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## Generating High Value from the Coatings Value Chain

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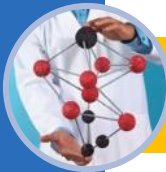
# Topics



**Coatings Industry Value Chain**



**Innovation-Drivers & Challenges**



**Transformation**



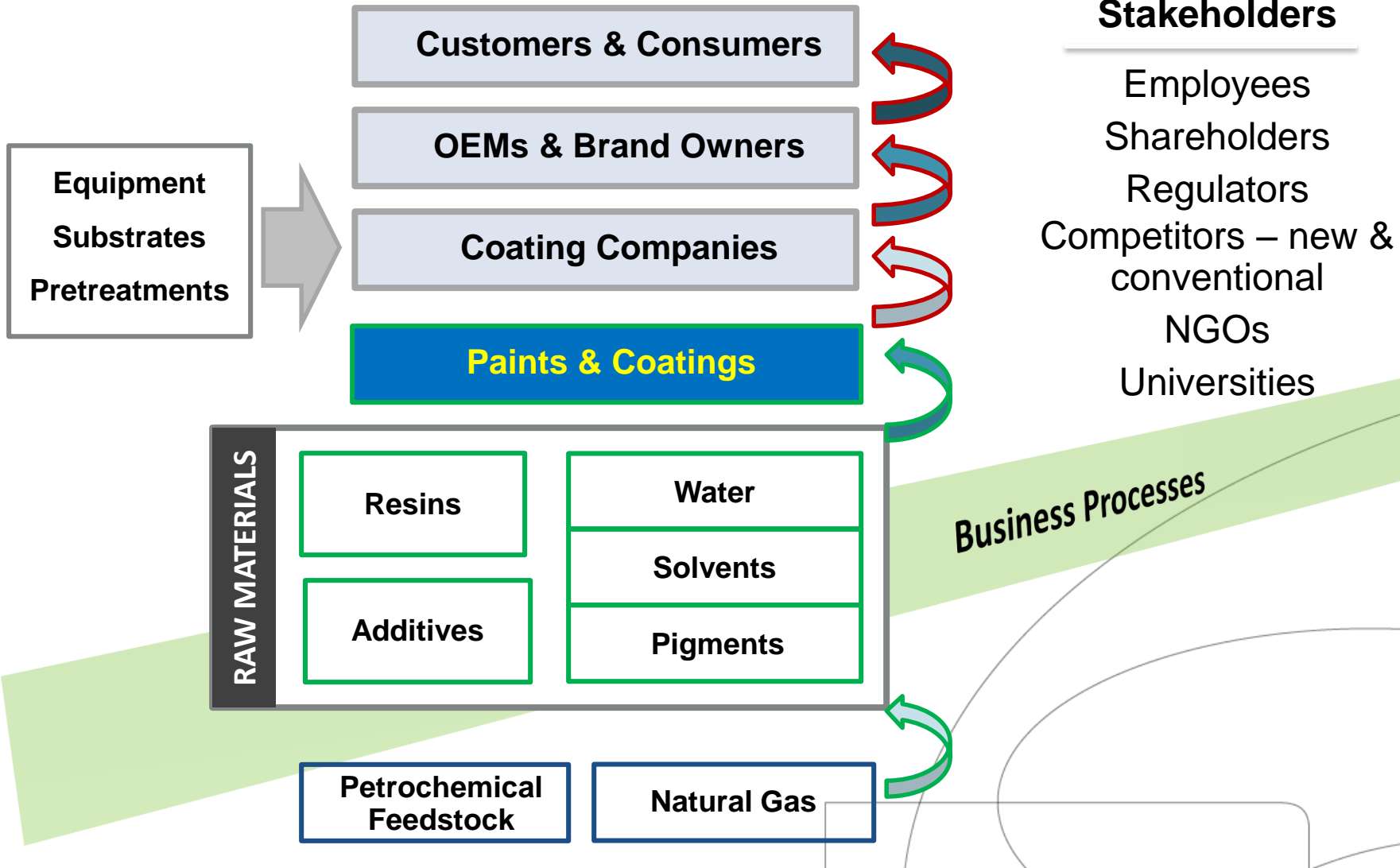
**Looking to the Future**

# Trends affecting the coatings value chain

## Macrotrends

- Globalization
- Inconsistent & low GDP growth
- Rapidly expanding middle class
- Urbanization
- Aging population
- Individualization
- Rising consumer engagement
- Increasing environmental protection and stewardship
- Raw material & energy supply & dynamic costs
- Big data management
- Scientific / technical advances
- Technical talent supply

# Dynamic, complex drivers & relationships

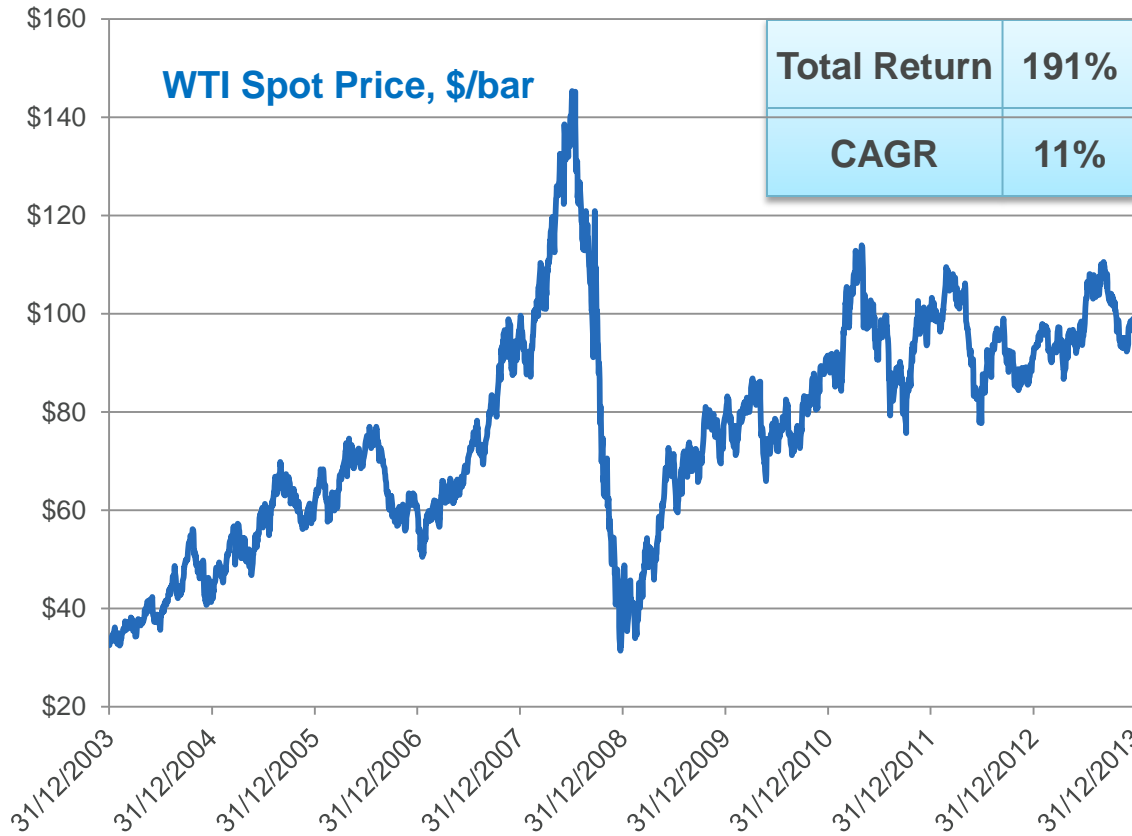


# Broad range of upstream customers



# Downstream supply chain trends

## 10 Year Inflation Trend 2003 – 2013 Oil Prices



### Industry Impact

- Raw material volatility over the last decade
- Suppliers of upstream materials have changed: consolidation & rise of regional players
- Pricing discipline required
- Value of strong brands and technology

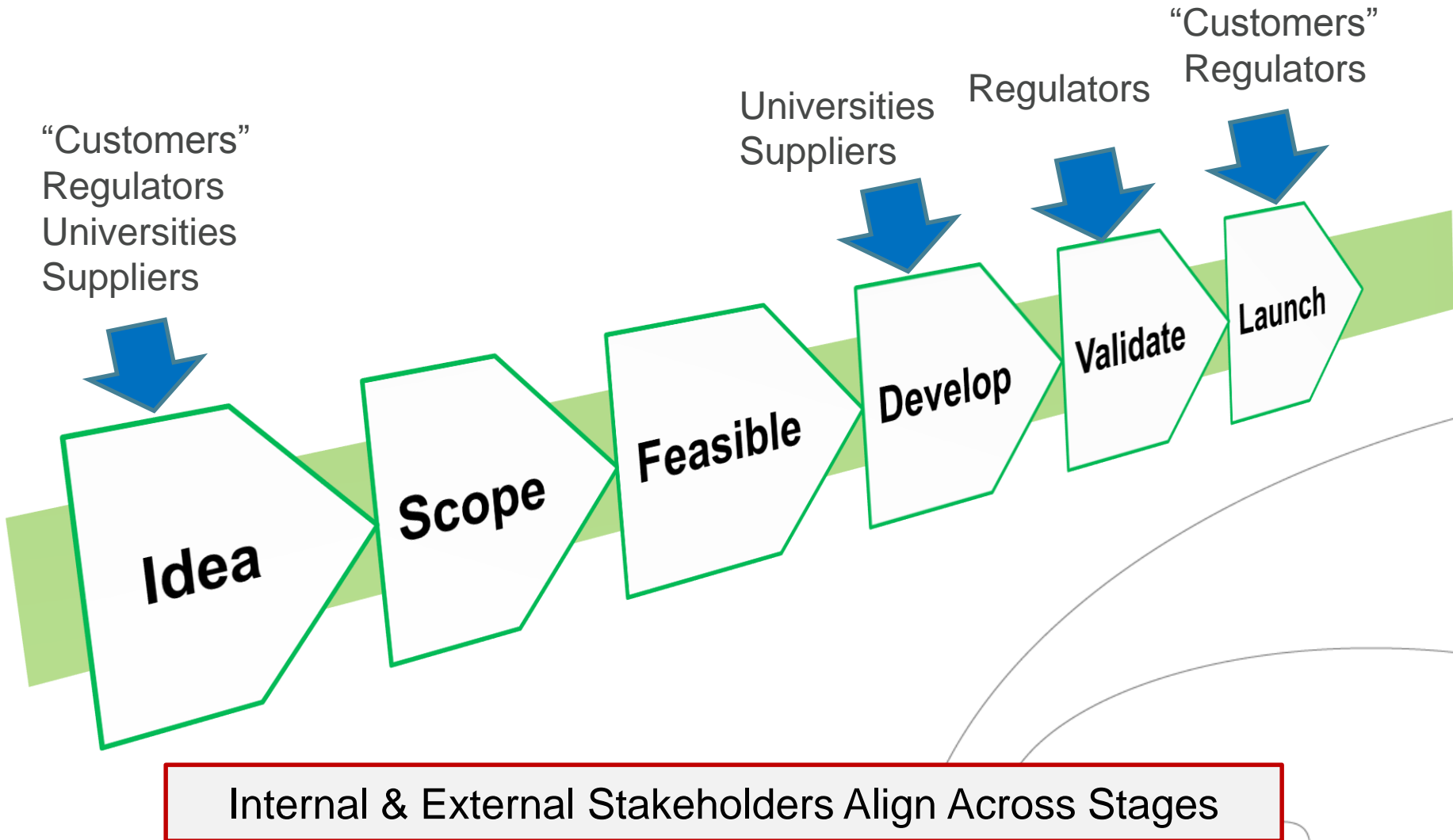


# ... leading to new opportunities

## Coatings Innovation Drivers

- New/changing suppliers of raw materials & energy
- New regional market growth
- Global stewardship & regulatory changes
- Changing application needs for new functionality  
Energy / heat management, housing and construction, healthcare, food supply, transportation / light-weighting, customized designs
- Enabling equipment & process improvements
- Big data analytics
- New materials ... bio-materials, nanotechnology, functional additives
- Scientific / technical advances applicable to coatings & customers' applications  
Automation, performance characterization & prediction, color technology, new materials

# Alignment to obtain goals





# View of coatings industry innovation



- Coatings for Plastic Automotive Parts – 1970s
- Productivity: Coatings Lifetime Enhancement, Film Weight Reduction & Energy Efficiency (e.g., UV since 1980s)
- Zero VOC Consumer Paints, Low Solvent & Water-borne Industrial Coatings – acrylic latex 1950s, high solids solvent 1970s
- Materials Efficiency of Coatings Application Process
- Eliminating Materials of Concern
- UV Resistant, Solar Reflective, Self Healing, Self Cleaning
- High Hiding Power Paints with  $\text{TiO}_2$  Efficiency – last 5 years
- Expanded appearance palette – metallic pigments 1980s

A Dynamic Innovative Industry

# Innovation challenges

- Greatest innovation opportunities rest upon broader technical competencies & systems design ... reaching externally, collaboration necessary
- Industry has not traditionally interacted with regulators
- Workforce skills not suited to adopt transformative technologies ... art vs science, robotics & automation, data analytics, collaboration vs individual contributor
- Materials of concern limit the palette of raw material options while performance requirements become more demanding
- Performance testing & specifications have not been updated ... conservative user industries

Innovation Required to Succeed

Looking to the

**FUTURE**



# The future looks like ...

Aquaguard™ water-based industrial coatings

## Product Innovation

First commercial water-based 2-coat system for containers, replacing high solvent, 3-coat, zinc-based coatings



## Market Value

Better corrosion protection and dramatically reduced solvent emissions without zinc or high solvent content

## Supply Chain Challenges

- Changes required to coating manufacturing line & process
- Specification process through brand owners
- Unique supplier relationship

# The future looks like ...

Next generation of packaging coatings for food & beverages

## Product Innovation

Fit-for-purpose coatings that meet all market concerns and performance / migration requirements globally.



## Market Value

- Compliance to regulatory requirements & responsive to consumer concerns.
- Meets all performance requirement; assurance of rigorous test protocols.

## Supply Chain Challenges

- Complex regulatory approvals & long specification time of new technology
- Completely new & fragmented supply chain
- Brand owner & NGO dialogue required to position new technology

# Summary & Success Factors

1

The supply chain is rapidly changing, presenting opportunities & challenges.

2

New skills, relationships & practices are required to succeed.

3

Collaboration / partnership is critical – holistic approach to design & development, reaching across the supply chain, access to broader insight & expertise.

4

Recent history shows that innovation is rewarded.