

SRI CONSULTING

Chemical Industry Trends

Impact on CMS

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SRI Consulting*

Introduction

SRI Consulting

- 55+ years of chemical business research
- Once known as Stanford Research Institute
- Now division of Access Intelligence

Safe & Sustainable Chemical Series

- New series of reports on important opportunities and threats to industry
- Bioproducts, safe materials, new energy



A Division of Access Intelligence, LLC

Items to Cover

- Sustainability — Just what does this mean?
- What is the status of the global chemical industry?
- What are some recent trends?
- What can we expect to see coming?
- Threats or opportunities to CMS?

What Constitutes Sustainability?

- Difficult question
- Different parties value different attributes
- Everyone wants it
- Stake holders demand it
- Three major areas of concern

Elements of Sustainability



Economic Sustainability

- It has to be
 - No value, no survival
 - Laws may help
- Bottom line value
 - Supplier → end-users
 - Entire value chain in total

Environmental Sustainability

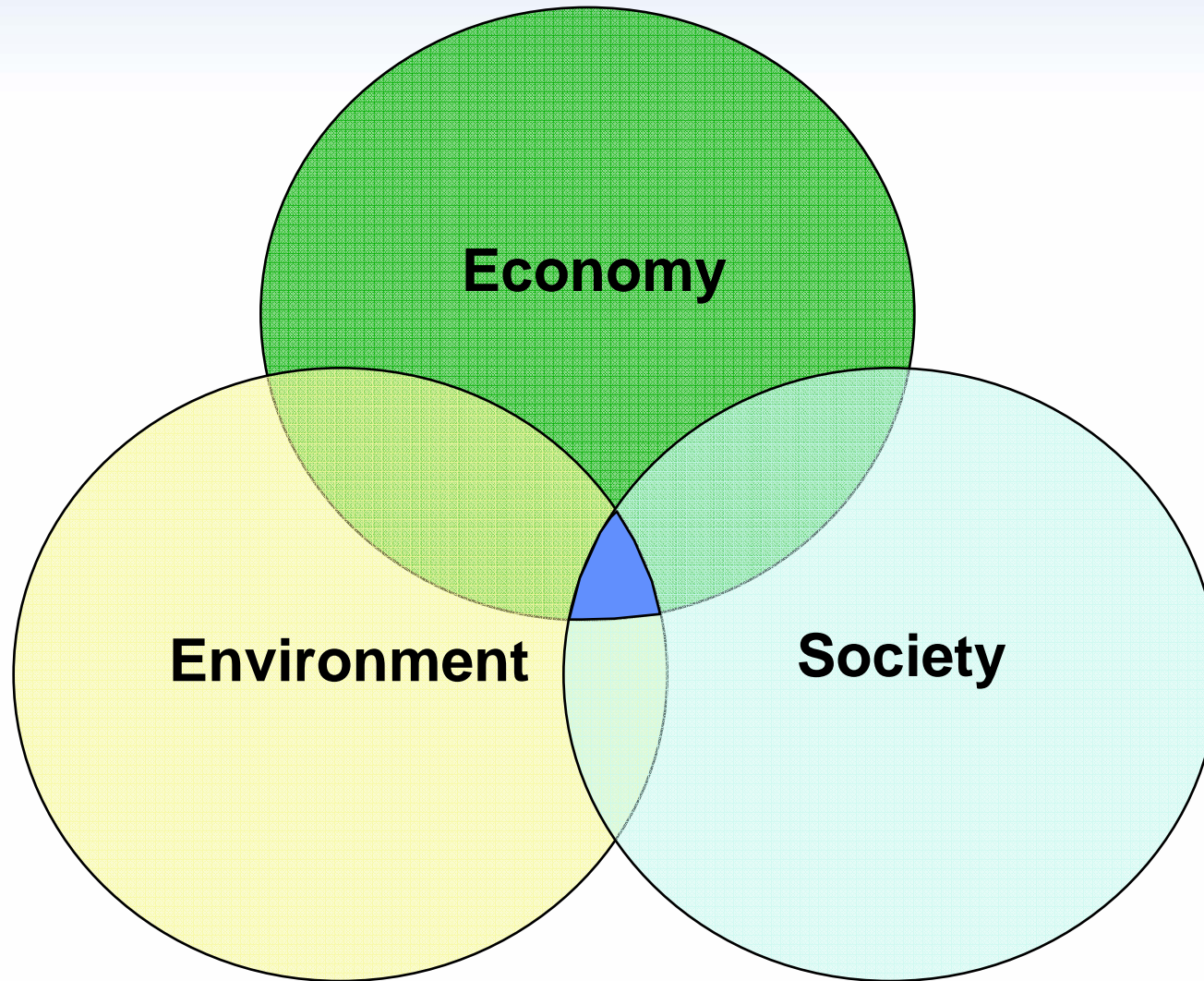
- Products and services renewable over time
- Safety along value chain
- Minimize toxicity
- Minimize GHG footprint

Sustainable in Society

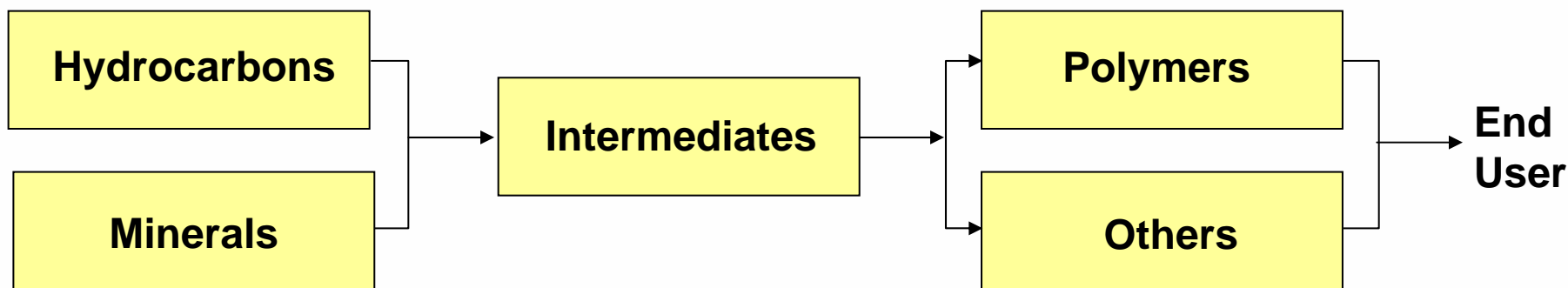
- Complex issue
 - Employment vs. economy
 - Self sufficiency
 - Integration into economy
 - Alternate use of capital
 - Educational issues
 - Infrastructure changes
 - N.I.M.B.Y.



So When Is a System Sustainable?



The Chemical Industry Today



Commodity
Specialty
Fine Chemicals

End Uses

Fine Chemicals
Plastics/Resins
Specialty – Functional
Specialty – Market Focus
Fertilizers
Fibers
Coatings
Solvents
Elastomers
Other

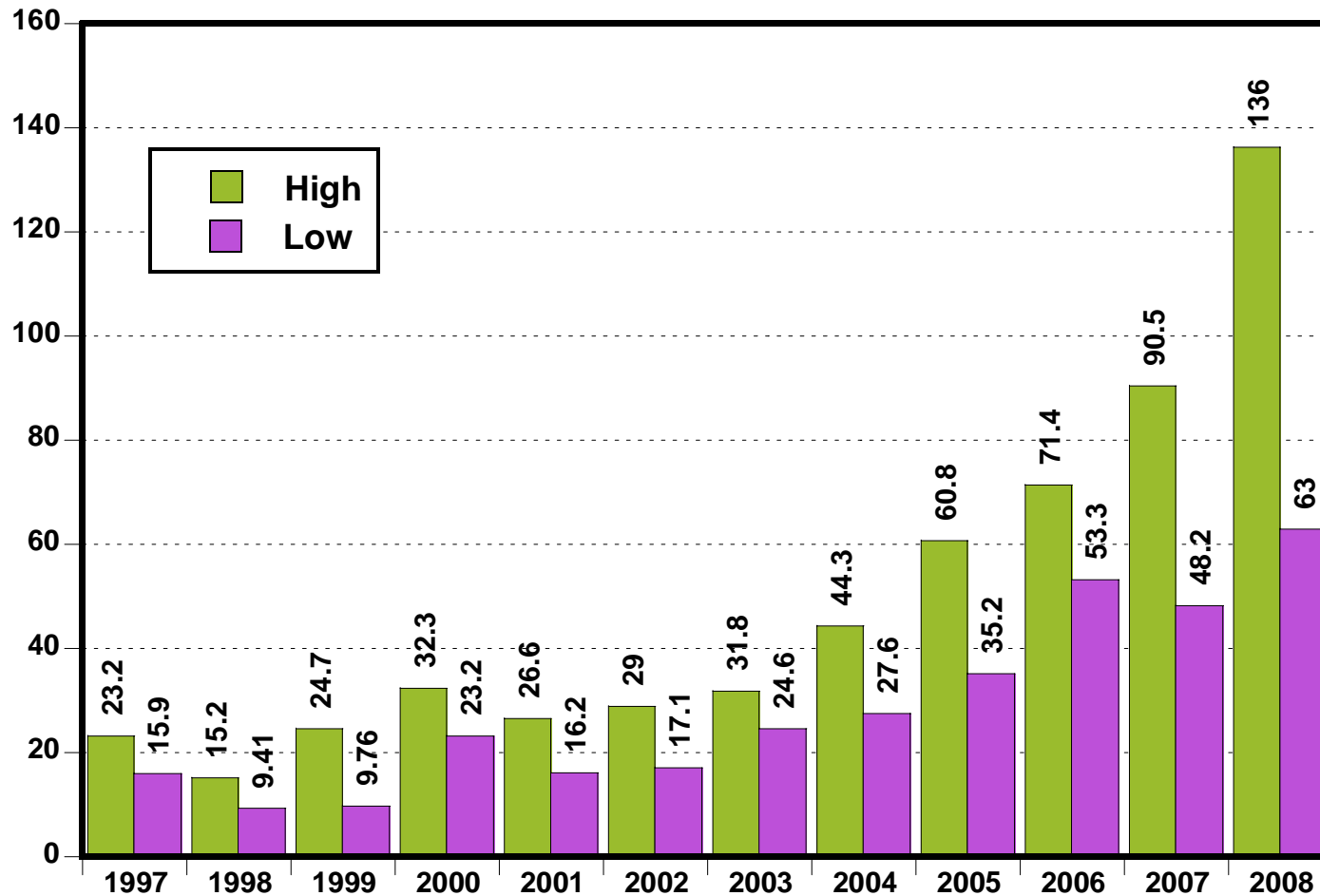
\$2 Trillion Globally
(or more)

Some Trends

- Energy uncertainty
- Biotechnology thrusts
- Regulations galore
- Nanotechnology
- Changing order

Historical Oil Prices

Dollars per
Barrel



Note: Based on weighted average, weekly, all-country, fob, exported value.

Source: EIA.

Biotechnology

- Red — Pharma
- White — Industrial
- Green — Agriculture

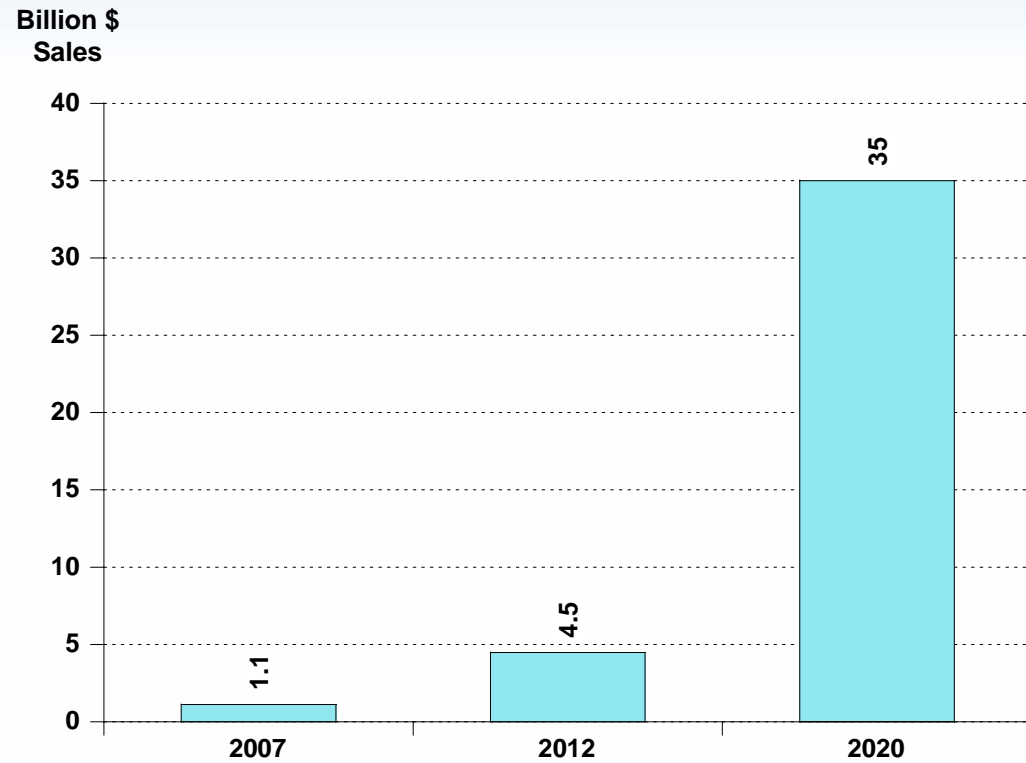
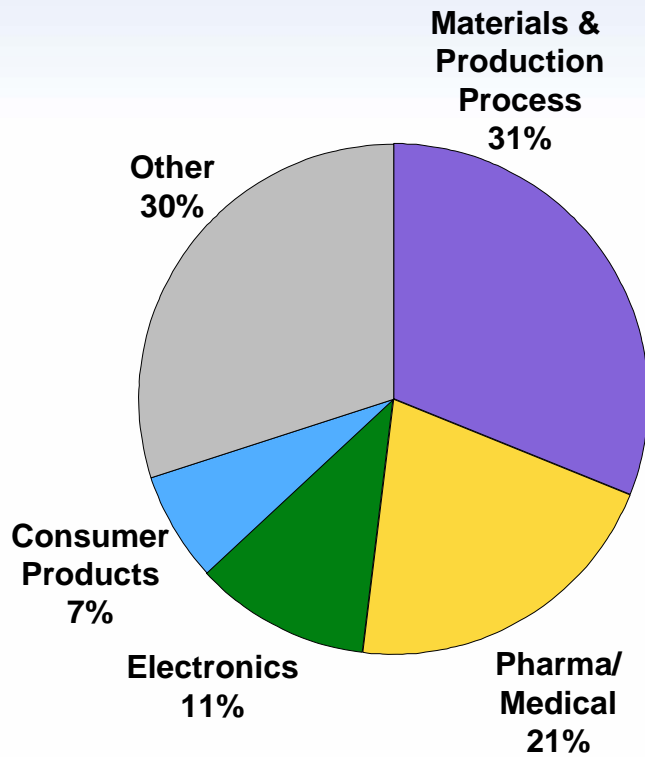
Biotechnology Focus

- Early focus – agriculture and pharma
 - Size of market
 - Profit potential
- New interest in industrial
 - “Green” focus
 - Energy situation

Nanotechnology

- Big interest several years ago
- Industry that is hard to define
 - Materials
 - Processes
- Many types of products
 - Nanotubes
 - Nanofibers
 - Fullerenes
 - Organoclays

Nanotech Applications and Growth



Source: Freedonia.

M&A Activity

Some Major Transactions 2008

- Dow buys Rohm & Haas
- Ashland buys Hercules
- Vestar buys Unilever N.A. Detergent business
- BASF buys CIBA
- Tata buys General Chemical Industrial Products
- Incitec Pivot buys Dyno Nobel
- Jordan Company buys Haas TCM

What's Coming?

- Less regulation (ha ha)
- Green & sustainable
 - New energy sources
 - Biomass conversion
 - Recycling
- Petroleums of the future
 - Water
 - Various elements

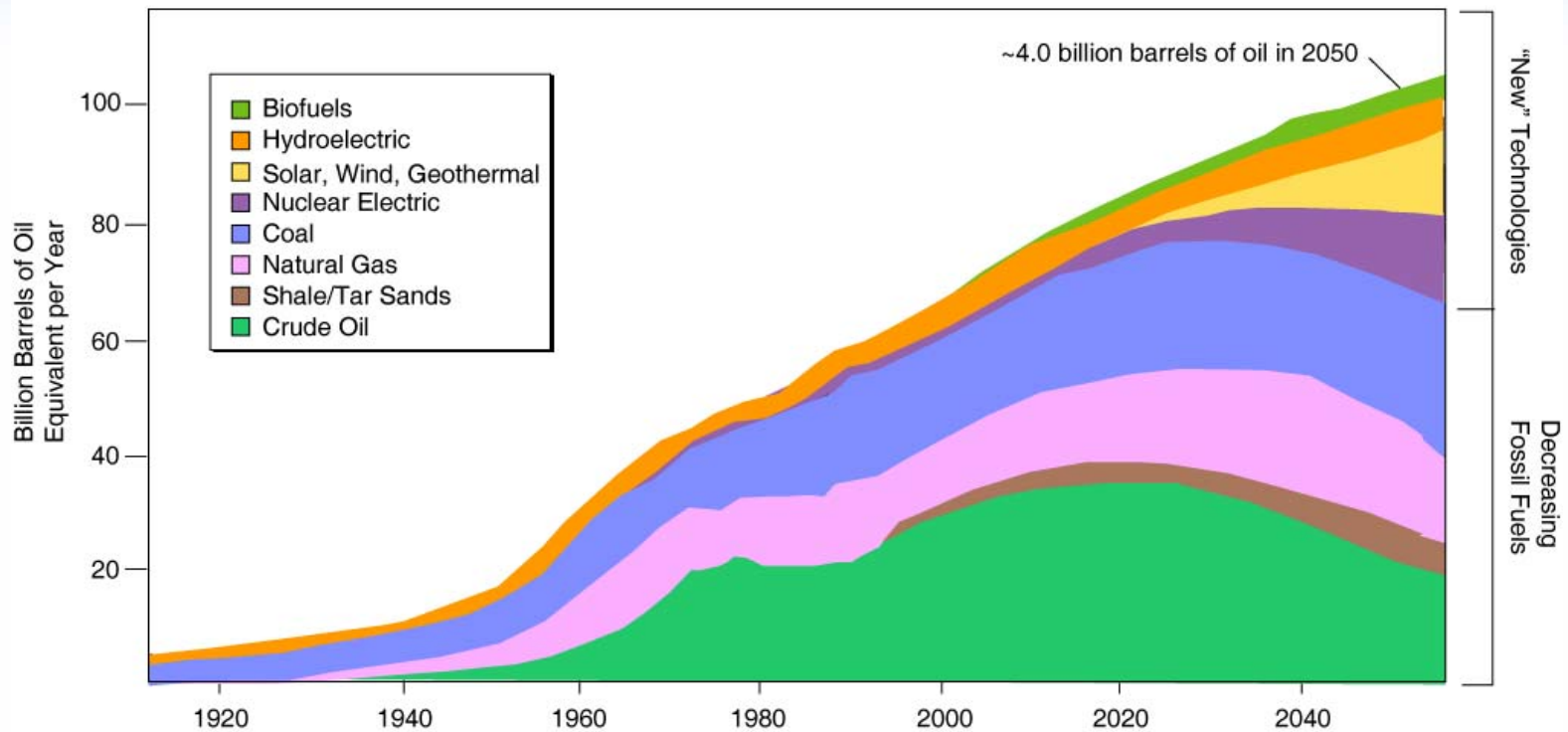
Regulations

- The big ones
 - Registration, authorization and evaluation of chemicals
 - REACH
 - Restriction of hazardous substances – electrical/electronic equipment
 - RoHS
 - Waste electrical and electronic equipment
 - WEEE

New Energy Sources

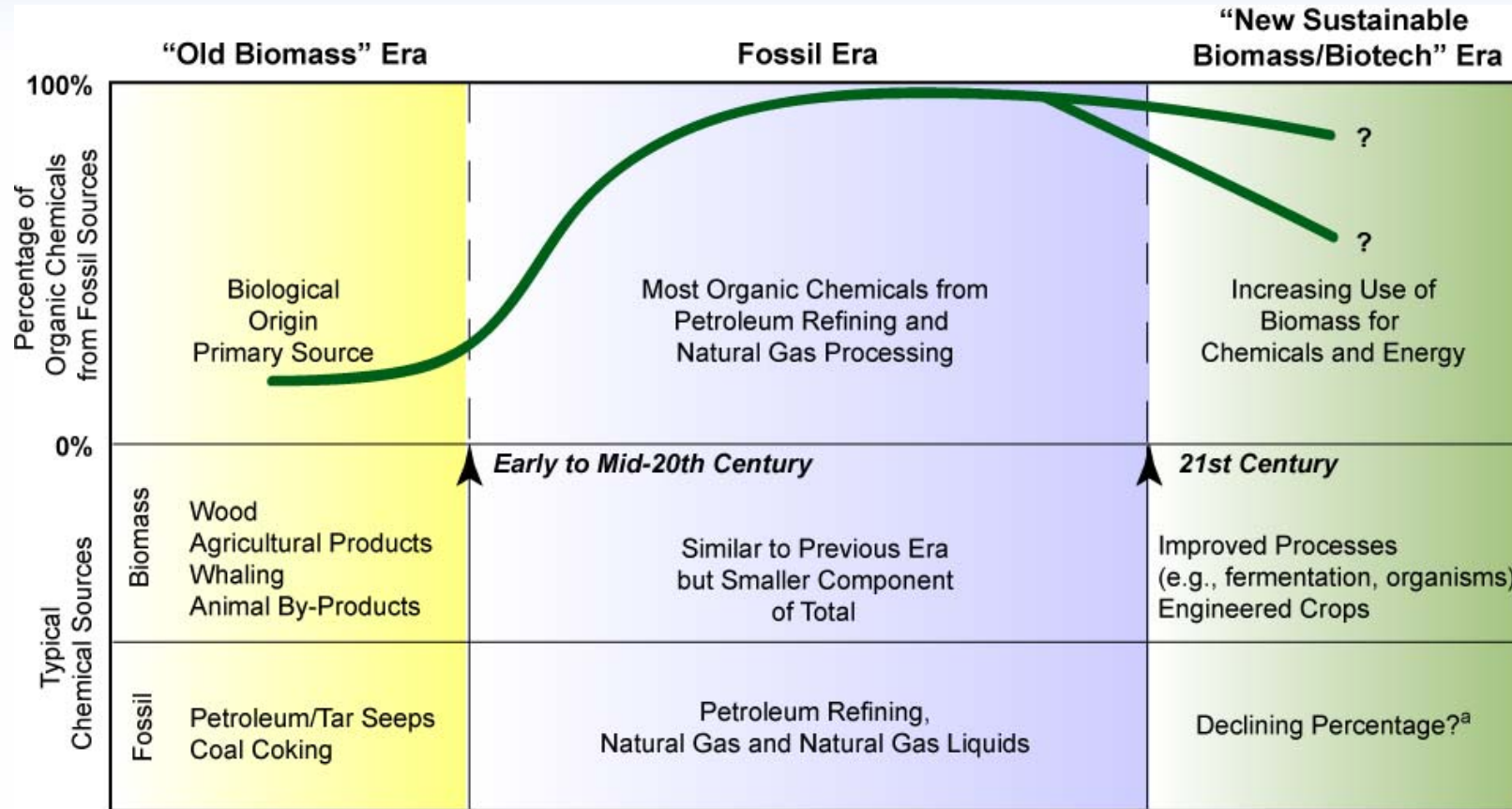
- Solar
- Wind
- Biofuels
- Rejuvenation
 - Nuclear

World Energy Demand – Long-Term Energy Sources



Sources: Lynn Orr, *Changing the World's Energy Systems*, Stanford University Global Climate & Energy Project (after John Edwards, American Association of Petroleum Geologists); SRI Consulting.

The Future



a. The question remains: with more energy being obtained from renewable (e.g., wind, solar) and resurgent (e.g., nuclear) sources, will this free up high-quality fossil sources for chemicals?

Source: SRI Consulting.

Chemicals from Biomass

- Forestry
- Natural Products
- Fermentation
- Food/Agriculture Products
- By-Product of Biofuels
- Thermochemical Products



Recycling

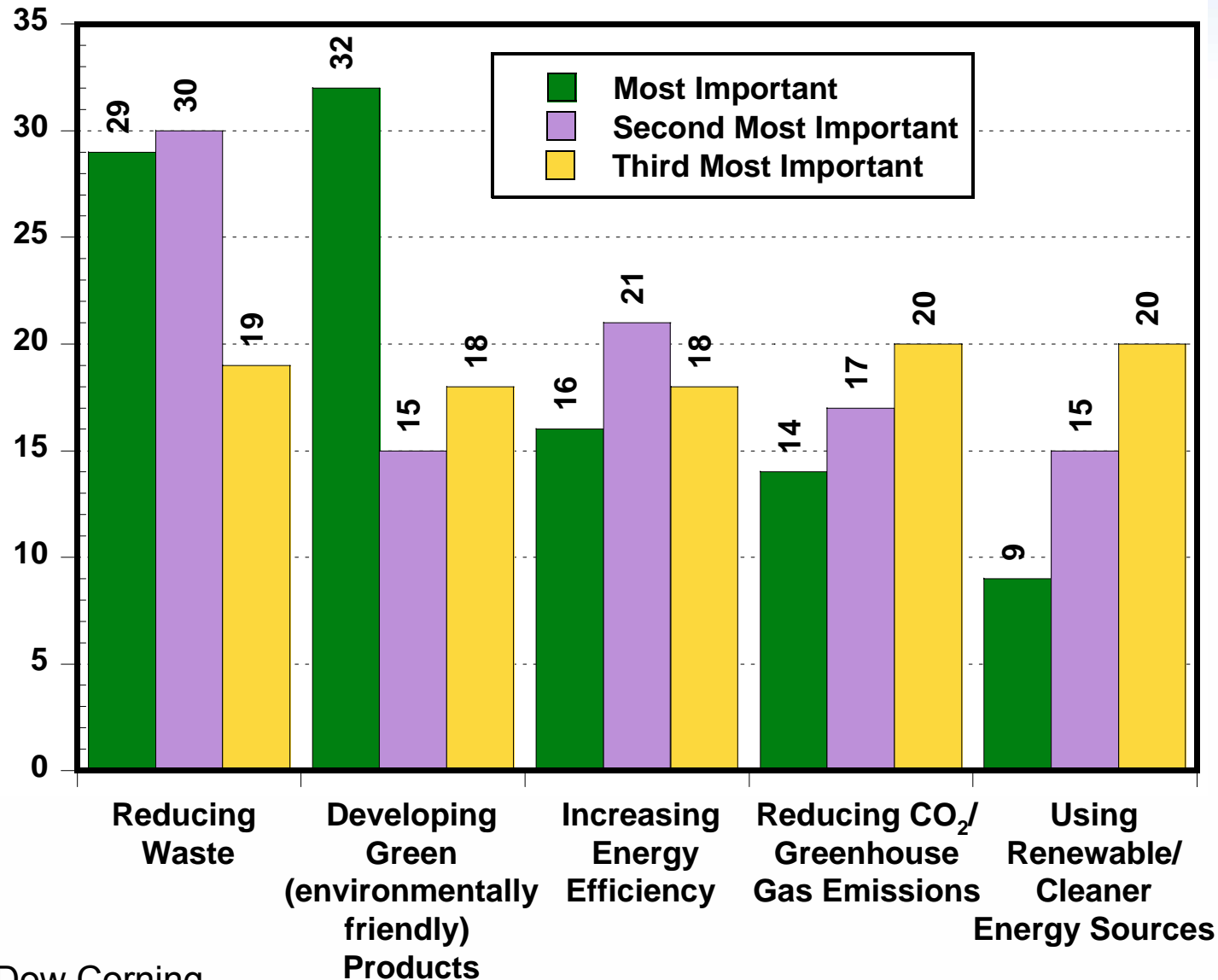
- Plastics
- Solvents
- MSW
- Reuse vs recycle
- Electronics
- Other

CMS Impact

- Green initiatives
- New materials in market
- New service opportunities
- Global changes
- Information value increasing

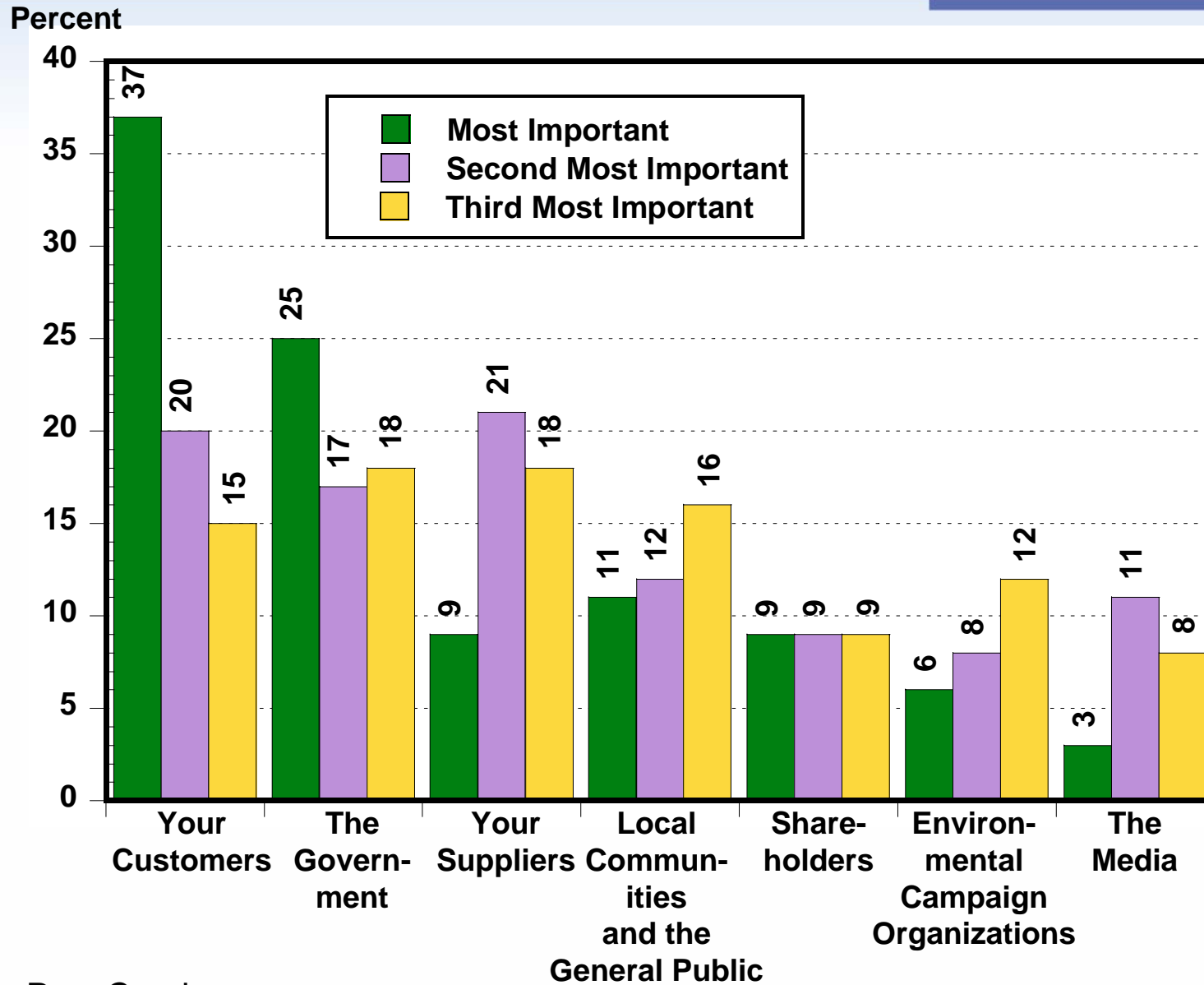
Dow Corning Study on Green

Percent



Source: Dow Corning.

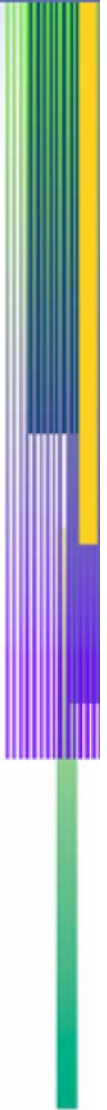
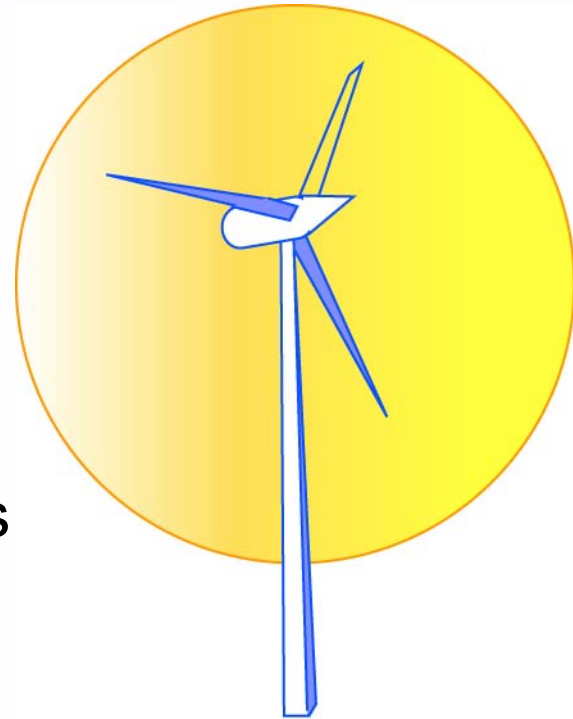
Where is Impetus?



Source: Dow Corning.

New Opportunities in Energy

- Solar
 - Non-photo voltaic
 - Heat transfer media
- Wind
 - Lubricants/functional fluids



Biomass → Chemicals

- Renewable/sustainable/locally produced
- CO₂ reduction
- Cost advantage
- Alleviate waste or by-products
- Less toxic
- Might be biodegradable
- Market/political advantages
- CMS providers can bring solutions to many issues



The Plastic Car



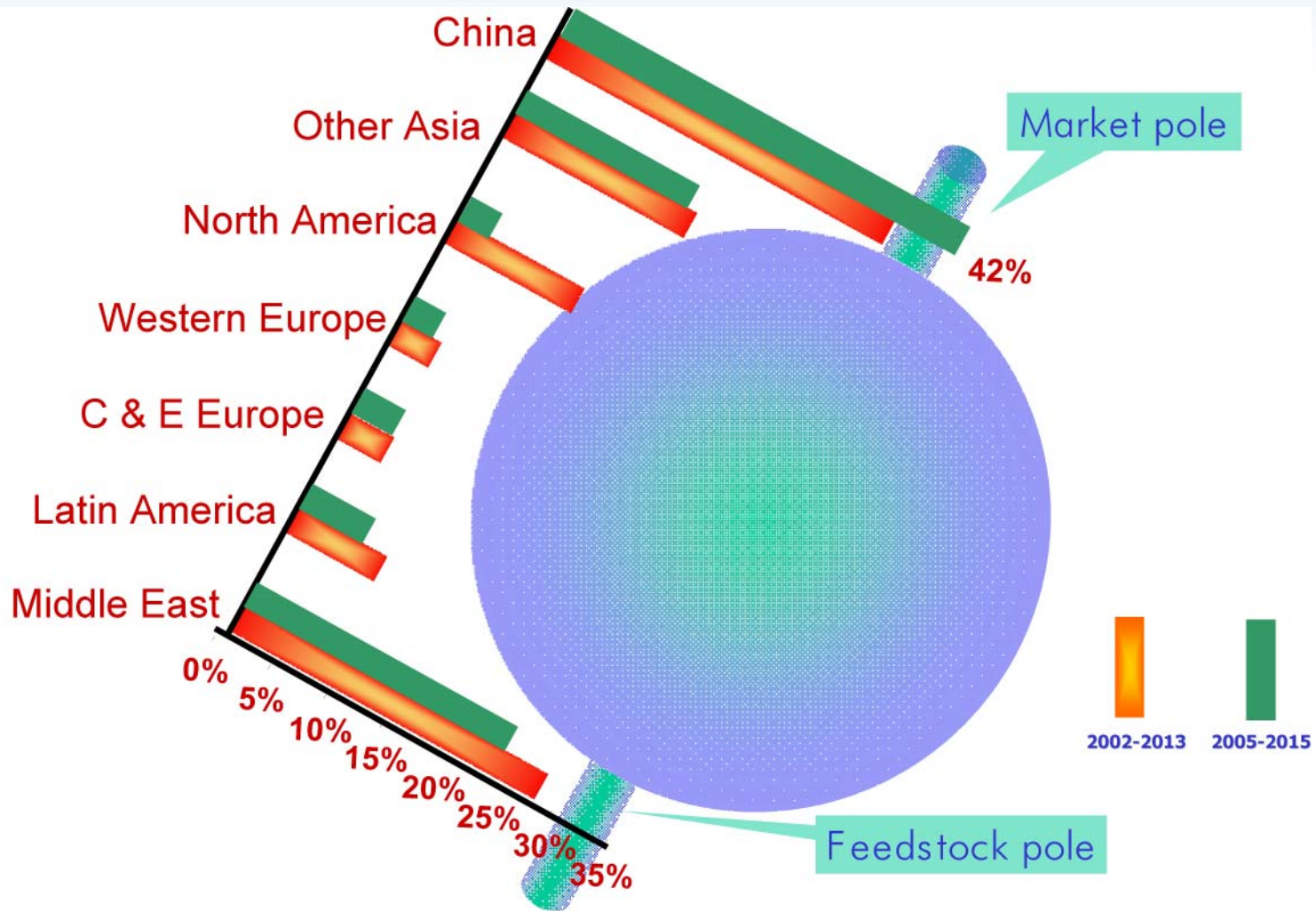
Serve the Entire Lifecycle

- Synthesis and production
 - Minimize waste
 - Use renewable/recyclable
 - Less GHG
 - Less toxic
- Optimize transport and packaging
 - Less material and energy
 - Less hazards
- Efficiency in use
 - Renewable/recyclable
 - Minimize
- Reuse/recycle/dispose
 - Value from waste



Changing Global Markets

Petrochemical Investment



Information Value Increases

- Regulations
- Green opportunities
- GHG status
- New materials
- Future trends



SRI Consulting Programs

- Process Economics Program
 - Process economic analysis of 100's of processes
 - Examples: Chemicals from Agricultural Waste, Methanol to Olefins
- Chemical Economics Handbook
 - Market analysis of hundreds of chemicals
 - Examples: Acrylic Surface Coatings, Zeolites
- Specialty Chemical Update Program
 - Strategic analysis of specialty product groups
 - Examples: Electronic Chemicals: Semiconductors, Silicon and IC Process Chemicals, Plastic Additives
- Safe & Sustainable Chemicals
 - Analysis of evolving chemical development – “oven”
 - Examples: Global Solvents Report: The Green Impact, Chemicals from Biomass

Thank You

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