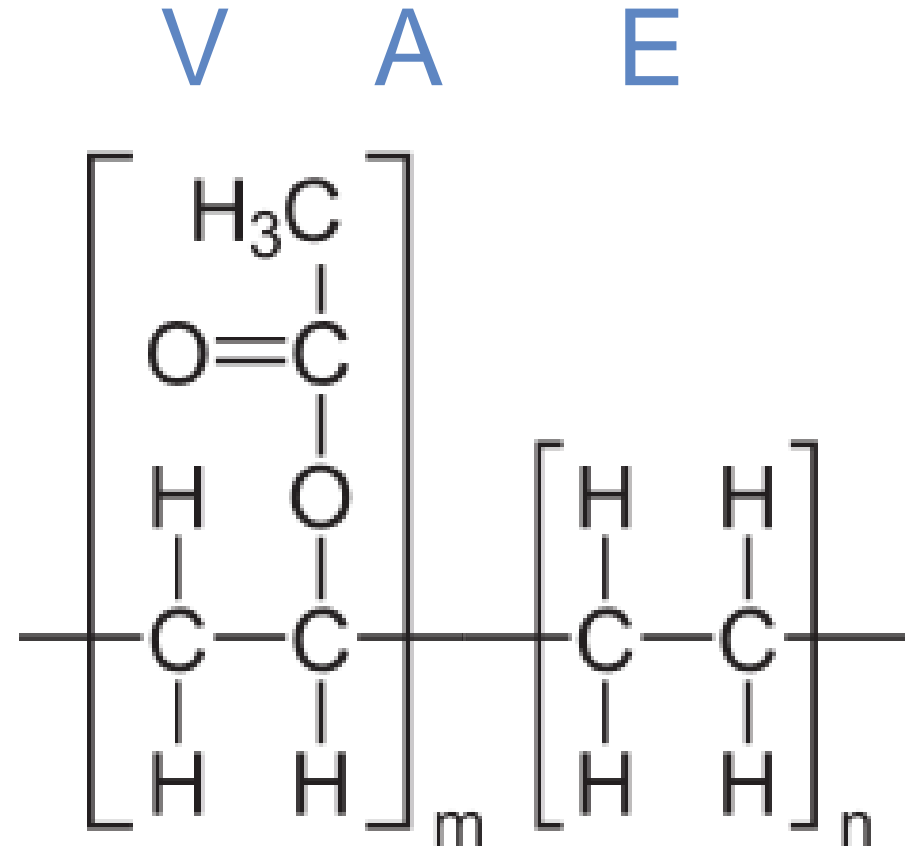
Chemical Day 2016 – WACKER POLYMERS **February 15, 2016**

Dr. Christian Hartel, Member of the Executive Board, Wacker Chemie AG

Vinyl Acetate-Ethylene (VAE) as Main Basis for Polymers' Dispersions and Dispersible Polymer Powders

The most significant benefits are:

- ▶ Perfect adhesion and cohesion
- ▶ Ethylene as internal plasticizer
- ▶ Produced without added Formaldehyde and APEOs*
- ▶ Waterborne
- ▶ **Ecologically Sound Performance**



VINNAPAS®

*alkyl phenol ethoxylates

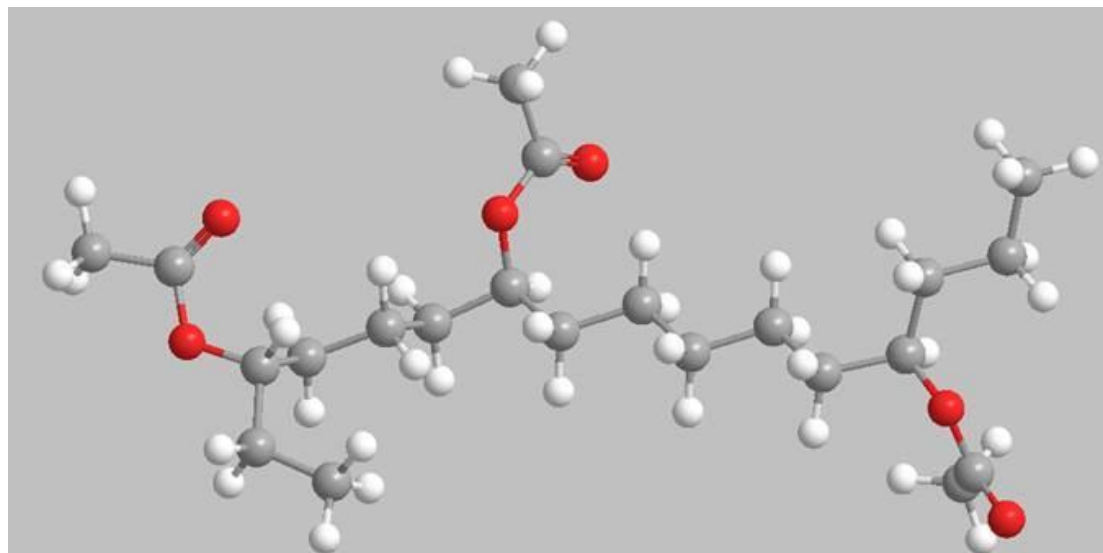
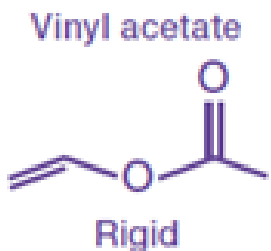
Good Copolymerization of Vinyl Acetate and Ethylene Leads to Tailor Made Products with a Broad Range of Applications

Properties due to Vinyl Acetate units

- ▶ Polar
- ▶ Hard feel
- ▶ Rigid
- ▶ Elasticity

Properties due to Ethylene units

- ▶ Nonpolar, hydrophobic
- ▶ Soft feel
- ▶ High flexibility
- ▶ High chemical resistance



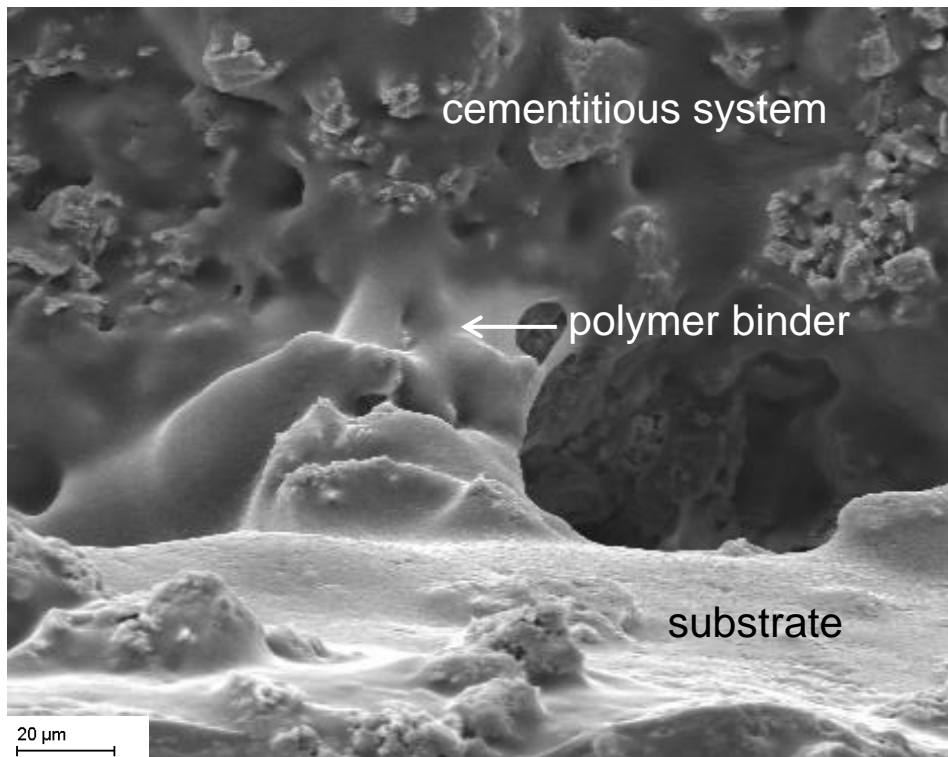
Ethylene

≡

Flexible

Polymer Binder in Cementitious Systems with Key Advantages

Polymer in cementitious systems

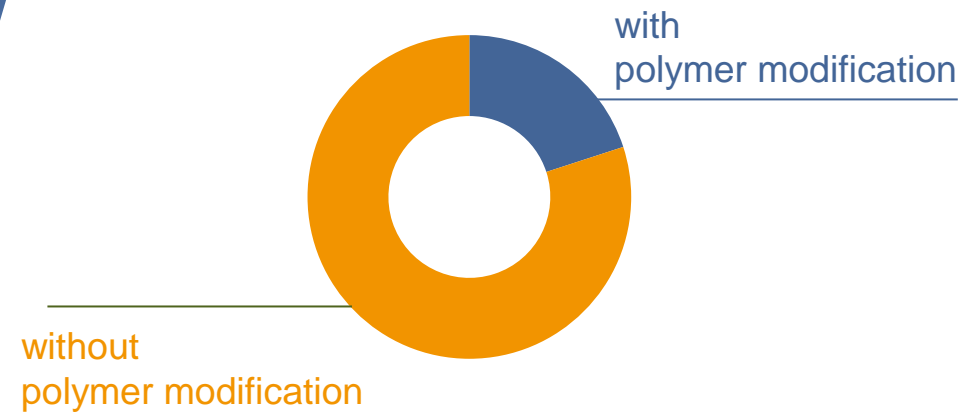


Source: WACKER, Scanning Electron Microscope

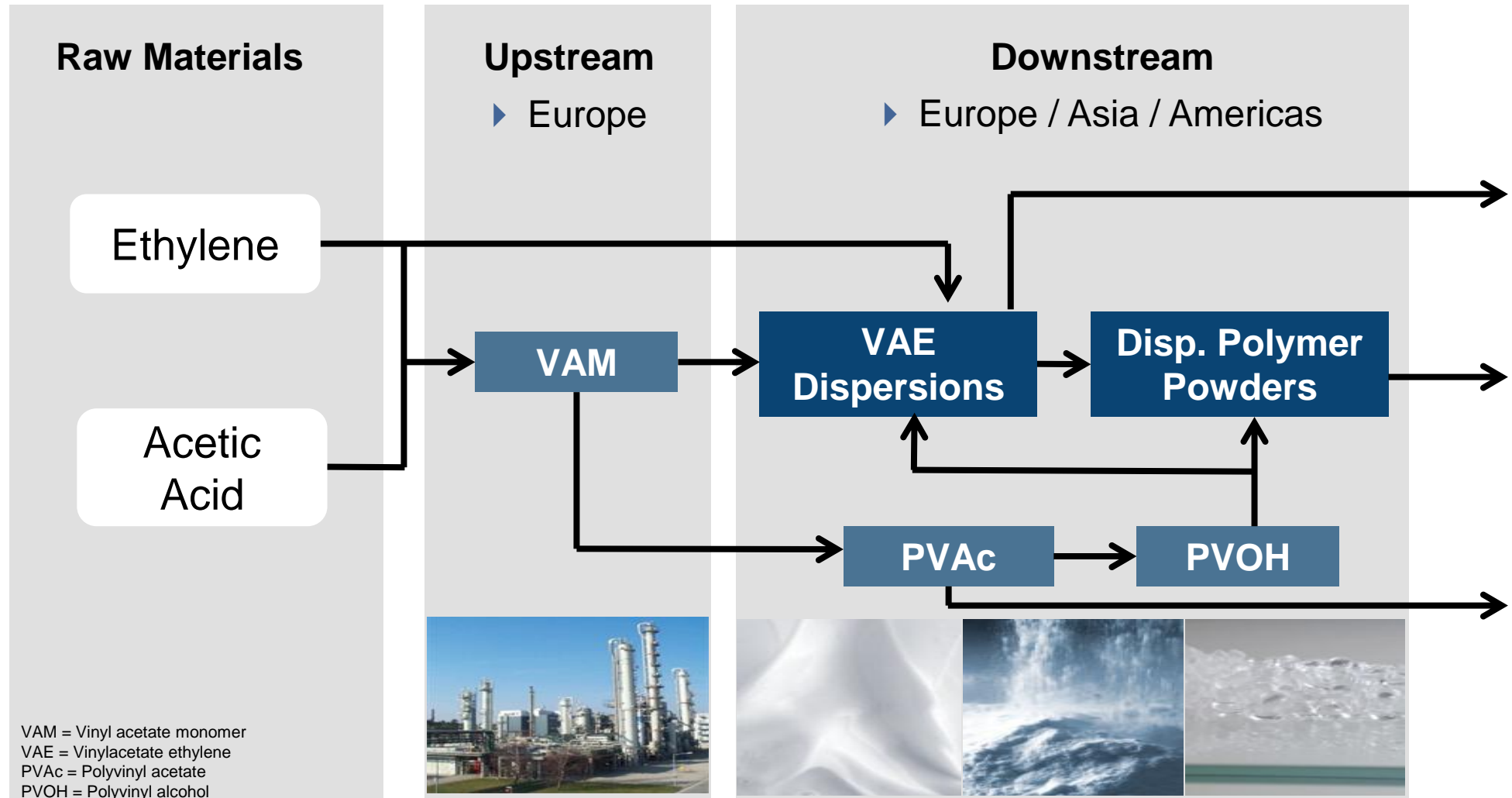
Key advantages:

- ▶ Adhesion on critical substrates
- ▶ Advanced workability and machine application
- ▶ Improve flexibility and toughness

Global dry mix mortars



WACKER POLYMERS: Unique with Integrated Production Sites in Europe, Americas and Asia



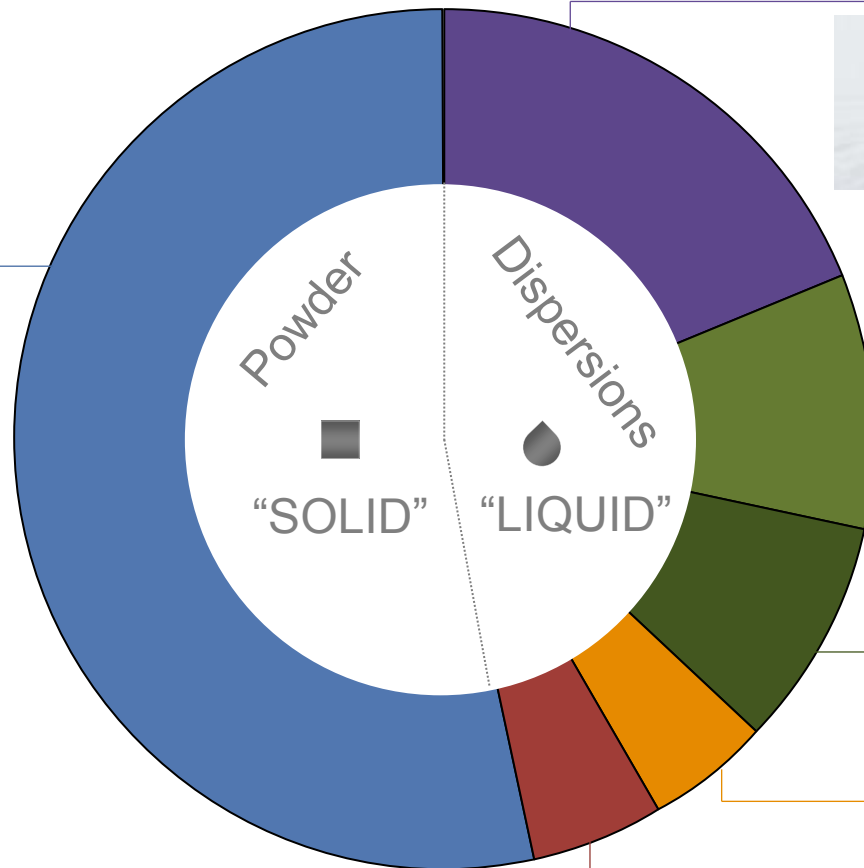
POLYMERS with Diverse Markets and Broad Customer Base

Portfolio 2014

Construction



- ▶ Tile Adhesives
- ▶ External Thermal Insulation
- ▶ Self Leveling
- ▶ Others



Adhesives



Coatings & Paints



Nonwovens & Textiles



Carpet

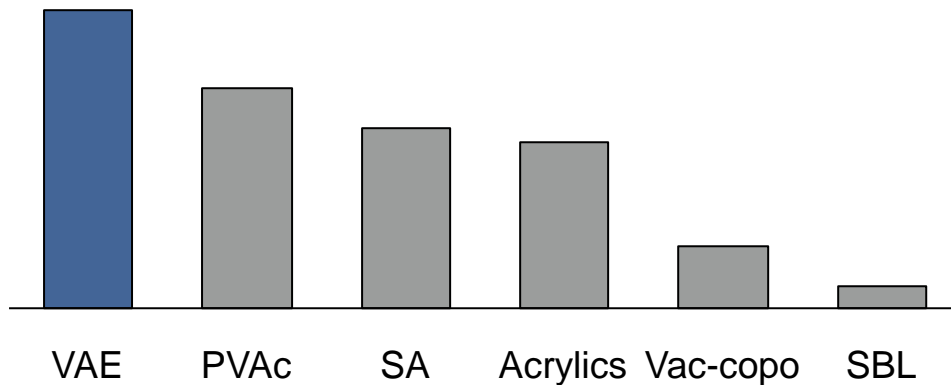


Others

Source: WACKER analysis

VAE With Strong Growth Through Significant Advantages

Polymer Latex Market Growth Rates 2009-2014

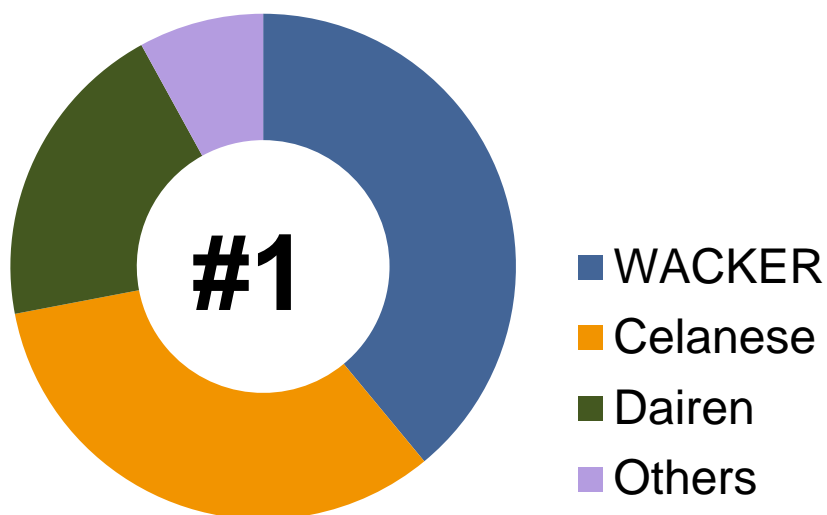


- ▶ Adhesion to different substrates
- ▶ Less combustible
- ▶ Broad range of heat resistance
- ▶ Easy applicability & workability
- ▶ Flexibility
- ▶ Reliability, clean machinability
- ▶ No plasticizers or additional solvents
- ▶ Low VOC* and low odor

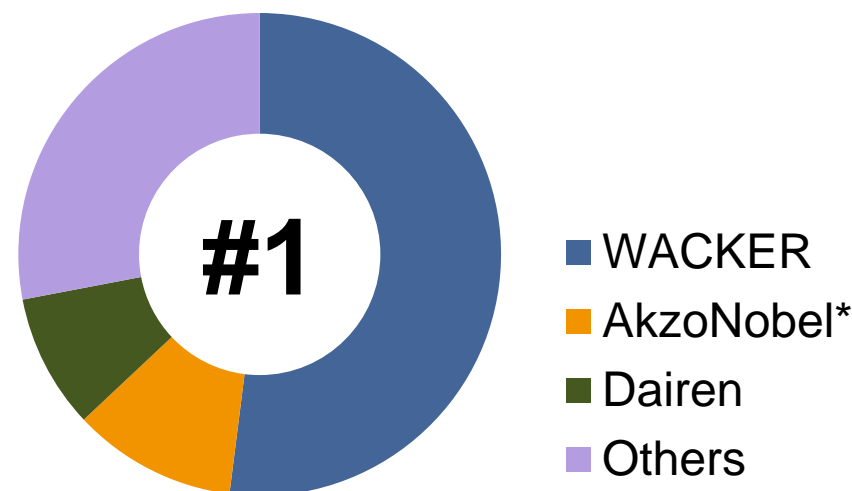


WACKER Global Market Leader in VAE Dispersions and Powder

VAE Merchant Dispersions Market by Competitor 2014



Dispersible Polymer Powders Market by Competitor 2014

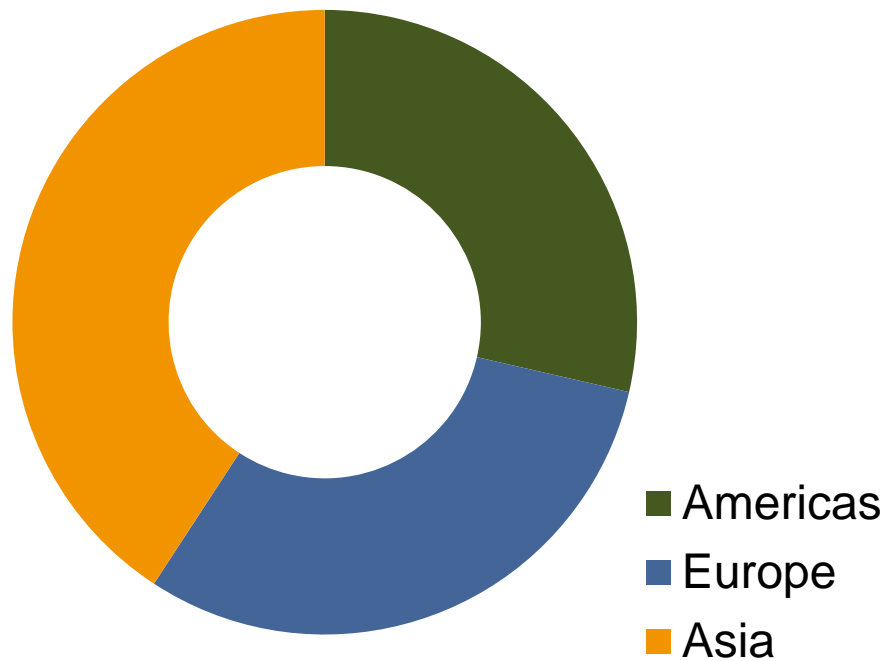


	PORTFOLIO			RELEVANT MARKET IN REGION		
	VAM	VAE	DPP	ASIA	EMEA	AMERICAS
WACKER	x	x	x	x	x	x
Celanese	x	x		x	x	x
AkzoNobel			x	x	x	x
Dairen	x	x	x	x		

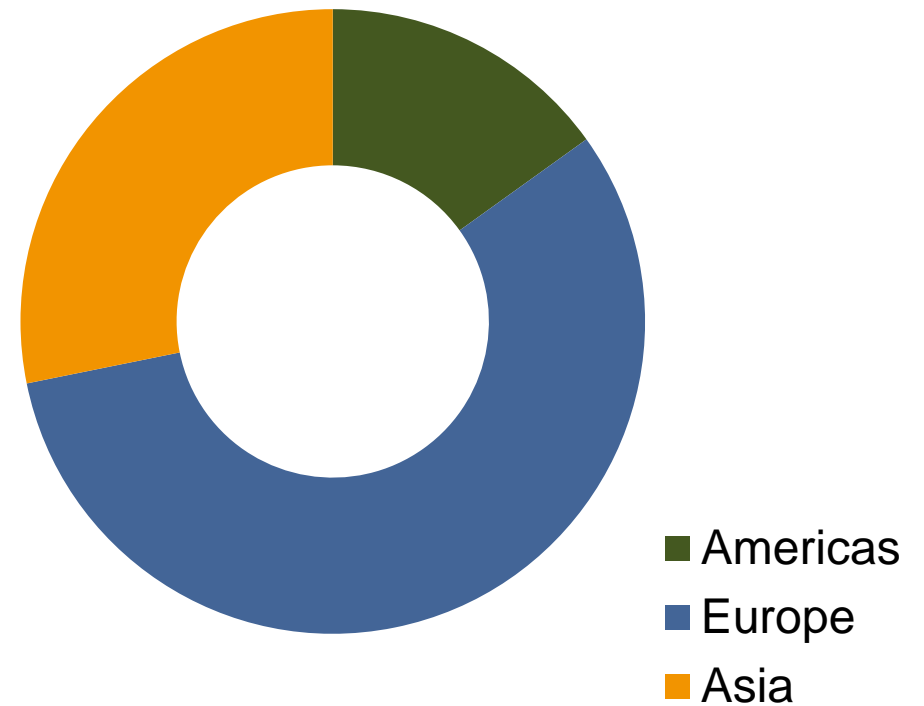
* Elotex

Sales of VAE Dispersions and Powder by Region

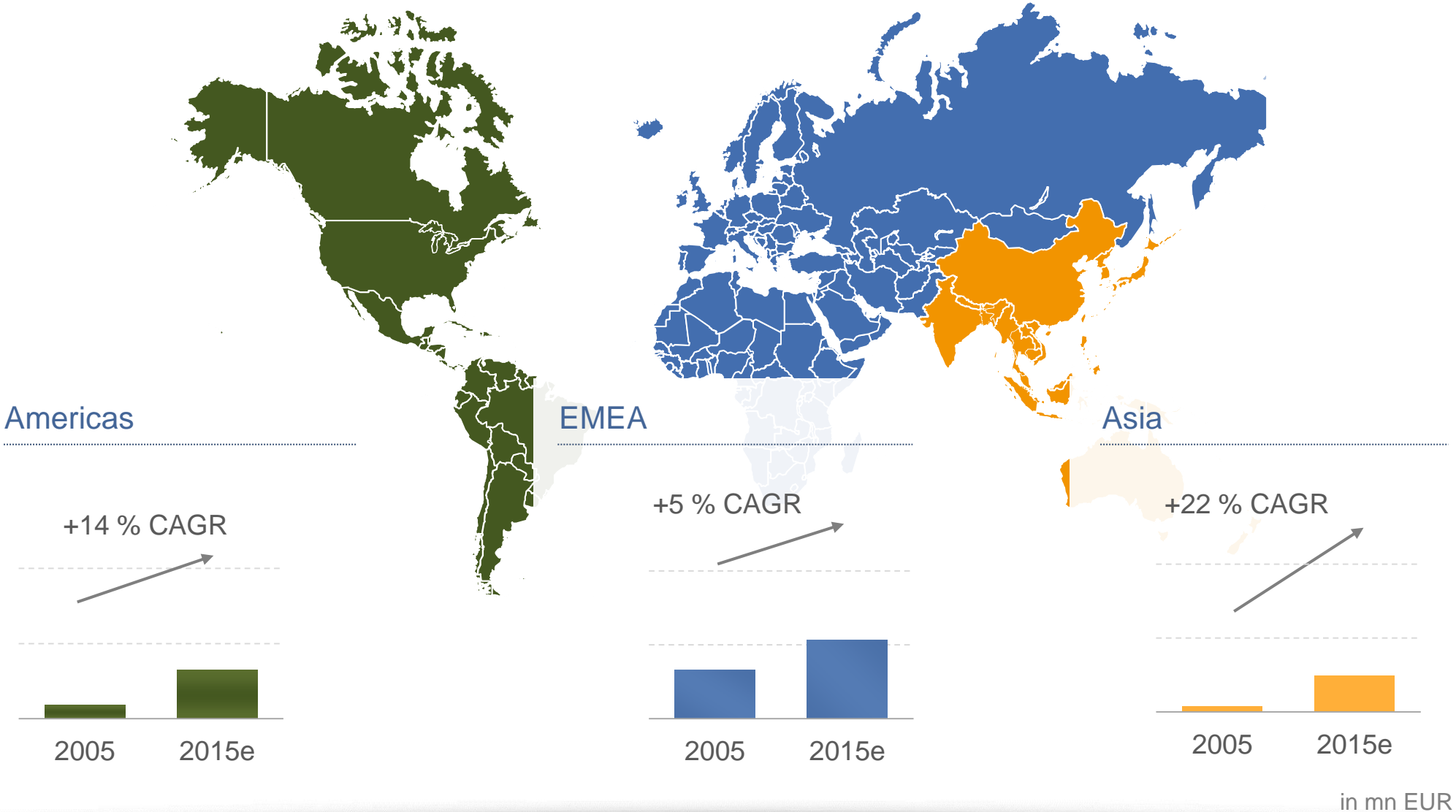
VAE Merchant Dispersions Market by Region 2014



Dispersible Polymer Powders Market by Region 2014



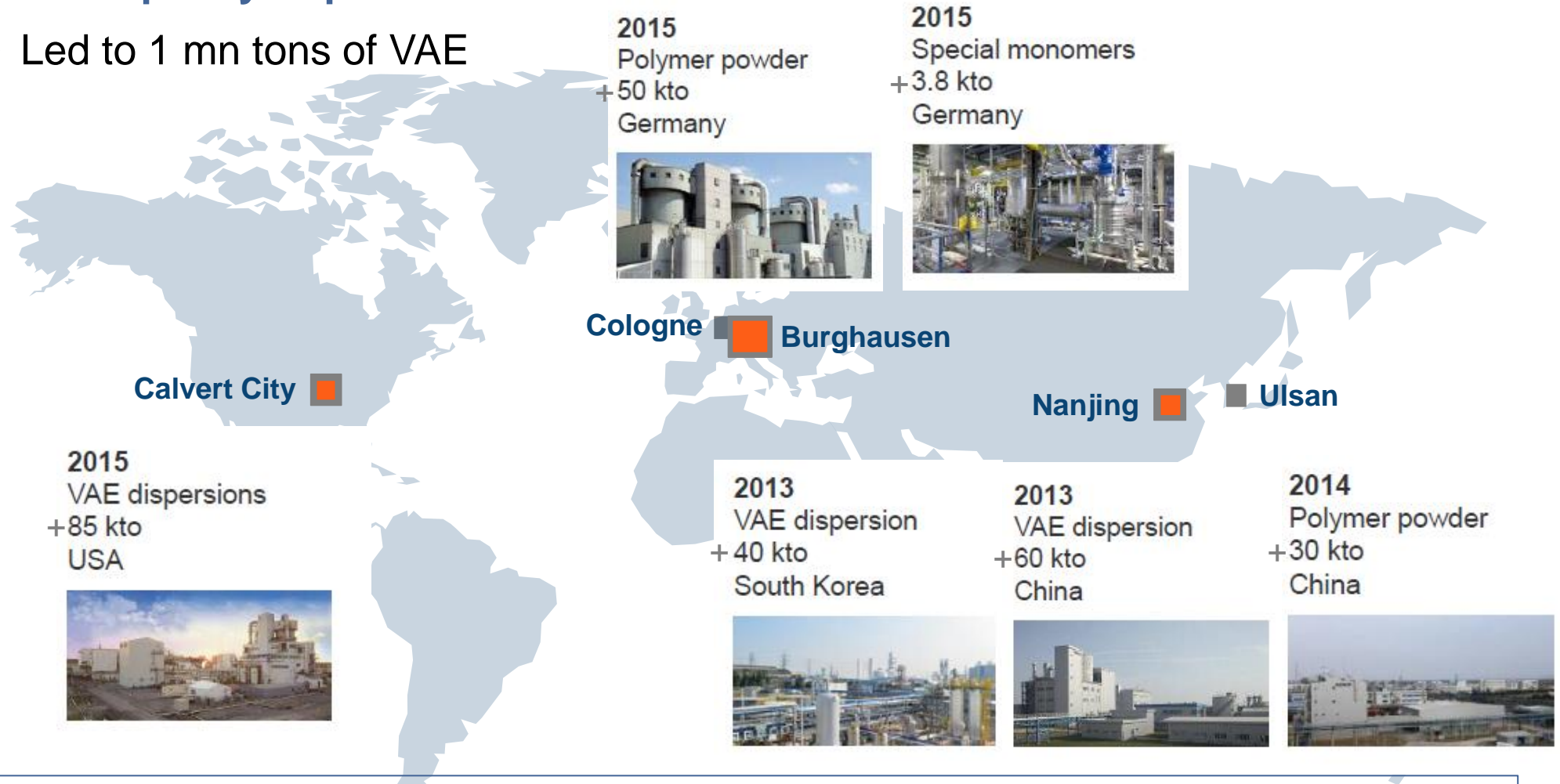
POLYMERS is Growing in All Regions with High Rates



WACKER POLYMERS with Continuously Expanding Footprint

Latest Capacity Expansions

- ▶ Led to 1 mn tons of VAE



▶ POLYMERS' production site are located strategically close to raw materials

Strategy has been Aligned to Focus on Long-Term Growth

Strategic Focus to outgrow core markets

Strategic Focus

Our Actions

Expansion

- ▶ Presence in all key markets via Technical Centers & WACKER ACADEMY
- ▶ New reactors in Asia/Americas and dryer in Europe

Substitution

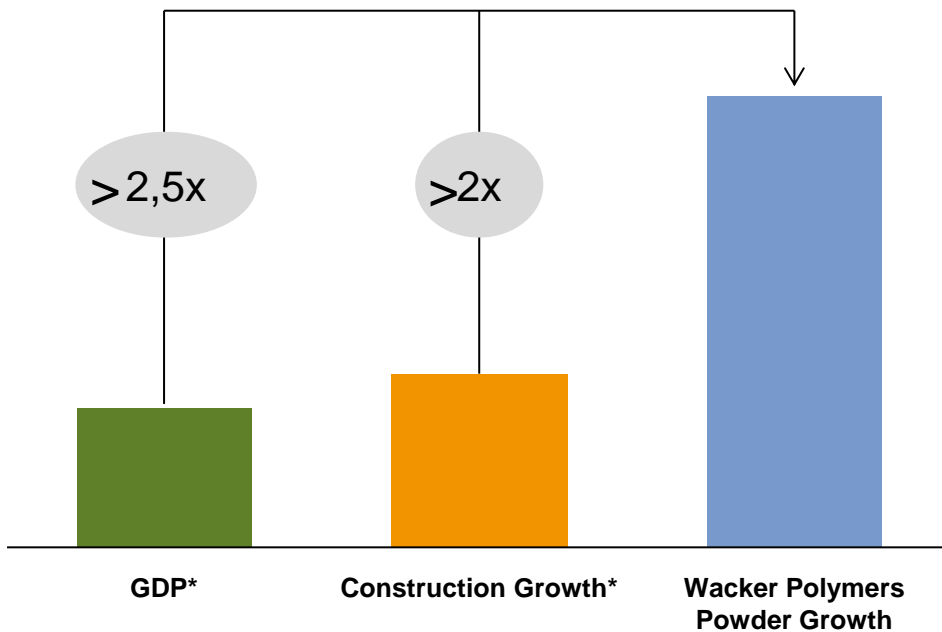
- ▶ Transformation of traditional construction systems
- ▶ Replacement of non-VAE technologies

Innovation

- ▶ New application development beyond existing core segments
- ▶ Operational Excellence by Process Development

Growth of Dispersible Polymer Powder with a Multiple of GDP

Average Annually Growth Rate 2010 -2015



WACKER's Growth in Powder

Mature Markets

- ▶ Trend towards bigger and thinner tiles
- ▶ WACKER with strong technical support and customized solutions

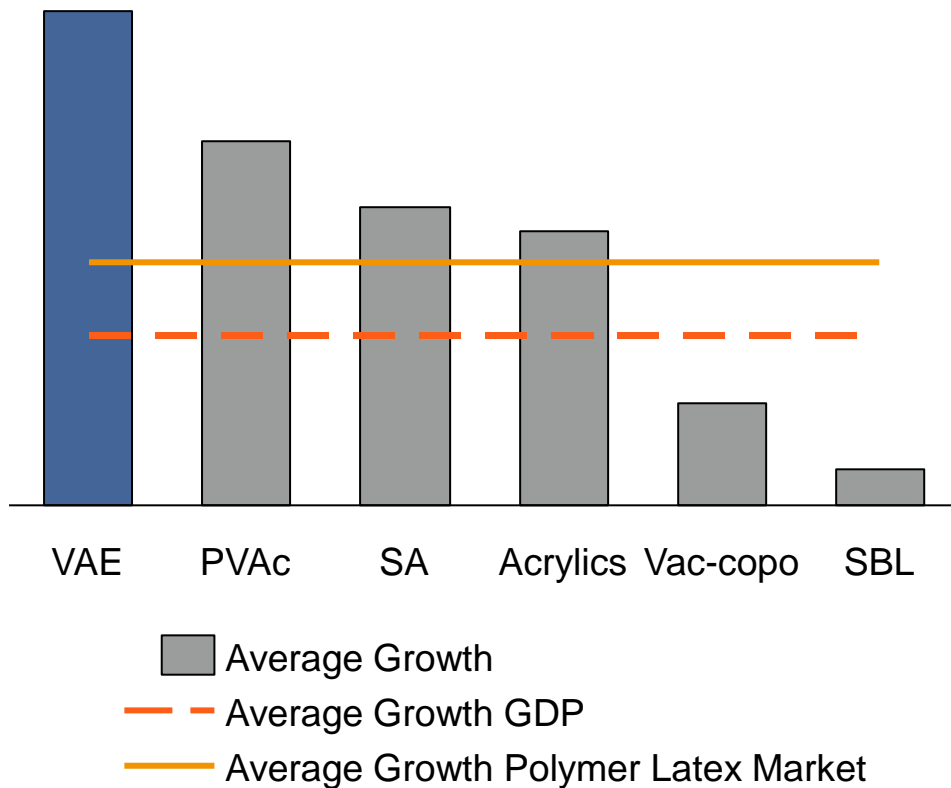
Emerging Markets

- ▶ Increasing quality standards and labor cost
- ▶ High efficiency through application speed and material savings

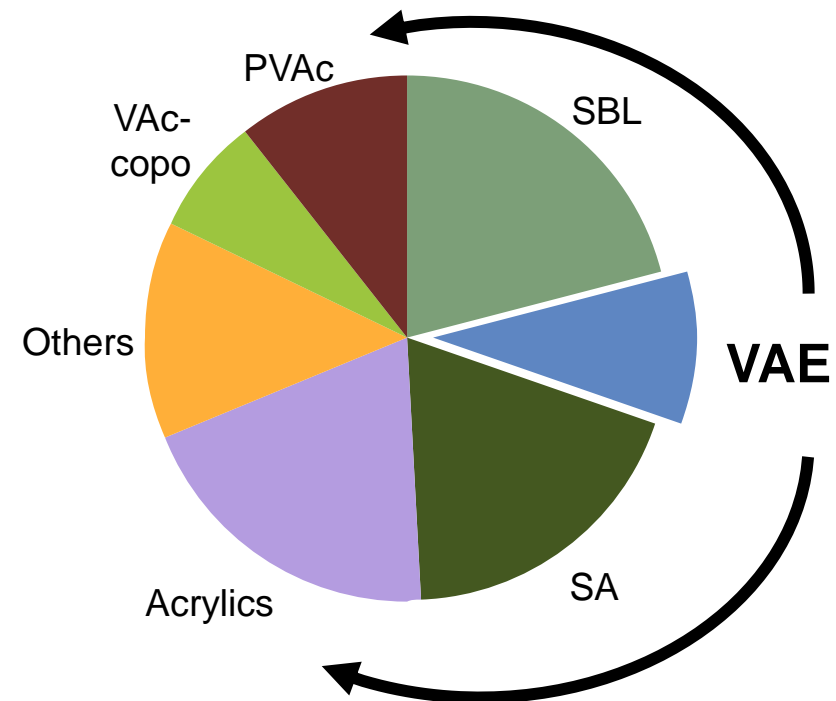
▶ High Percentage of Growth in Powder Achieved by Substitution

Substitution with A High Contribution for Growth in Dispersions

Polymer Latex Market Growth Rates 2009 – 2014*



Synthetic Polymer Latex Market Volume



* Sources: Kline Studies 2015

Delivering VAE Application Know-how Directly to our Customers

WACKER ACADEMY

- ▶ Mix between theory and practice
- ▶ Fixed location
- ▶ Located close to technical center



→ since 2007 →

WACKER on Wheels

- ▶ Truck going directly to locations
- ▶ Demonstration of product advantages live
- ▶ Since 2014 in Asia



→ 2013 →

MyLab

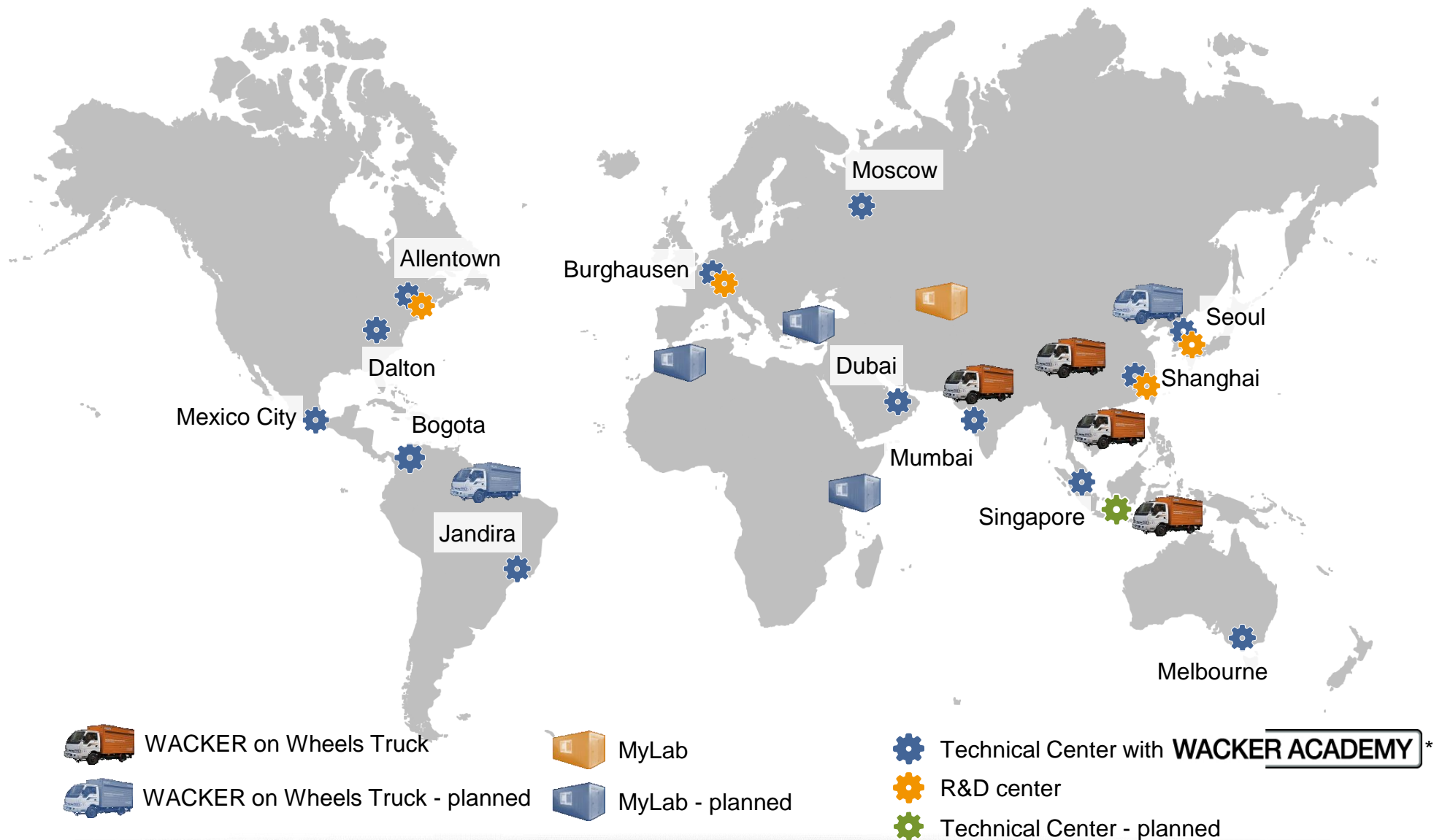
- ▶ Movable Container
- ▶ Mix between Technical Center and WACKER on Wheels
- ▶ Smart and easy to implement



→ 2015 →

▶ Regional solutions to support local needs and developments

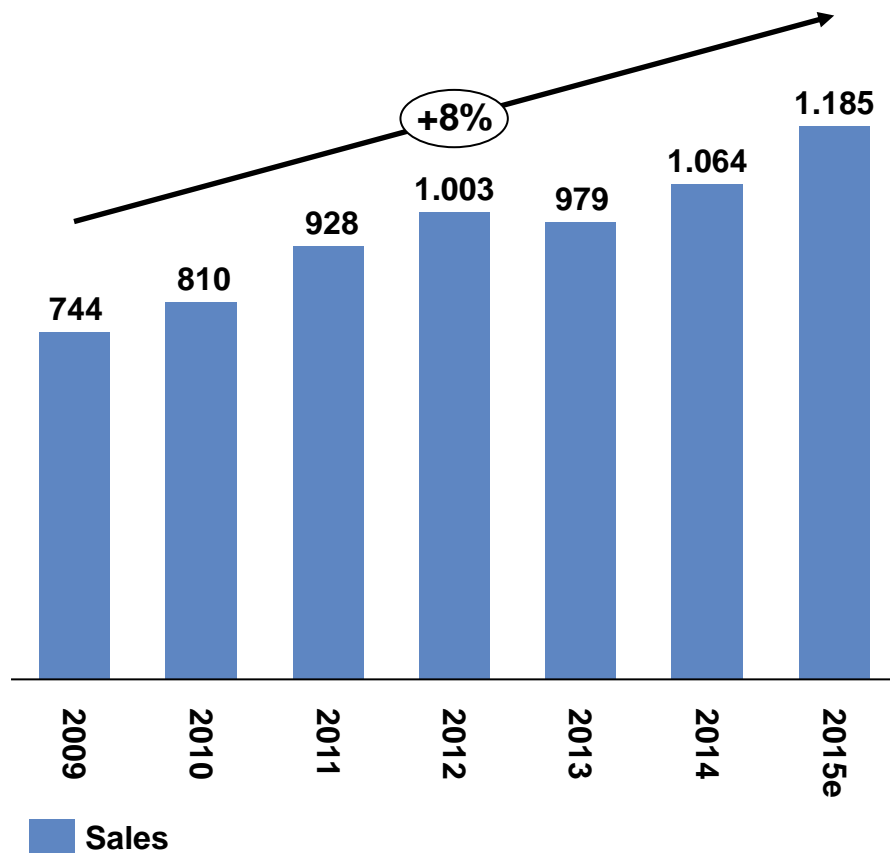
POLYMERS Increases Speed to Market with Unique Approaches



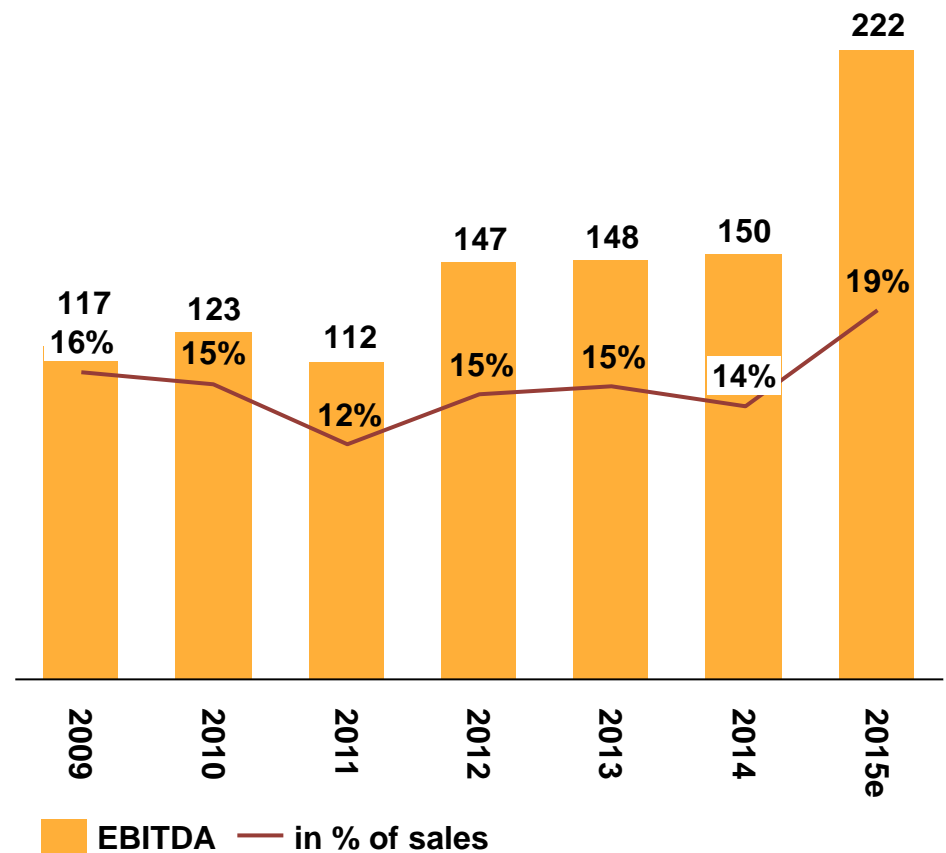
* Melbourne without Academy

POLYMERS with a Consistent Growth over the last Years

Sales
in mn EUR



EBITDA
in mn EUR



Raw Material Prices with Impact on EBITDA - Different Pricing Mechanism Apply for VAE

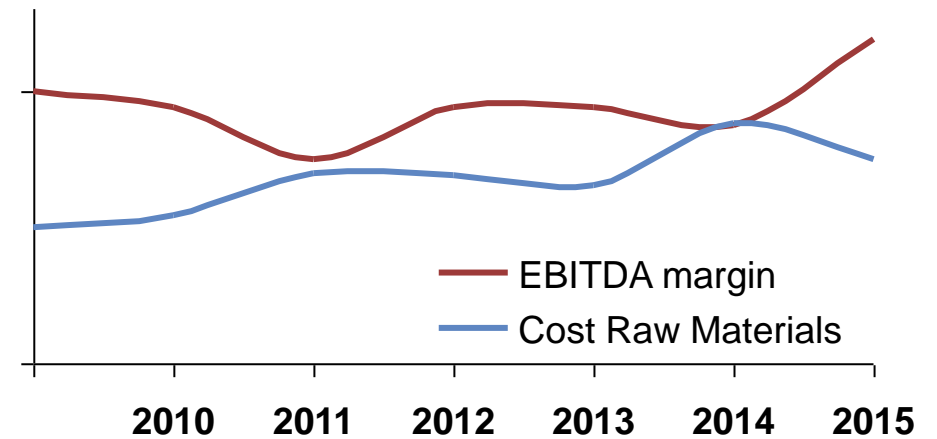
Ranked Cost Structure of POLYMERS

- ▶ Raw Materials
- ▶ Labor
- ▶ Logistics
- ▶ Depreciation

Strategy

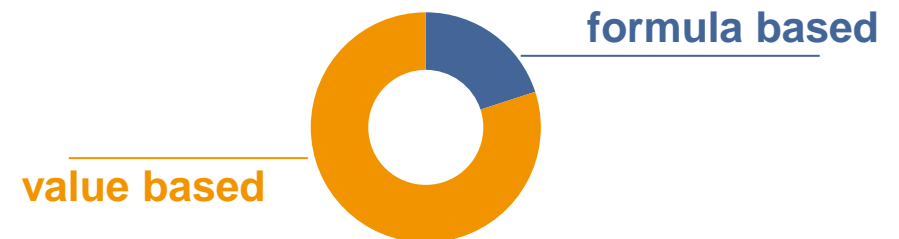
- ▶ Value based pricing
- ▶ High capacity loading
- ▶ Product Mix
- ▶ Operational Excellence (WOS)

Raw Material Prices and EBITDA Margin



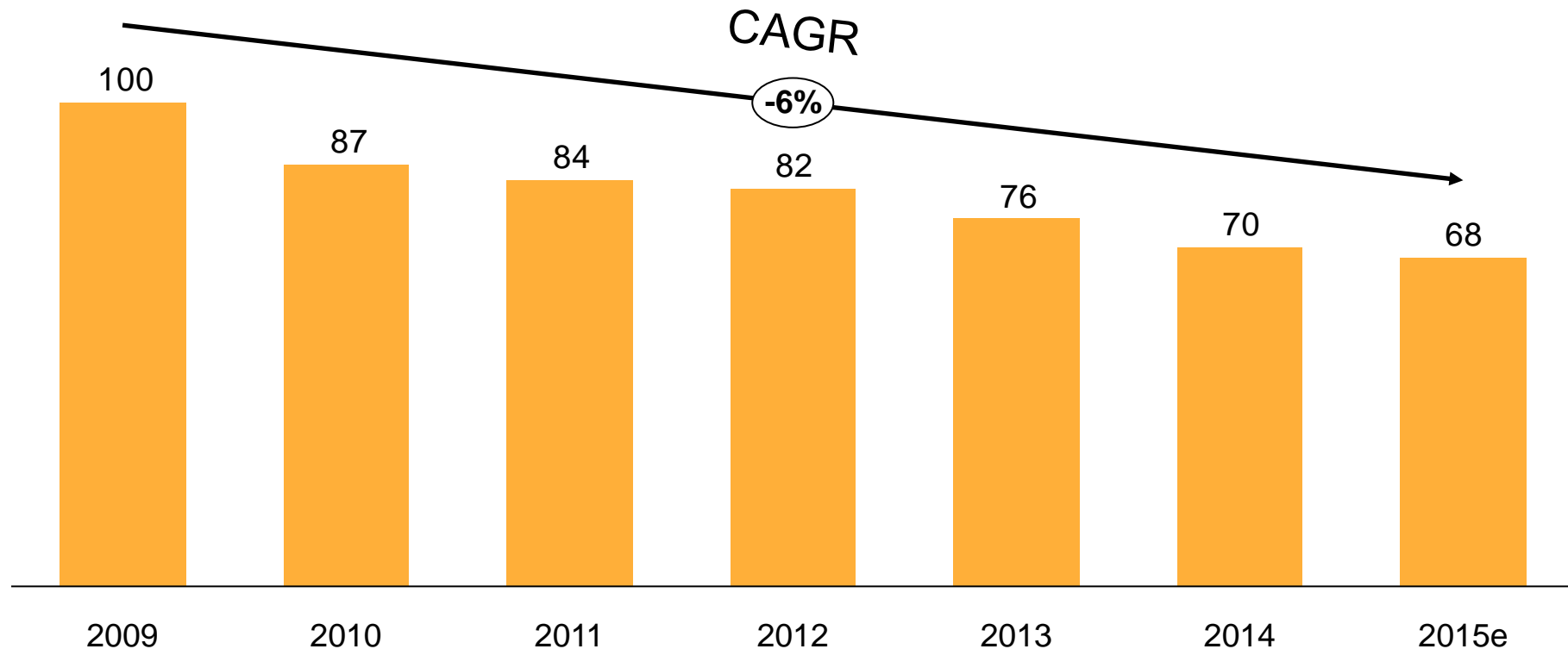
Sources: ICIS, IHS, TECNON, BLOOMBERG

Pricing



Operational Excellence Through the WACKER Operating System Led to Significant Reduction in Operational Costs

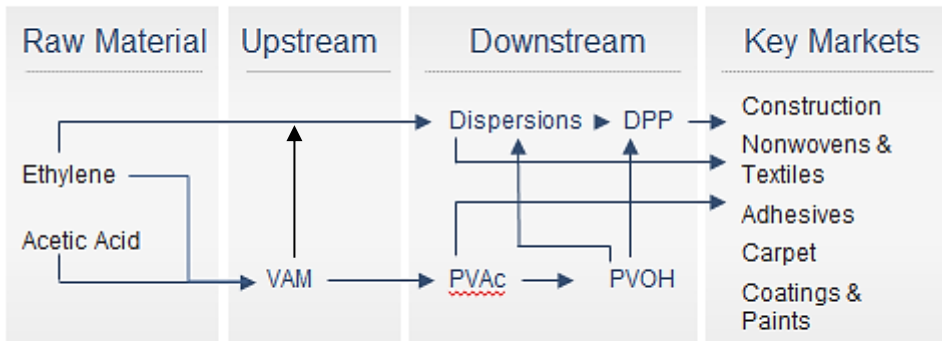
Specific Production Cost POLYMERS (w/o Raw Materials)



► Continuous Improvement of Specific Production Costs

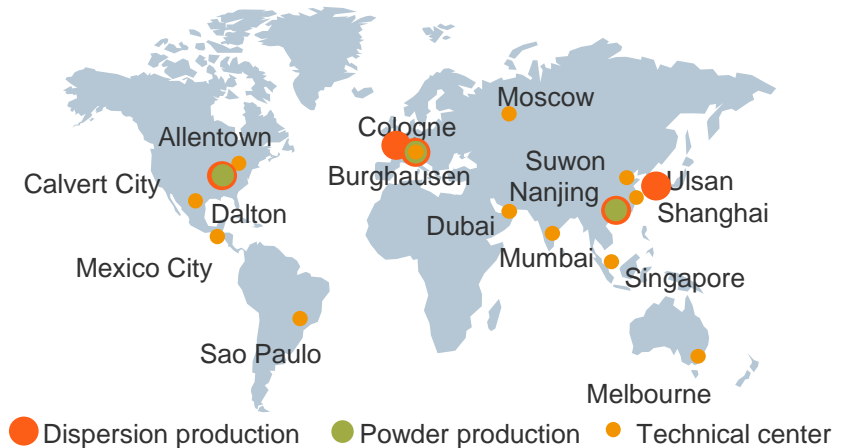
WACKER POLYMERS: Global Leader in High Growth Markets

Supply Chain

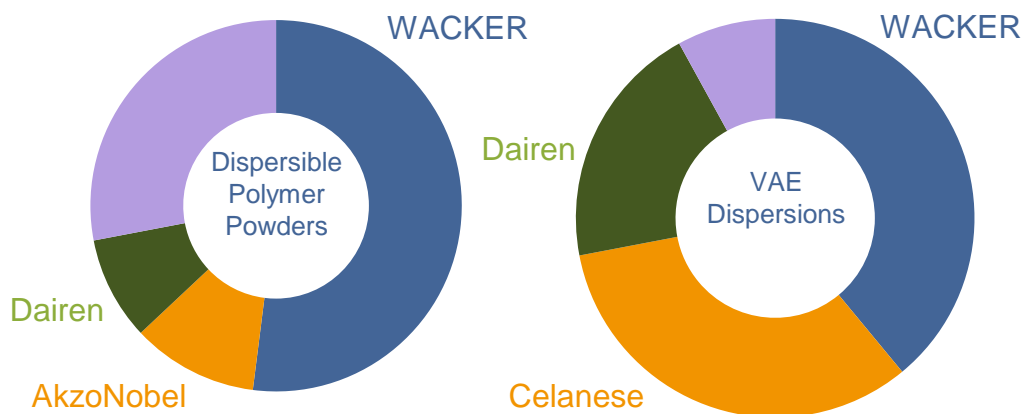


VAE = Vinyl acetate ethylene, VAM = Vinyl acetate monomer,
 PVAc = Polyvinyl acetate, PVOH = Polyvinyl alcohol
 DPP = Dispersible Polymer Powders

Global Setup



Global VAE and DPP Market 2014



Market Characteristics

- ▶ Diverse market and customer base
- ▶ Historic growth above GDP
- ▶ Key trends, innovation and new applications drive growth
- ▶ Moderate capital entry barriers and high technology barriers in most segments
- ▶ Innovation and in-depth formulating expertise broaden scope of applications

Chemical Day 2016



Dr. Hartel / Mr Willems: Welcome to WACKER

Mr Willems: WACKER SILICONES

Dr. Hartel: WACKER POLYMERS

Dr. Hartel / Mr Willems: The Common Ground - Chemicals



WACKER



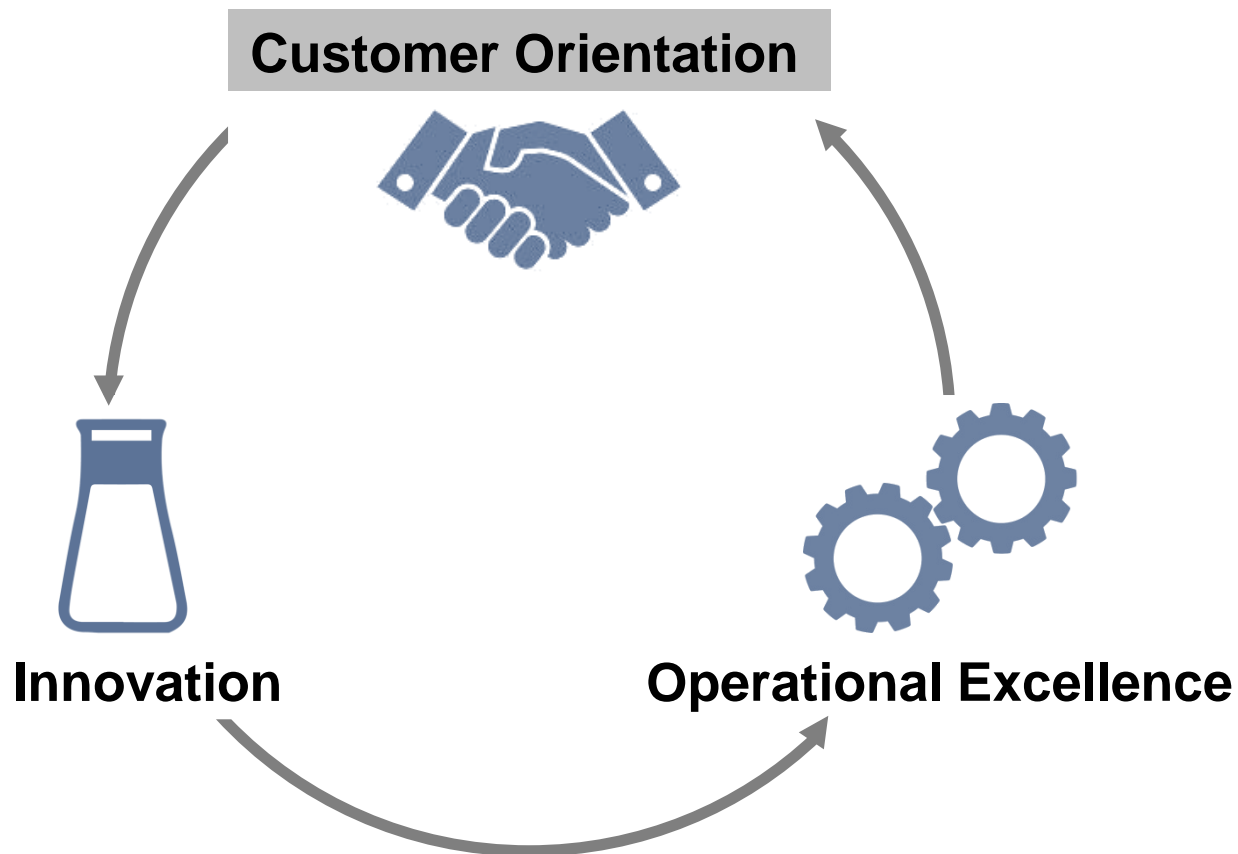
CREATING TOMORROW'S SOLUTIONS



The Common Ground: Key Infrastructure for Growth Customer Orientation, Innovation , Operational Excellence

Dr. Christian Hartel, Member of the Executive Board, Wacker Chemie AG
Auguste Willems, Member of the Executive Board, Wacker Chemie AG

Systematic Approaches to our Customers - Globally



Customer Orientation : The Foundation of Our Success

>16,000

infinite

>3,500

all



of
Customers

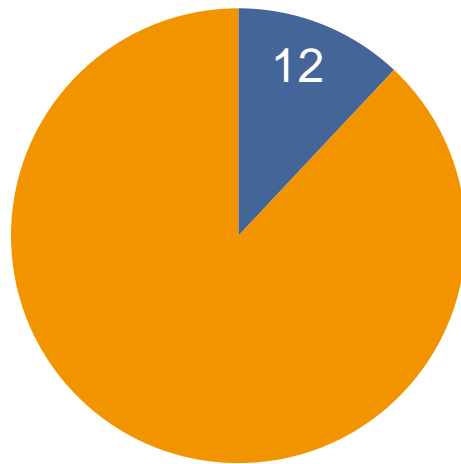
of
Industries

of
Products

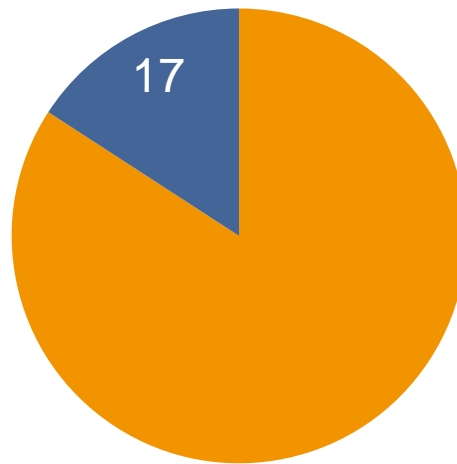
of
Regions

Customer Concentration in Chemicals: Top 5 Share in % of Sales

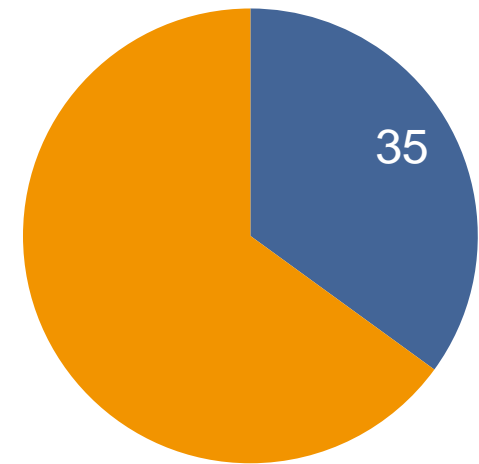
SILICONES



POLYMERS

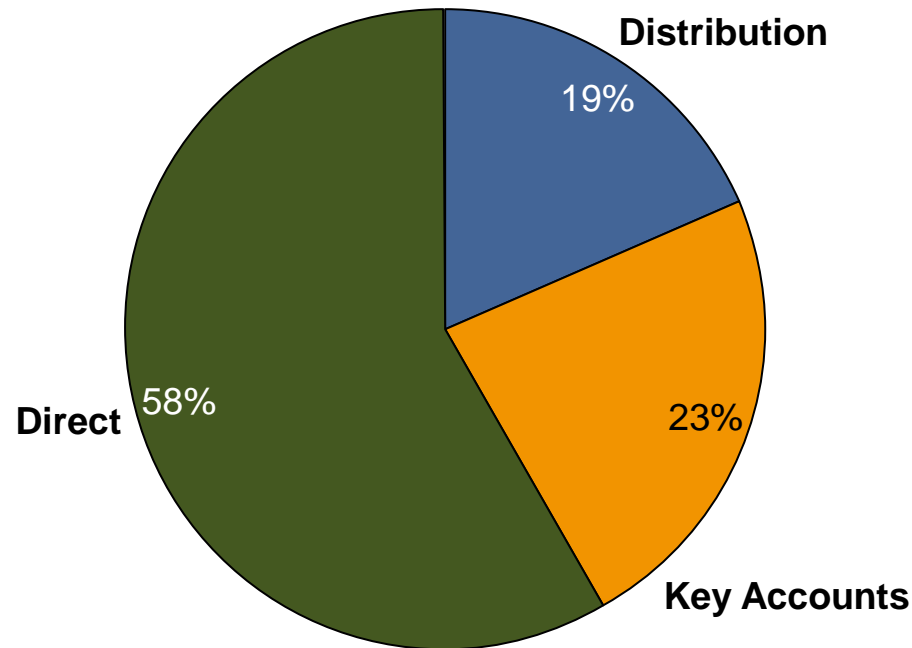


BIOSOLUTIONS



Addressing Customers Effectively: WACKER Chemical Sales by Channel

Sales Channels



Direct Sales

- ▶ Sales Representative with Marketing and Technical Service

Distribution

- ▶ Selected regional partners
- ▶ Market Development Support

Key Accounts

- ▶ Holistic approach across all disciplines
- ▶ Executive sponsoring
- ▶ Matching customer set-up

Global Chemical Sales by Customer Classification

Customer Focus @ WACKER: A Team Approach Combining Customer Intimacy with Cost to Serve

Direct Sales

Sales

High Customer Proximity

- ▶ Approx. ~50 sales offices worldwide

Marketing

Large Expertise

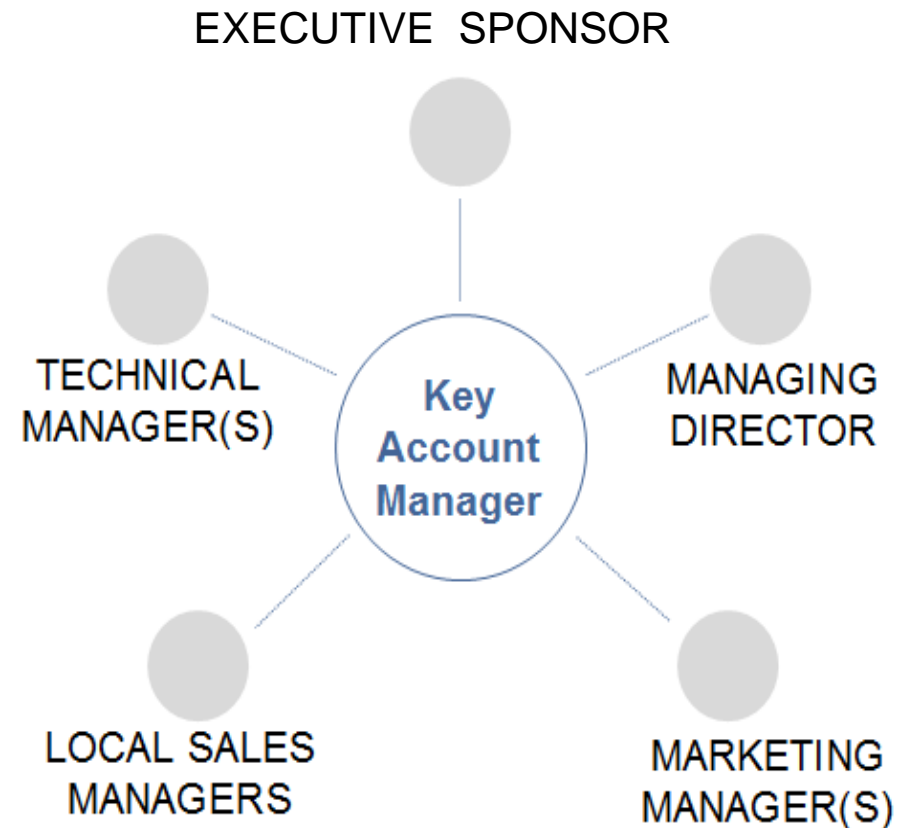
- ▶ Market development
- ▶ Strategy
- ▶ Market knowledge

Technical Service

Know-How

- ▶ Technical Service
- ▶ On-Site application support

Key Accounts



Customer Proximity Creates Customer Retention



**Best Innovation Contributor
Beauty Care
2014
Henkel**



**Preferred Supplier Award
2014
Bosch Group**



**Best Supplier Partner
2014
Unilever**

Technical Centers Provide Enhanced Customer Support with Local R&D Capability

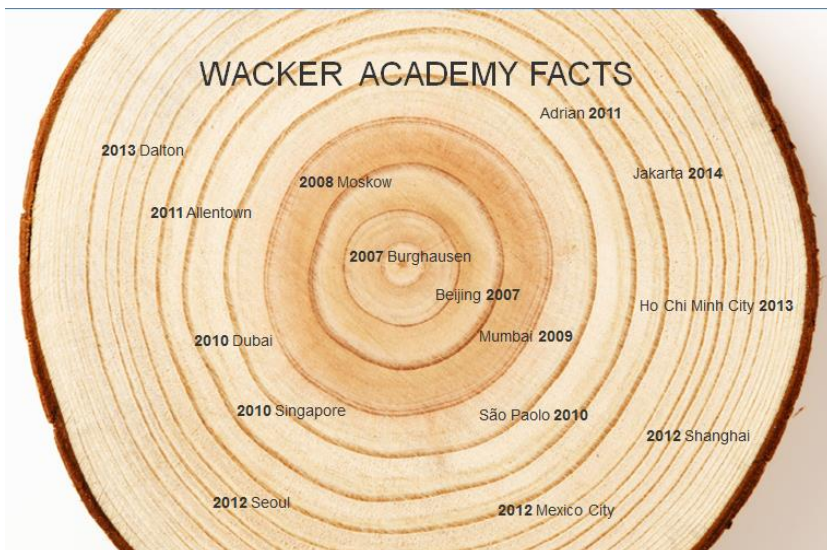


Technical Centers Service Offering

- ▶ Market-driven product innovation
- ▶ Facilitate tailored solutions for the local market
- ▶ Short response times, speed-up of innovation and proximity to customers
- ▶ Liaise with leading academia
- ▶ Interface to global competency network
- ▶ Support local production
- ▶ Intellectual property management

Deeper knowledge of and quicker response to local market needs

WACKER ACADEMY – Providing a Regional Infrastructure to Support Customers



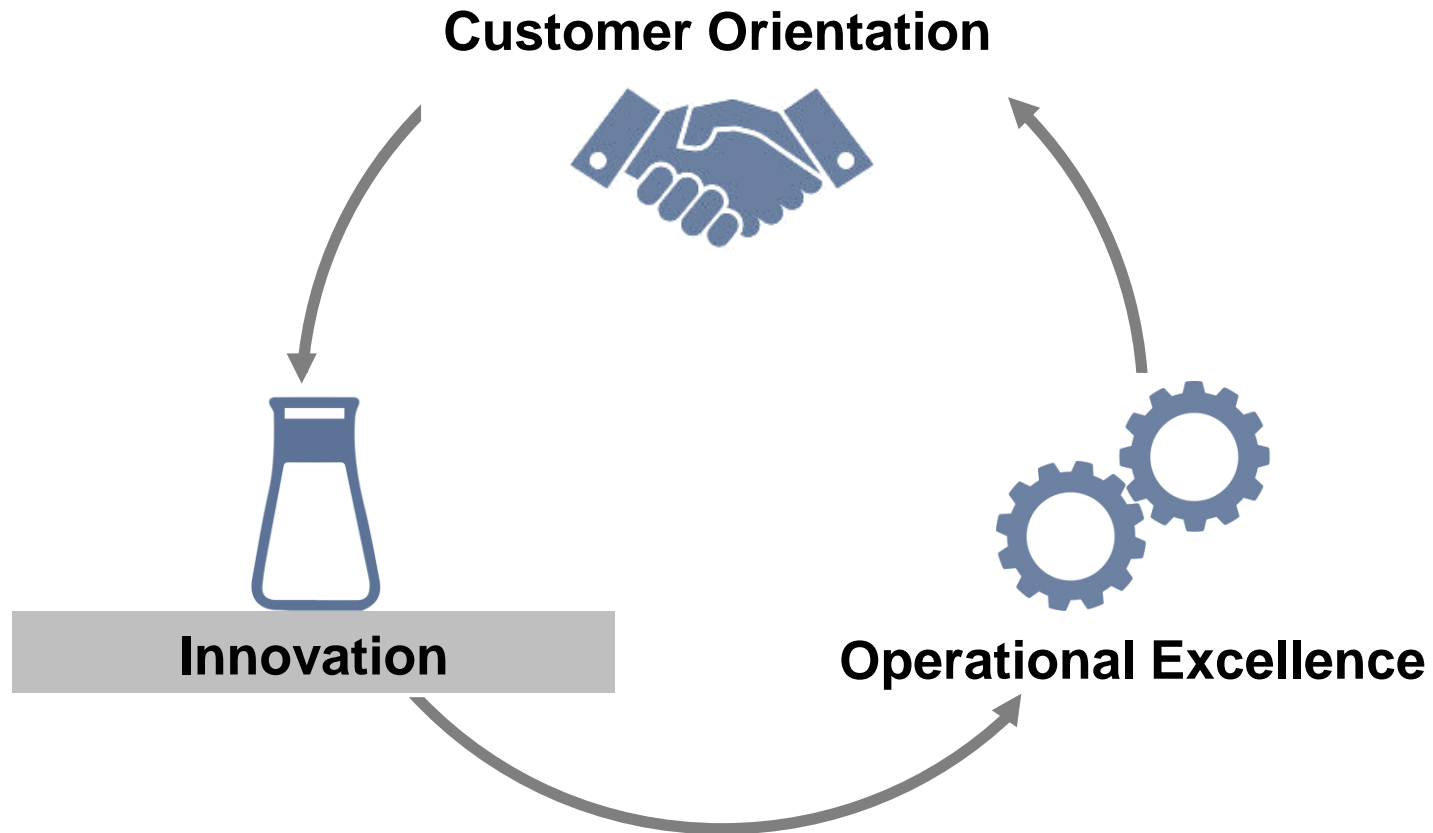
WACKER ACADEMY

- ▶ Customer & Distributor teach-in
- ▶ Mix between theory and practice – Meeting room plus lab
- ▶ Close link to technical center

Key Strategies

- ▶ Improve existing products
- ▶ Drive innovation in close co-operation with customers
- ▶ Leverage global network effects between academies

Innovating for Growth



Innovation: We make it happen close to the Customer

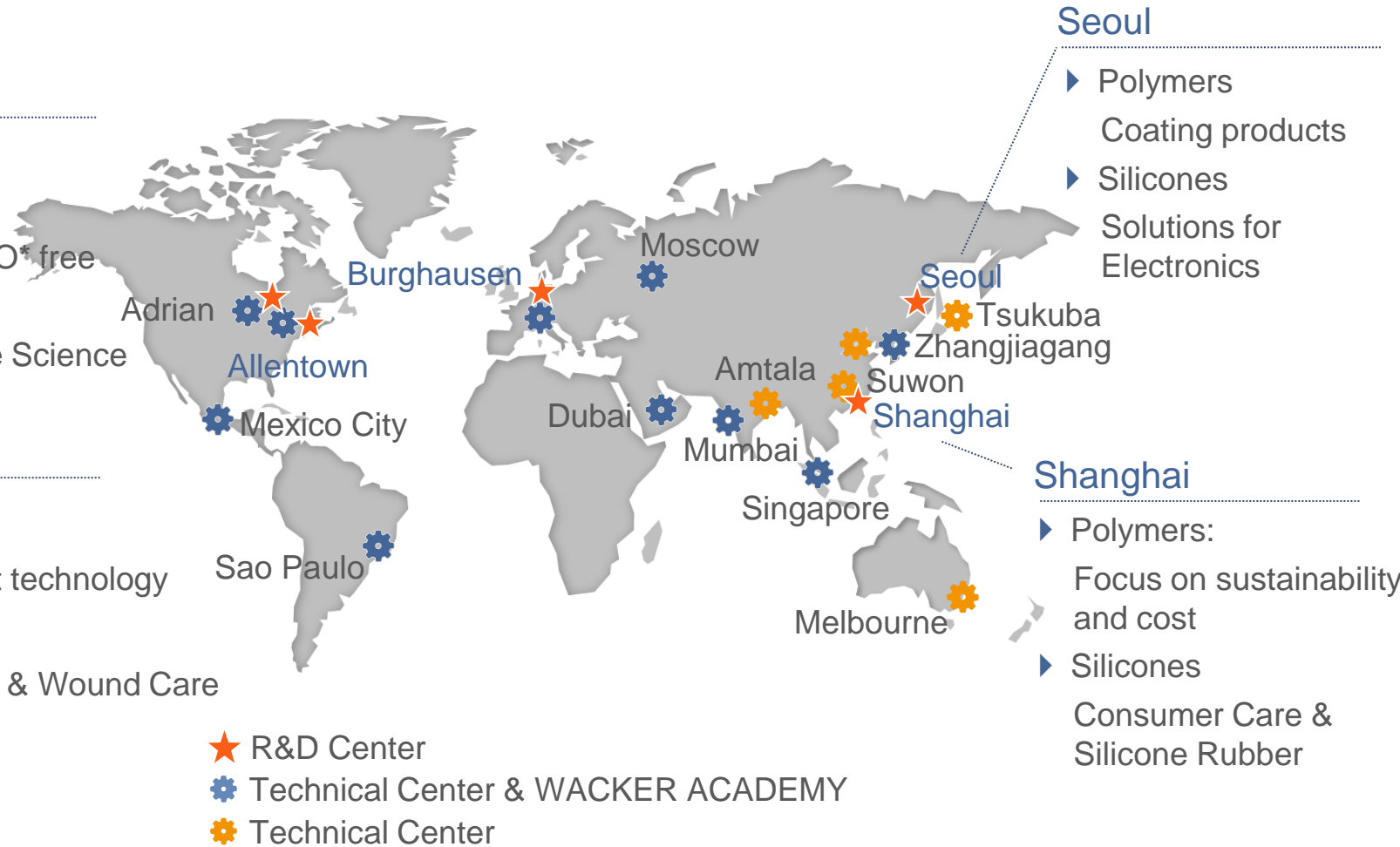
Innovation Centers in Core Markets

Burghausen

- ▶ Polymers
Low VOC* and Formaldehyde/APEO* free
- ▶ Silicones
Solids and Interface Science

Allentown/Adrian

- ▶ Polymers
Solutions for Carpet technology
- ▶ Silicones
Solutions for Health & Wound Care



* VOC = volatile organic compound
APEO = Alkylphenol ethoxylate

A Multi-Layer Approach: Combining Divisional Innovation, New Solutions and Technology Management



Divisional Innovation

- ▶ Modify existing products
- ▶ Develop new applications

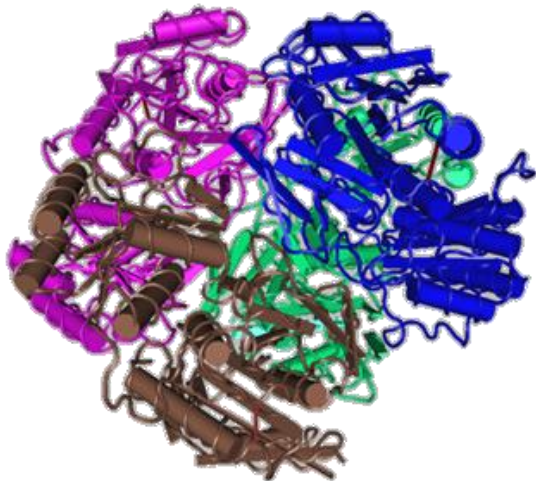
New Solutions

- ▶ Leverage existing technologies for innovation outside established business portfolios
- ▶ Cross-organizational project development

Technology Management

- ▶ Technology and product development in new business areas
- ▶ Little overlap with divisions

New/Existing Innovation: New Production Process for L-Asparaginase – Key to Treating Lymphocytic Leukemia



3D-model of L-Asparaginase

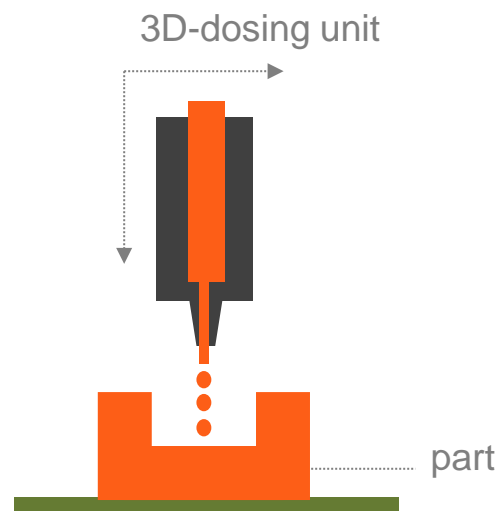
- ▶ Spectrila®, a medication made by WACKER's customer **medac** for treatment of acute lymphocytic leukemia
- ▶ L-Asparaginase as the active pharmaceutical ingredient of Spectrila®
- ▶ L-Asparaginase is part of WHO's "List of Essential Medicines"

- ▶ WACKER developed the whole manufacturing process from scratch
- ▶ New process using WACKER's proprietary technologies
- ▶ Based on this process WACKER will supply medac with L-Asparaginase from its GMP-facilities from 2016

Mode of Action

- ▶ Leukemic cells highly dependent on L-Asparagine feed from outside the cell
- ▶ Asparaginase converts L-Asparagine, depriving leukemic cells of asparagine leading to death of leukemia cells

New/New Innovation: Ready-to-Use 3D Solution



Prerequisite

- ▶ CAD product design
- ▶ 3D printer

Advantage

- ▶ Short development cycles (hours to days)
- ▶ Low costs for prototyping and small series (no economy of scale)
- ▶ Novel product design

- ▶ Additive molding (3D printing) of silicone parts will soon be established as an easy-to-use, flexible and cost-effective solution complementing traditional molding technologies like injection molding

New/New Innovation: Silicon Film as Electro-Active Polymer with attractive Applications



Alexander Wacker Innovation Award 2015



- ▶ Application areas are medical technology, energy generation, automation and robotics as actuators / sensors
- ▶ Production of uniform silicon films with up to 20 μm film thickness

Existing/ New Innovation: Self-Draining Concrete

ETONIS 150, ETONIS 260



Draining Concrete

- ▶ Infiltration capable (e.g. road tarmac)
- ▶ Noise reduction (e.g. railroad tracks)
- ▶ Production in existing concrete mixing plants

Composition

- ▶ Water
- ▶ Road chips
- ▶ Sand
- ▶ Cement
- ▶ Plastic fibre

New/Existing Innovation: Transforming Skimcoats in India



Skimcoat Applications

- ▶ Skimcoat quickly became our core business in India
- ▶ Vinnapas® 5010 N / 8034 H as hydrophobic binder for white cement based putty and skimcoat

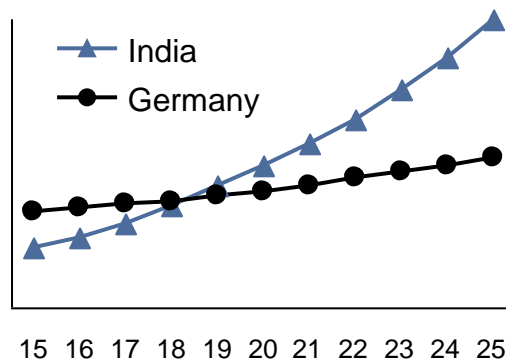
Innovation & Transformation

- ▶ White cement based skim coating
 - ▶ Provides a base layer for paints, potential to grow to the size of the overall Skimcoat Market
 - ▶ Replaces acrylate-based systems with excellent covering properties at an optimal cost

Growth

- ▶ Expect India to outgrow German market for dispersion powders already in 2019

Dispersion powder (in kt)



A Unique Value Proposition: Combining POLYMERS and SILICONE Capabilities

Epoxy Polymer /Polyurethane Replacement Industrial Flooring

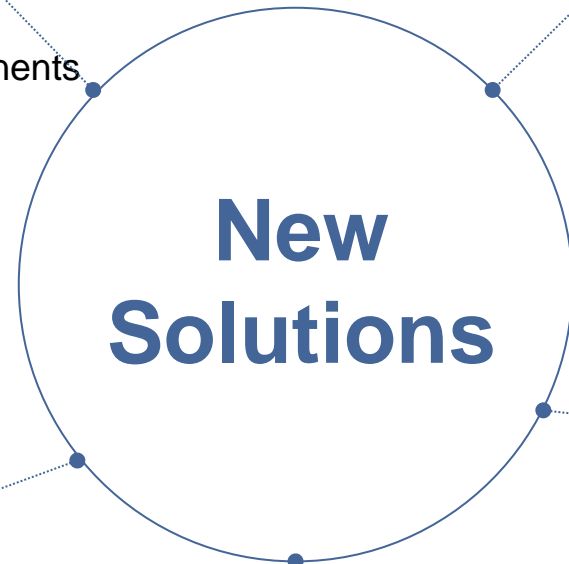


- ▶ Environmentally friendly
- ▶ Ease of use
- ▶ Low number of components

Epoxy Polymer replacement Primer for industrial floors



- ▶ Better adhesion and tougher surface
- ▶ Lower system complexity

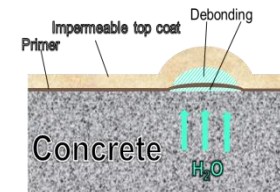


Surface treatment for mineralic substrates



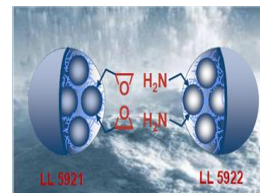
- ▶ Epoxy/polyurethane Replacement
- ▶ Combine fine particle polymers with hydrophobicity

Epoxy Polymer replacement Water Vapor Barrier



- ▶ Polymers with high VC or C2 content
- ▶ Lower system complexity

ET 593 Reactive Polymer Powders



- ▶ Improved chemical resistance for cementitious mortars
- ▶ Test runs with customer underway

Corporate R&D Fields in Chemicals

Chemistry 1



- ▶ Functional silicones, membranes and porous coatings
- ▶ Silicate insulation materials
- ▶ New crosslinking methods

Chemistry 2



- ▶ Development of active materials for Li-ion batteries (functional polymers, particles and composites)

Function



- ▶ Active materials for energy storage
- ▶ Performance testing

Application



- ▶ Innovative materials based on HDK®
- ▶ New technologies

Biotechnology



- ▶ Protein production
- ▶ Metabolic engineering
- ▶ Industrial biotechnology

Services

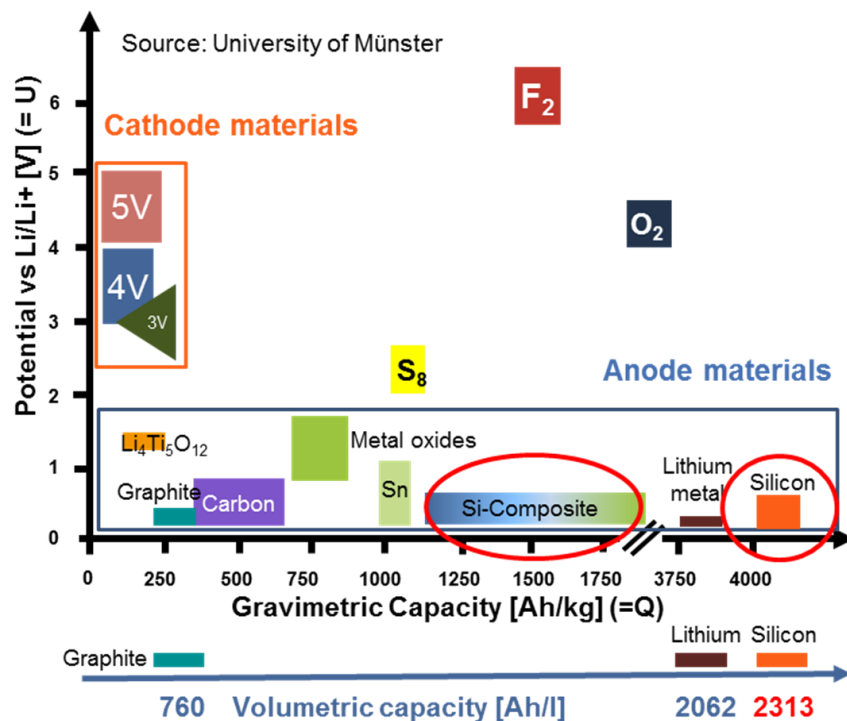


- ▶ Analytics and method development
- ▶ Toxicology



Corporate R&D: Si-Anodes for Lithium-Ion Batteries

The landscape of LIB materials*



WACKER development target

Product package to enable increase in energy density of the cell by 20-40% including

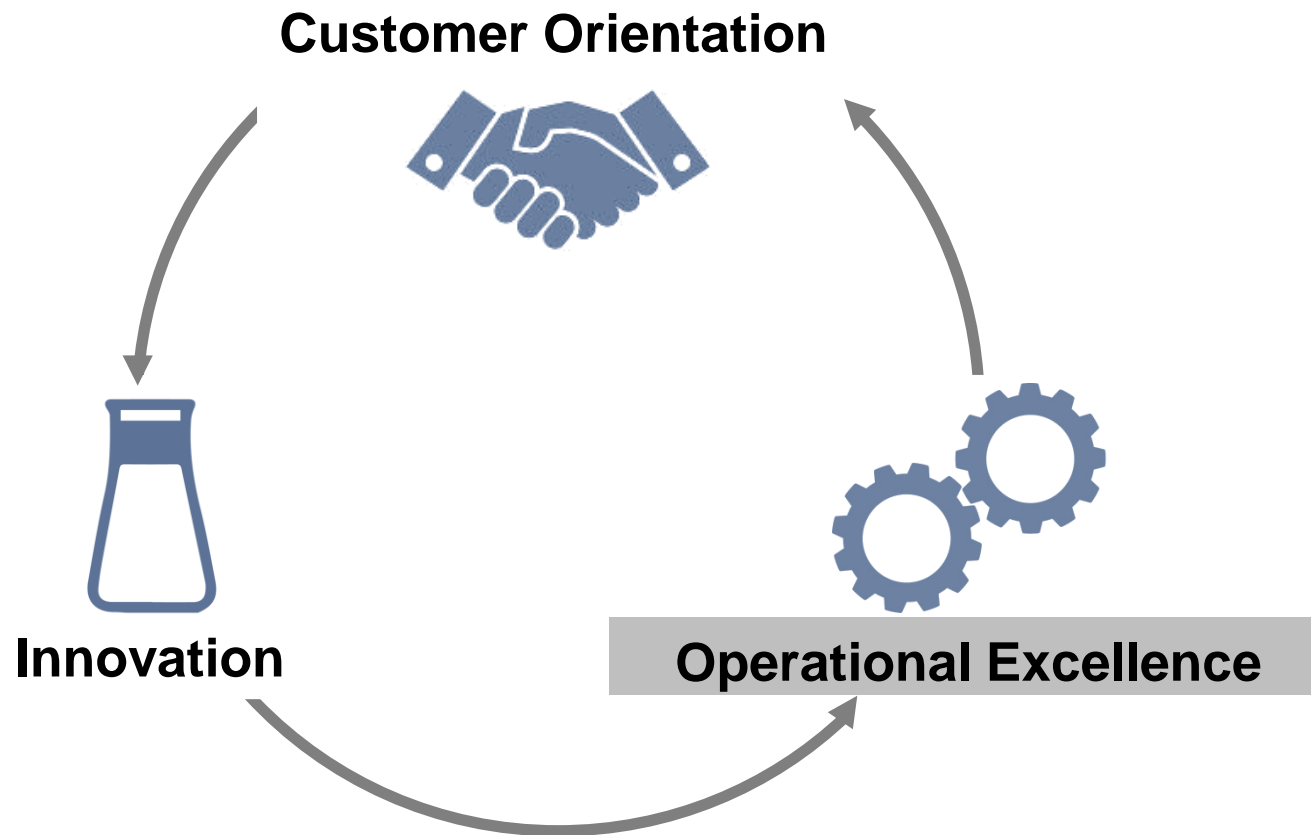
- ▶ stable Si containing anode active material with ~ 1000 mAh/g (up to 1500 mAh/cm³)

optionally supported by

- ▶ optimized binder
- ▶ adjusted electrolyte

▶ S.H. Kang**: „Si-anodes are an inevitable to meet the high energy density demand of Lithium-Ion Batteries“

Driving Value Creation in Operational Excellence



The WACKER Operating System - „WOS“: Continuous Focus on Productivity

Ambitious Goals

- ▶ Reduction of specific operating costs

- ▶ Strong employee participation
- ▶ Involvement of all organizational levels

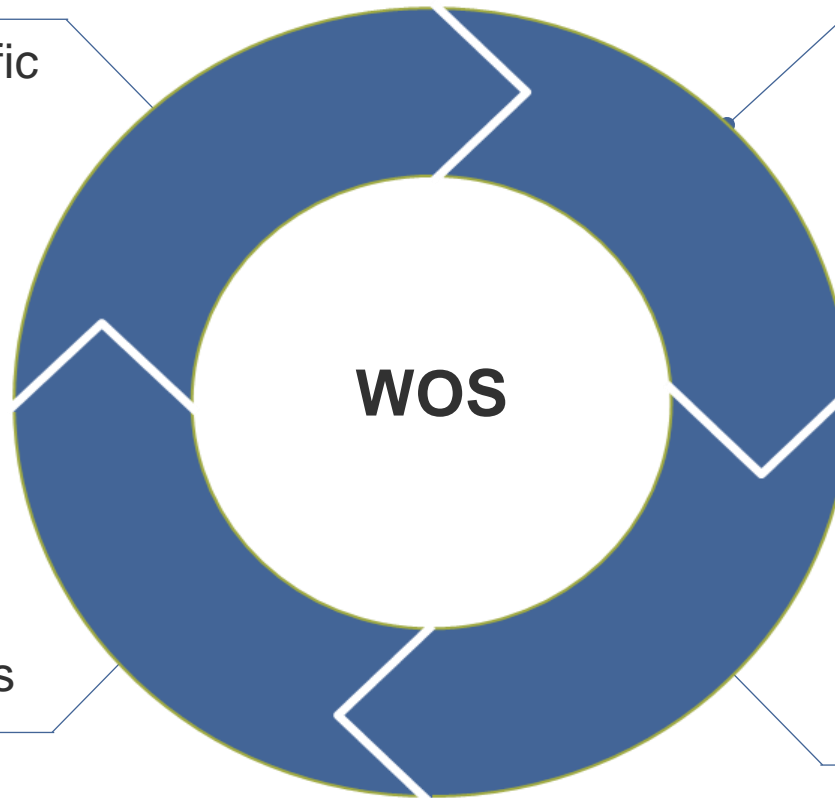
Employees

Projects

- ▶ Clearly defined responsibilities and projects

- ▶ Use of state of the art tools (e.g. six sigma, APC, OEE)
- ▶ High investments in trainings and qualification

Tools



- ▶ **WOS - WACKER Operating System**
Targeting continuous improvement along the whole value chain

Elements of Continuous Improvement

WOS Academy



- ▶ Training of methods (Six Sigma, LEAN), about 80 employees p.a.
- ▶ Support belt projects; projects with more than 2 Mio. € benefit p.a.

From knowledge to application

Methods and Tools



- ▶ General tool to log production losses, implemented in more than 50 plant´s worldwide
- ▶ OEE-Cockpit for production plants, implemented in more than 40 plant´s worldwide
- ▶ WOS Database for measure tracking of more than 500 projects p.a.

Data logging and analyzing

Projects



- ▶ Support plants and corporate services
- ▶ Application of methods and tools for improvement
- ▶ Create measures for improvement

Improve productivity

Basis for Continuous Improvement : Uniform, Integrated Data Logging Tool for Production Plants

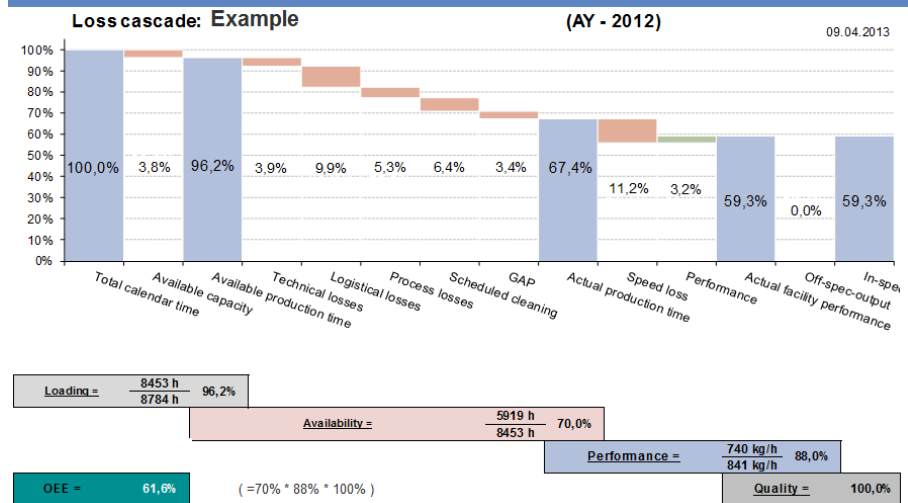
Integrated system for identification of production losses

- ▶ Automatic data logging of failure
- ▶ Categorize losses
- ▶ Data analysis
- ▶ Use statistical process control

System implemented in majority of all production plants worldwide

OEE-Cockpit for production plants

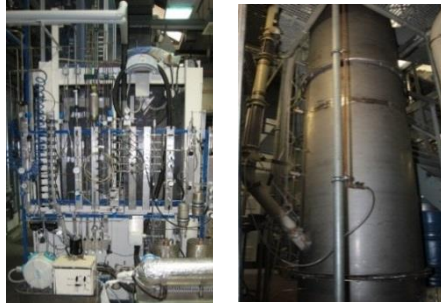
Overall Equipment Effectiveness



Process Development with Essential Contribution for Operational Excellence

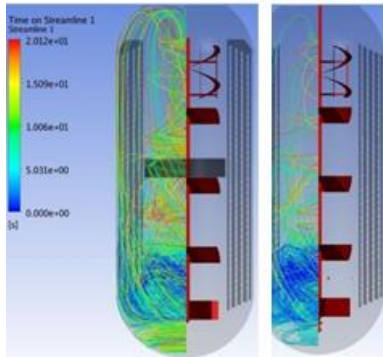
Pilot plant

Develop scale up rules and improve technologies



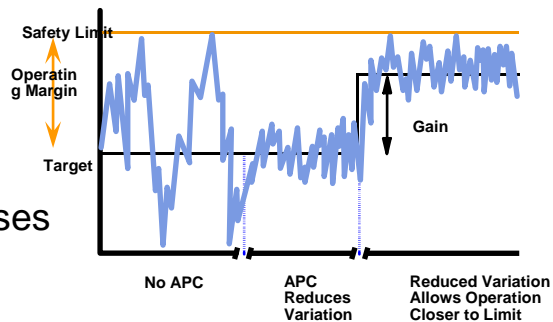
CFD

Optimised design of processes and equipment



APC

Pushing the plant beyond the limits, avoid dynamic losses



Objectives

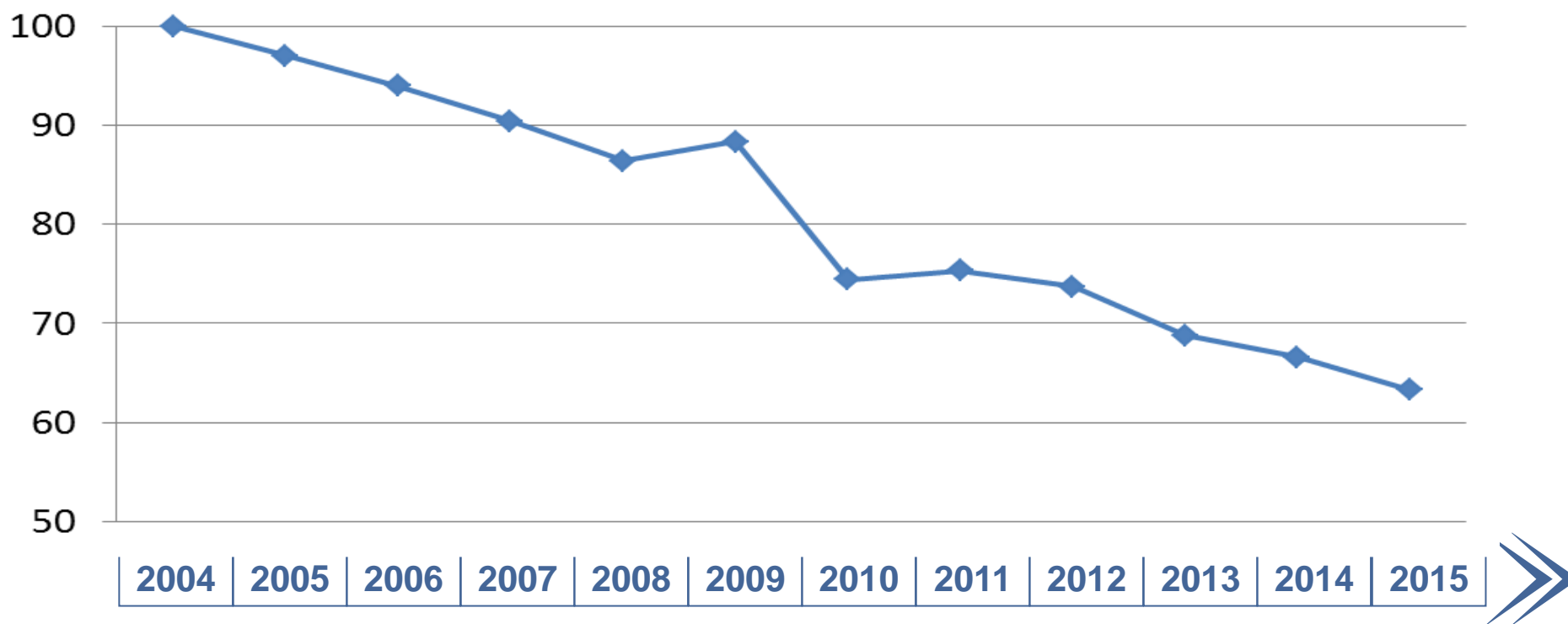
- ▶ Avoid capital costs
- ▶ Maximize throughput
- ▶ Minimize productions costs

Competencies/Methods

- ▶ Engineering Excellence in core processes
- ▶ Expertise in design and scale up
- ▶ Pilot plants
- ▶ Process Simulation tools:
 - Flow Sheet Simulations (e.g. Aspen)
 - Rigorous Modelling (e.g. Polymerization)
 - CFD - Computational Fluid Dynamics
 - Wacker Process Explorer (Visualize losses)
 - APC - Advanced Process Control

Supply Chains with Significant Improvement over 10+ Years

Continuous reduction of specific OPEX (average of relevant plants)



► WOS 1.0

Reduce spec. OPEX
30 % in 3 years

WACKER German Plants

► WOS 2.0

Reduce spec. OPEX
10 % p.a.

WACKER Group Plants,
Corporate Services

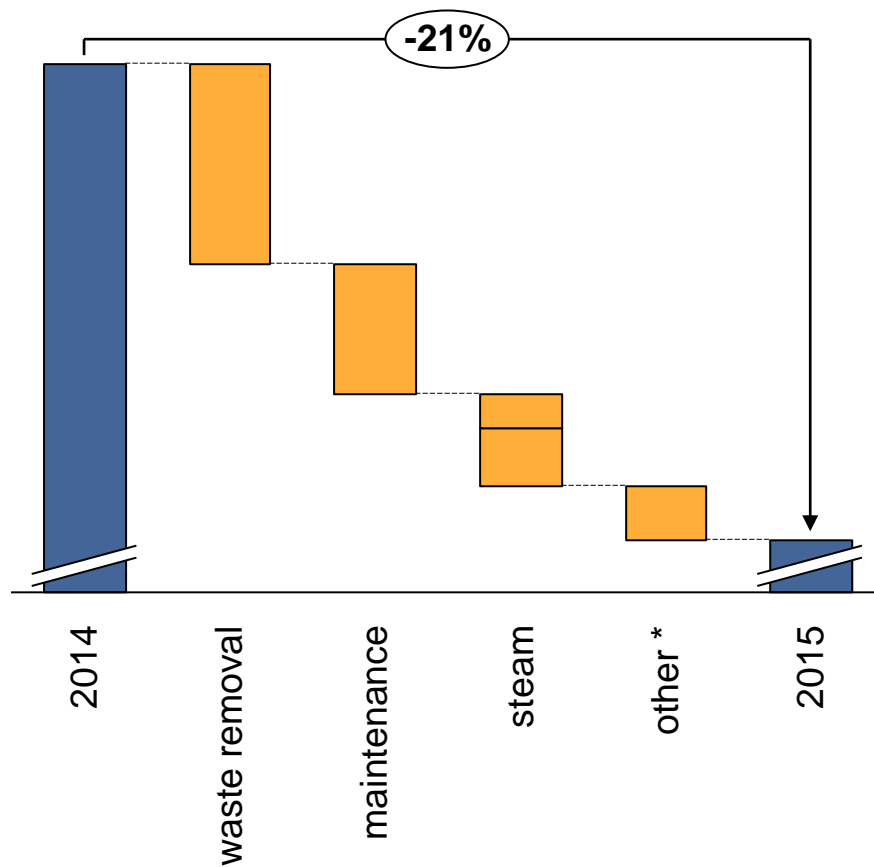
► WOS 3.0

Individual plant targets

WACKER Group Plants,
Corporate Services

Example SILICONES 1/2: Optimizing Silane Distillation in Nünchritz

Specific Costs 2014 vs. 2015 [€/t]



Target

- ▶ Increase yield -> continuous process development
- ▶ Optimize heat recovery
- ▶ Minimize waste streams

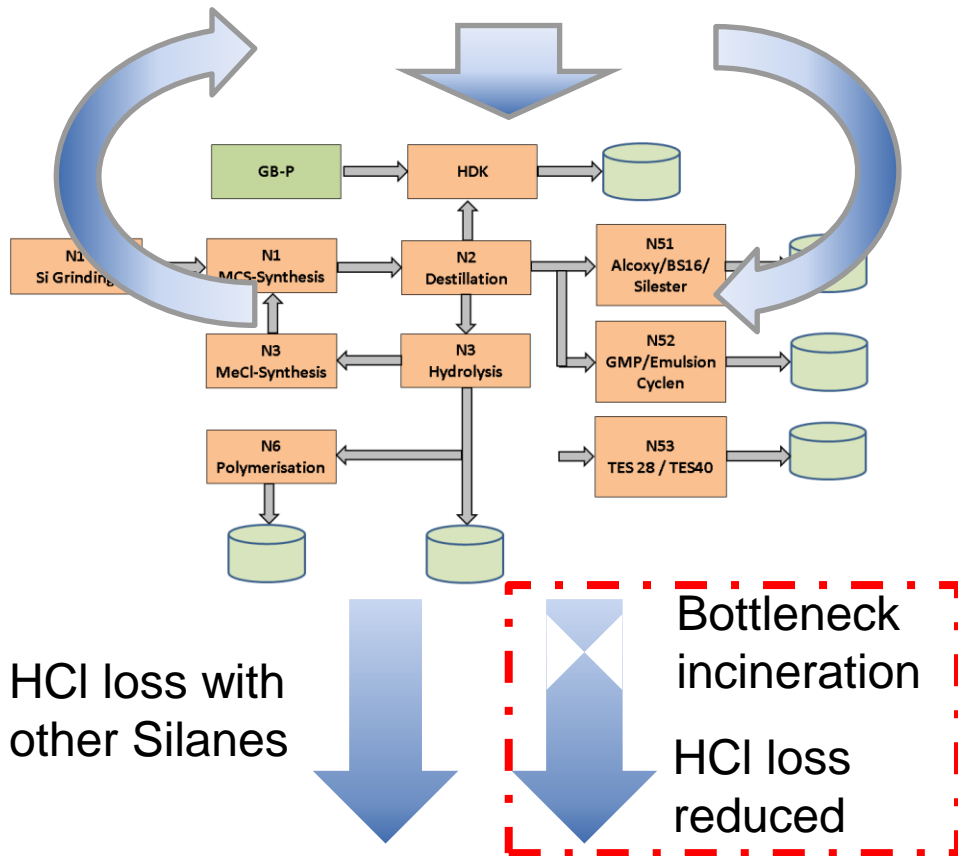
Result

- ▶ Decrease specific costs by 21% yoy

* other= sum of values of other cost types

Example SILICONES 2/2: Leveraging the Verbund for Debottlenecking in Siloxane

Siloxane production & HCl circuit



Target

- ▶ Reduce chlorine loss in production system
- ▶ Improve yields in MCS* production
- ▶ Optimize material flow between SILICONES and POLYSILICON

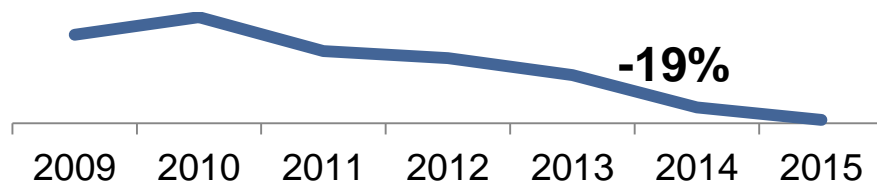
Results

- ▶ New production records for MCS in Nünchritz
- ▶ Reduced costs
- ▶ Reduced chlorine loss by over 2/3

Example POLYMERS 1/2: Reducing Energy Needs in Dispersible Powders



**Consolidated Energy kWh/to
(indexed)**



Target

- ▶ Reduce specific energy needs per ton of dispersible powder in VAE spray dryers
- ▶ Re-use stranded energy outputs in the Verbund system

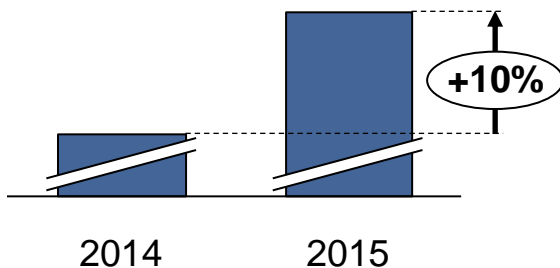
Result

- ▶ Lower energy costs
- ▶ Leveraging Verbund
- ▶ Capacity gain

Example POLYMERS 2/2: Improving Capacity of Existing Dispersion Reactors



Capacity (t/a)



Target

- ▶ Increase output of existing reactors without significant capex

Projects

- ▶ Improve continuous polymerization
- ▶ Optimize cooling
- ▶ New vacuum pump
- ▶ Recipe optimization

Result

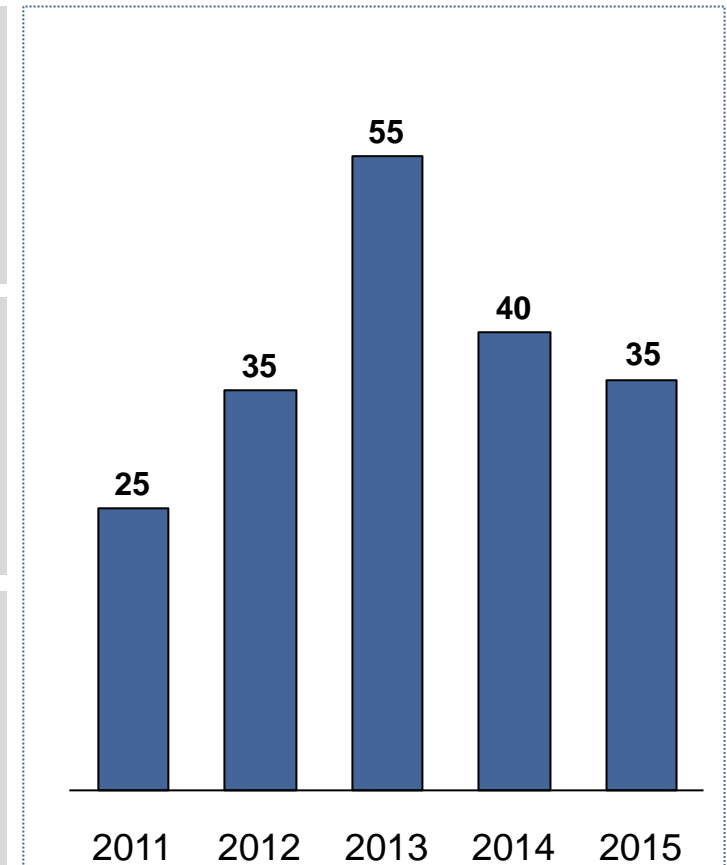
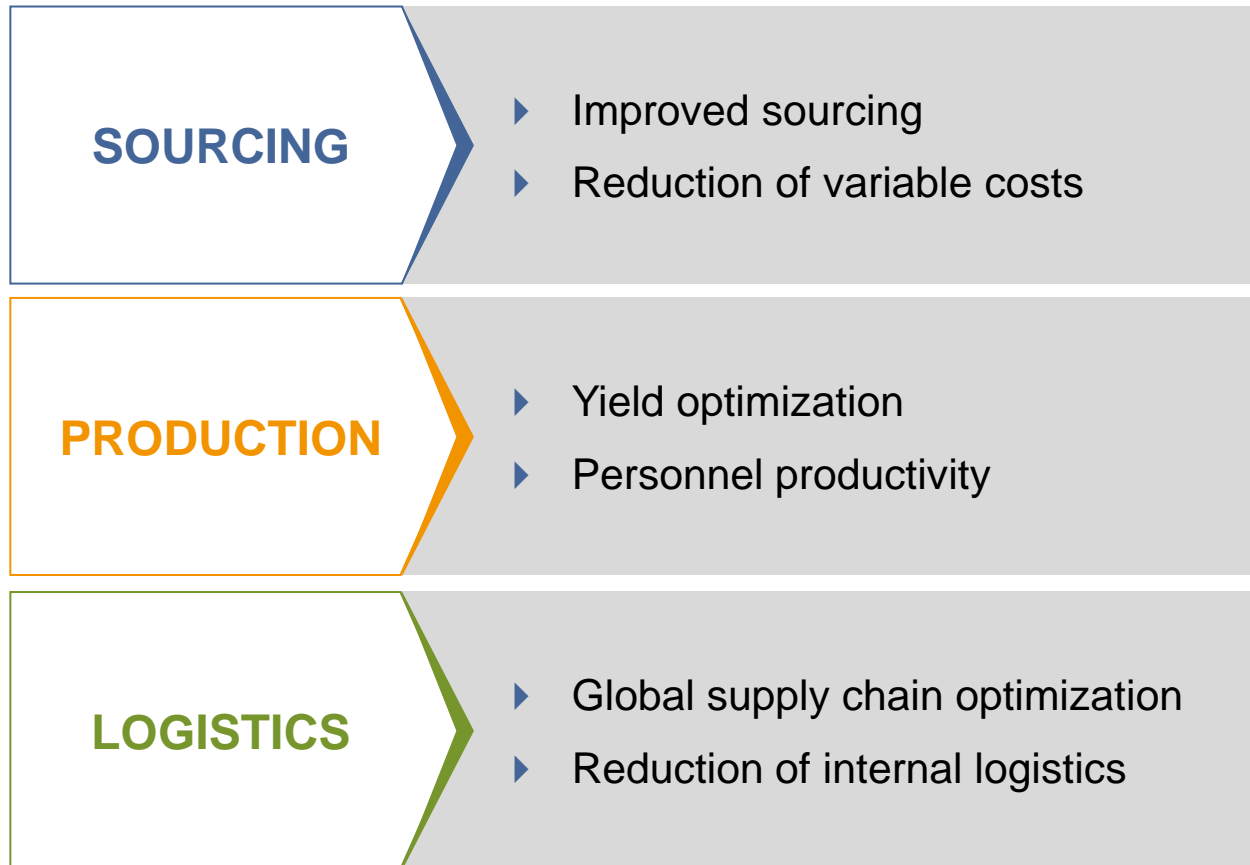
- ▶ More Capacity
- ▶ Lower specific costs

Benefits of Operational Excellence within Chemicals

Functional areas

Areas of focus

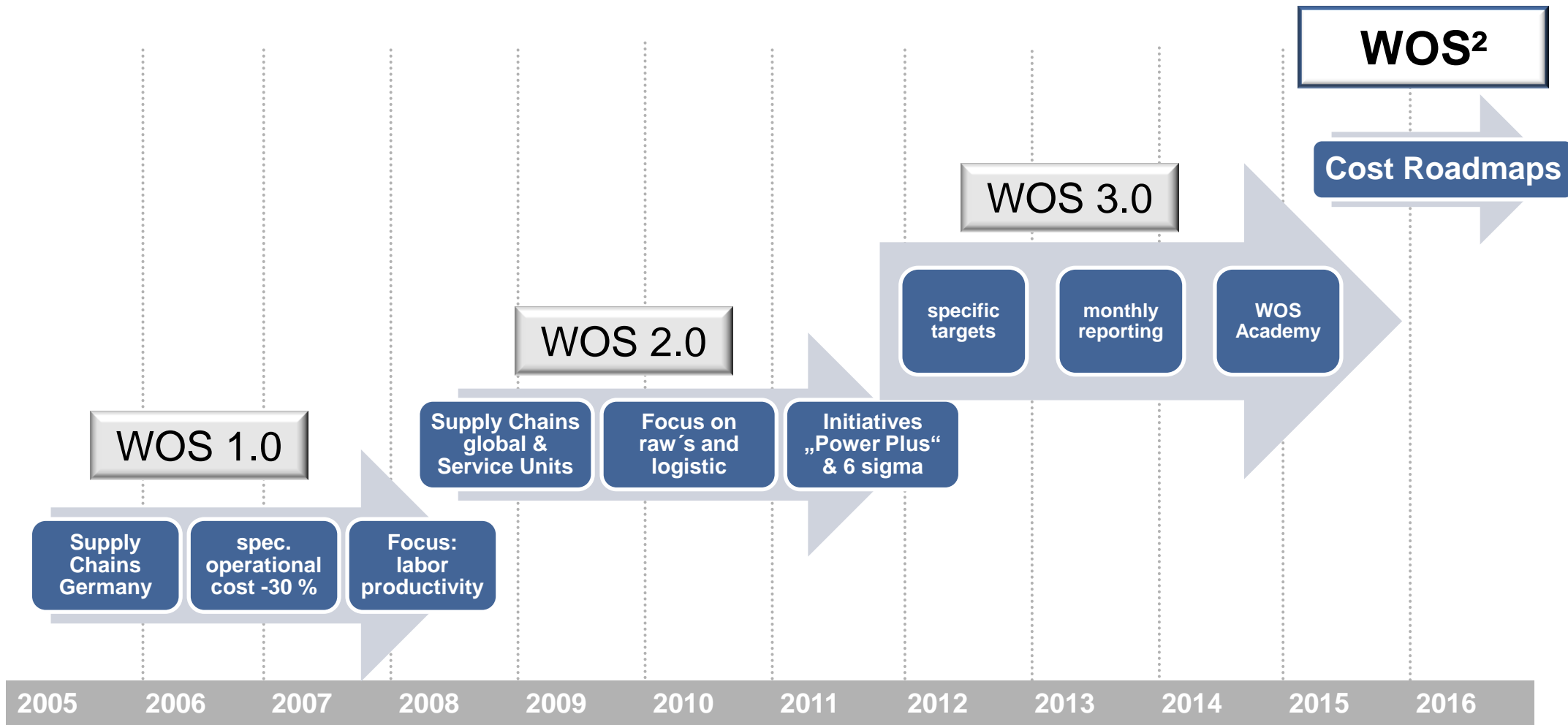
Productivity Savings (in €m)



▶ Realized productivity savings over five years: 190 €m

WOS – Evolutionary Development since 2005

WACKER Operating System – Steadily raising the bar



WOS² - Aggressive Cost Roadmaps: Transferring A Winning Approach to Chemicals

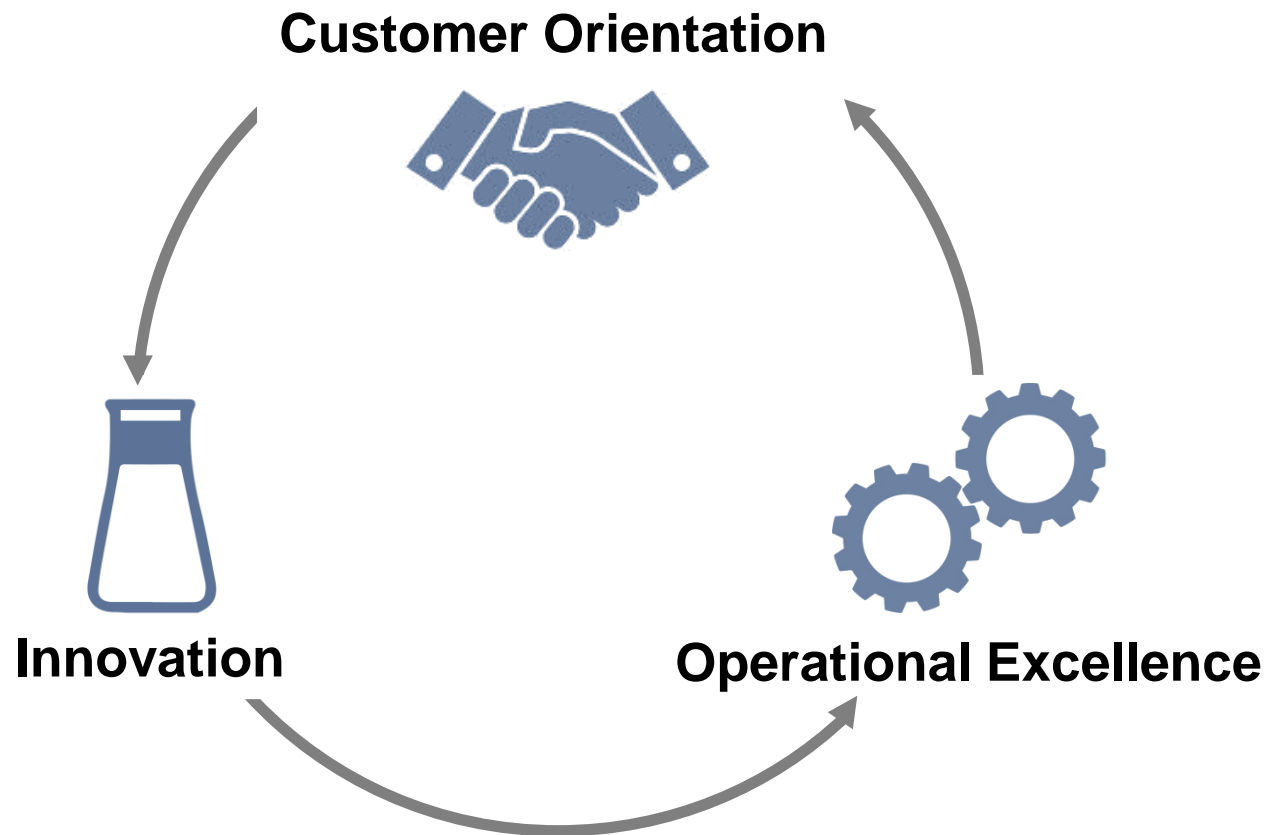
Chemicals

Measures

- ▶ WOS WACKER Operating System: targeting continuous cost decrease in specific operating costs
- ▶ Raw material and energy cost: optimized yields, loss reduction, raw material and energy recovery, process optimization
- ▶ Labor: reduce set-up times and non-value-added activities
- ▶ Logistics: lean processes, optimized packaging
- ▶ Technical spending: optimize inspection cycles, spare part storage
- ▶ Asset utilization: debottlenecking

▶ **Leveraging successful cost roadmap approach to Chemicals**

WOS Fosters a Continuous Improvement Culture



WACKER

CREATING TOMORROW'S SOLUTIONS

Chemical Day 2016
February 15, 2016

WACKER: Issuer, Contact and Additional Information

Issuer and Contact

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Financial Calendar

- 03/17/16 – FY Results 2015
- 04/28/16 – Q1 Results 2016
- 05/20/16 – Annual Shareholders' Meeting
- 07/28/16 – Q2 Results 2016
- 10/10/16 – Capital Market Day
- 10/27/16 – Q3 Results 2016

Additional Information

ISIN:	DE000WCH8881
WKN:	WCH888
Deutsche Börse:	WCH
Ticker Bloomberg:	CHM/WCH:GR
Ticker Reuters:	CHE/WCHG.DE
Listing:	Frankfurt Stock Exchange Prime Standard

