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# Impact Of The Economic Crisis On Petrochemical Supply Chains

GPCA Supply Chain Forum

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**ATKEARNEY**

# The world went through 4 stages of financial meltdown, losing \$33 trillion in equity value

## Phase 1

Subprime crisis becomes a credit crunch (Aug '07)

## Phase 2

Investment banks feel the pain (Mar '08)

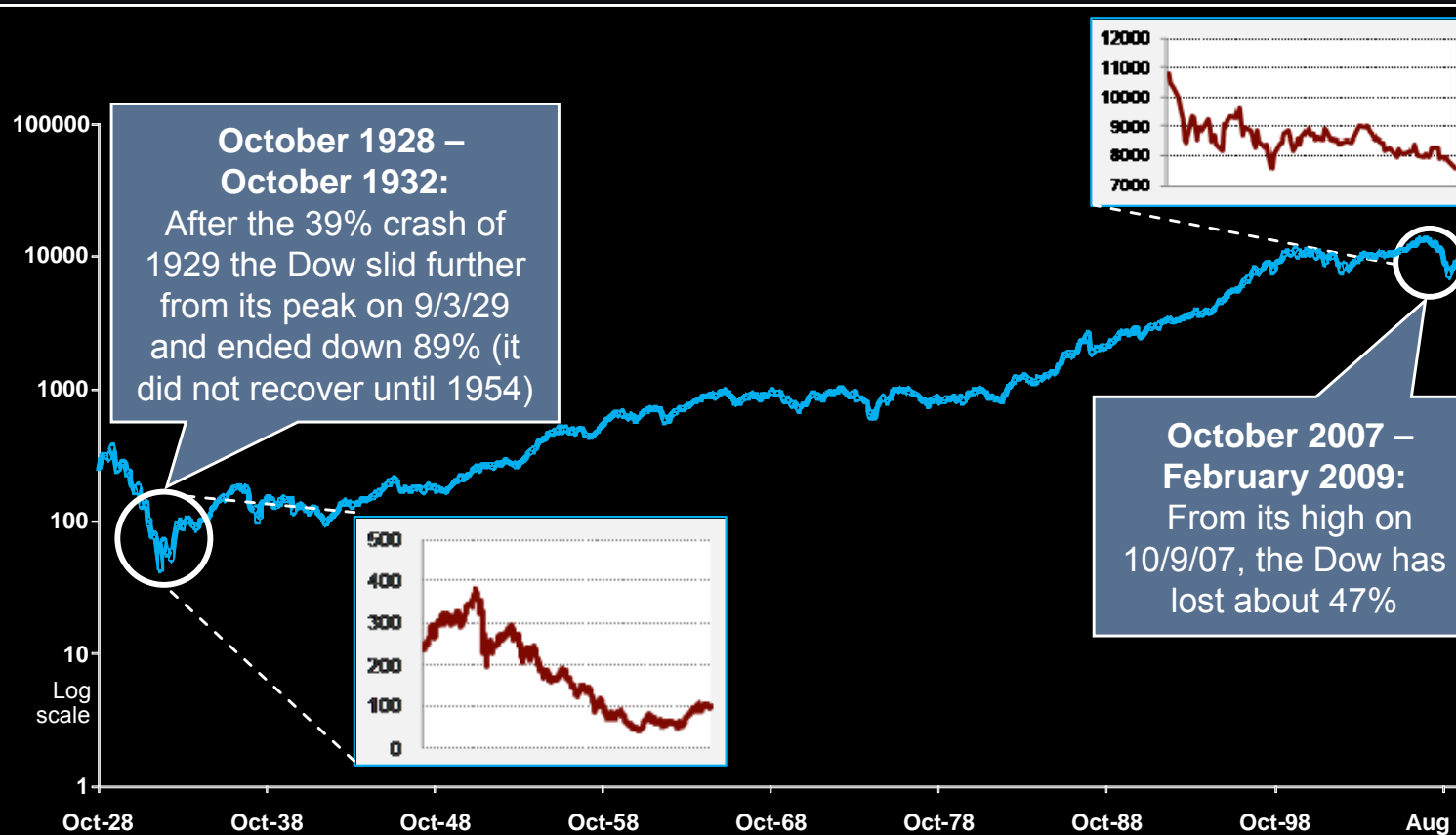
## Phase 3

Bank consolidation & govt. intervention (Sep '08)

## Phase 4

Uncertainty Remains (Jan '09 to date)

## Example: Dow Jones Industrial Average

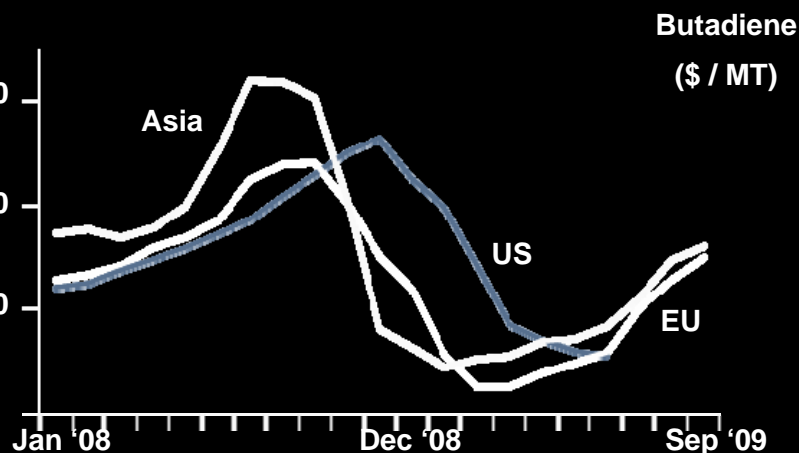


This represents the sharpest drop since the 1930s

# The financial crisis forced the chemical industry into times of unprecedented uncertainty and change

## Landslide Changes in the Chemical Industry

### Rapidly Changing Prices



- Price volatility across all key chemical value chains
- Regional differences in operating rates, driven by supply/demand balances
- Few exceptions that are countercyclical

### Large-Scale Capacity Adjustments

**Dow Chemical to cut 11% of jobs, close 20 plants**

Updated 12/9/2008 2:51 AM | Comments 77 | Recommend 9 | E-mail | Save | Print | Reprints & Permissions |

By Paul Davidson

Dow Chemical (DOW) is closing 20 plants

**BASF to Shutter 80 Plants as Demand Shrinks**

**Lyondell affiliate closes local plant**

By BRETT CLA

Feb. 12, 2009, 4

**Companies Help**

Share

Seeking to cut costs, p

Over 400 announcements of plants closed / idled

RUBBERTOWN

**OxyVinyls plant to close**

- Significant capacity adjustment driven by plant closures and idling
- Freeze of ongoing construction and development projects
- Unclear restart timelines

# There is considerable uncertainty about the post-crisis economy

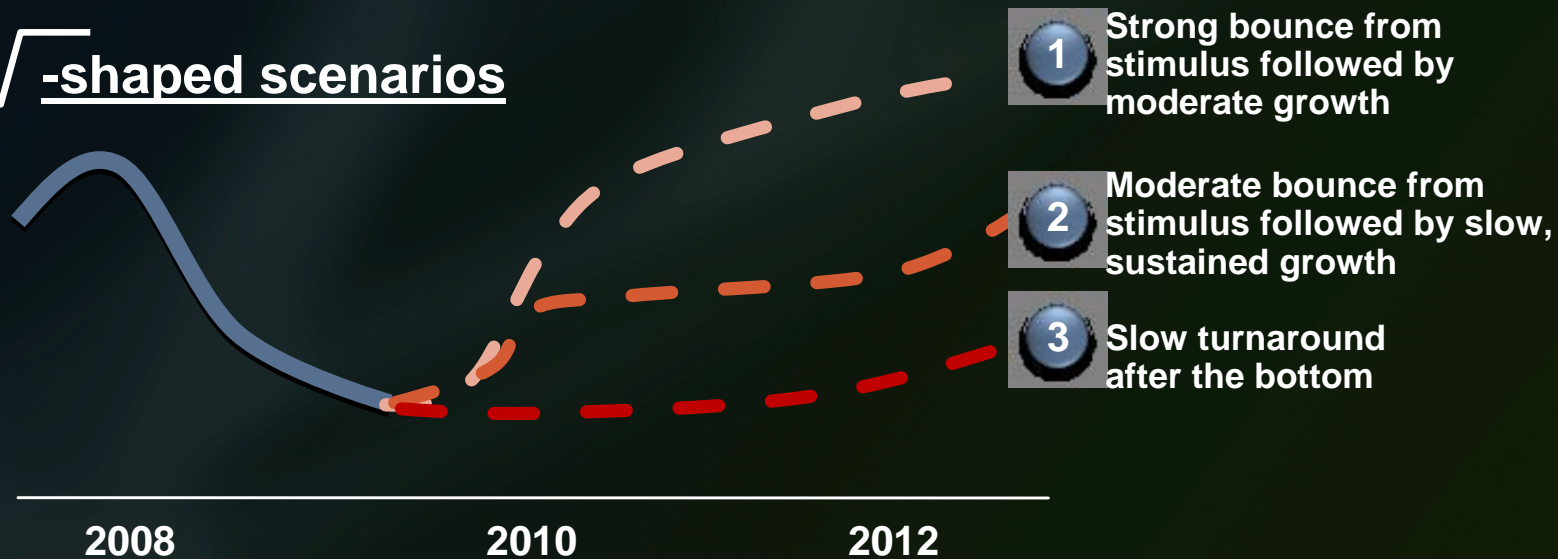
## L-Shaped Depression



## U-Shaped Recovery



## √-shaped scenarios



# By monitoring a set of leading indicators, one can identify where the global economy is on the recovery curve

## Structural Problem Areas in the Global Economy

Lack of Coordinated International Economic Policy

Loss of wealth leads consumers to spend less

Climate of protectionism impacts world trade flows

Potential of 1970s style stagflation



## Sample Macroeconomic Indicators

### Quantitative

Official Reserves, and Balance of Payments Policy

Consumer Confidence

Employment in key markets, Trade regulations

Inflation/ Deflation

+

### Qualitative

Government action and summit agreements

Changes in consumer behavior

Supplier trends, FDI index

Central Bank Surveys

These indicators help inform near term supply chain decisions

# In addition to near term uncertainty, petrochemical supply chains should also take into account long term trends

## Importance of macro-trend drivers for petrochemical supply chains

Natural Resources & Environment



- Sustainability trends open up new market opportunities
- Greater urgency for product and process innovation

Globalization



- Economic and political integration will continue – relocation of customer industries and introducing new competitors

Consumption Patterns



- Emergence of mass markets in developing countries will drive chemical sector growth
- Diversity of consumer needs will increase complexity

Regulation & Activism



- Environmental pressure will intensify regulation (e.g. REACH, Waxman-Markey)

Demographics

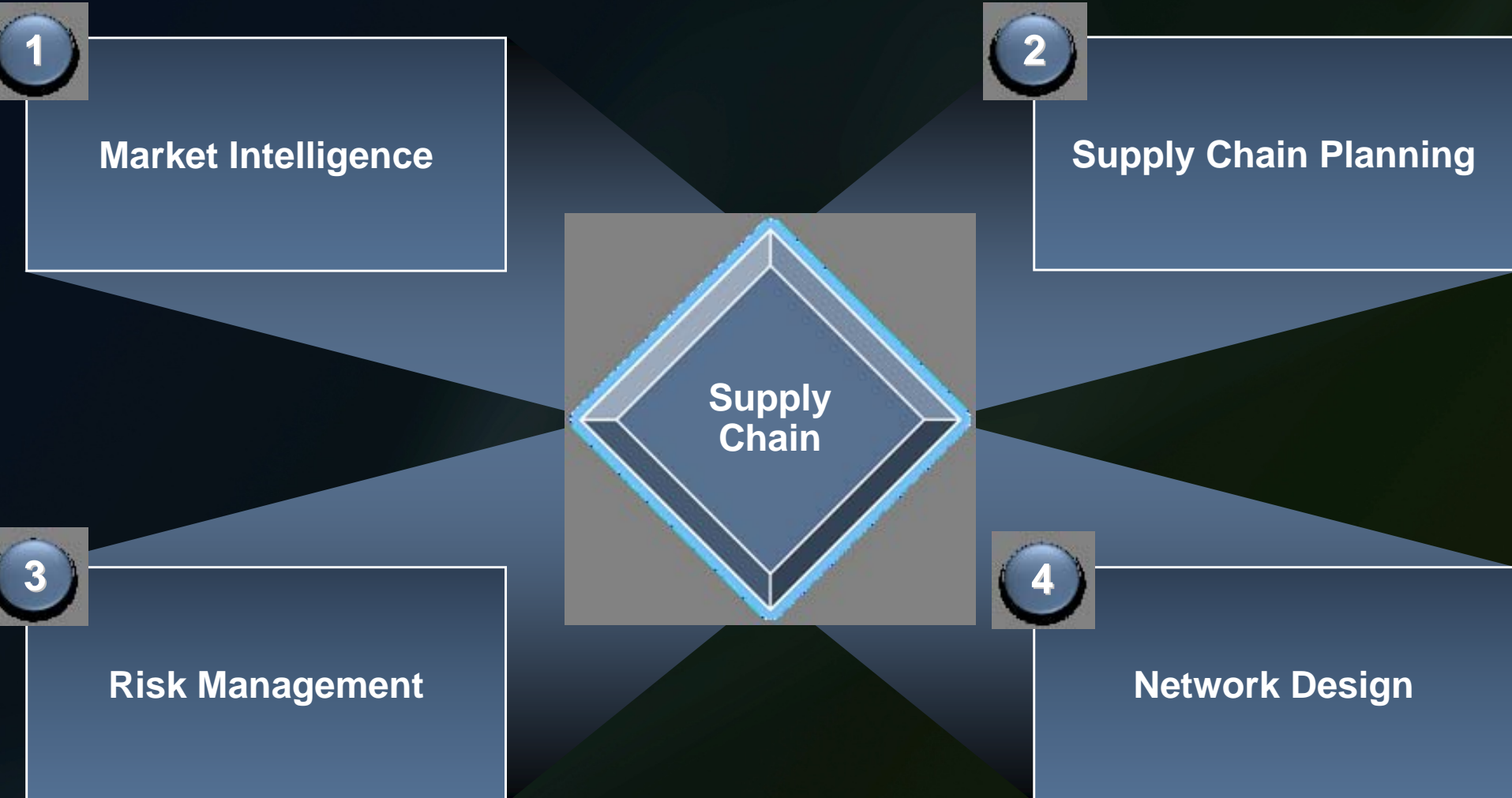


- Aging in developed countries causing talent shortages, changes in labor force and a new consumer segment
- Shifting of technically capable resource pool towards developing countries

● = High   ● = Medium   ● = Low

# The near term recovery scenarios along with long term trends require four key supply chain capabilities

Supply chain capabilities in an uncertain environment





# A robust market intelligence capability is key to making effective supply chain decisions during uncertainty

## Demand Intelligence

### Automotive



### Construction



...



- Impact of end use market trends on chemical demand?
- Substitution trade offs?
- Impact of regulation?

## Supply Intelligence

Dow Chemical to cut 11% of jobs, close 20 plants

BASF to Shutter 80 Plants as Demand Shrinks

Lyondell affiliate closes local plant

By BRETT CLANTON Houston Chronicle Copyright 2009 Feb. 12, 2009, 4:57PM

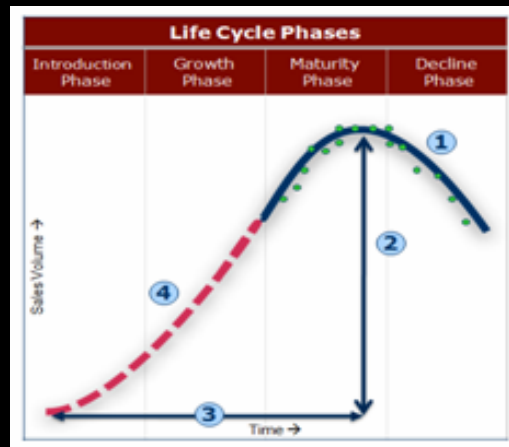
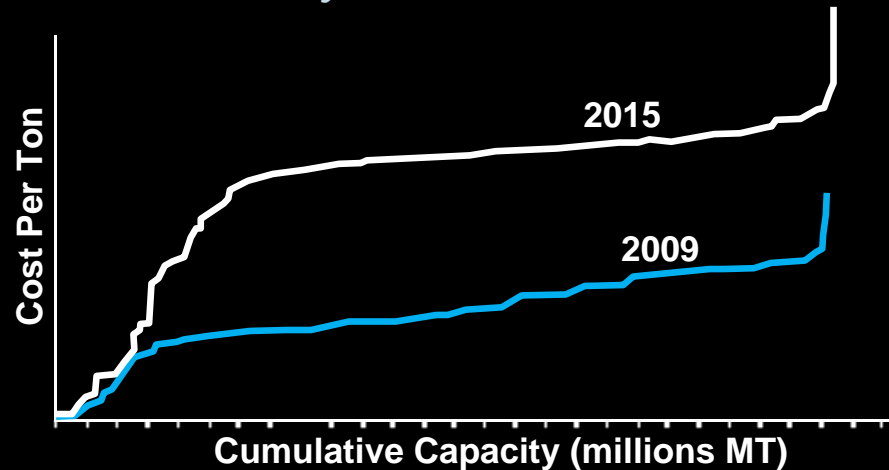
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Equistar Chemicals, a bankrupt said today it will indefinitely close Bayou and cut 220 jobs amid se

Near & Long Term Supply Implications?

## Robust Analytics

### Cost Curve Analysis



Product Lifecycle Analysis

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# Supply Chain Planning typically involves five planning blocks with focus on different time horizons

## Elements and Time Horizon of Supply Chain Management

Strategic Planning Layer  
(1 to 5 years)

### Service Levels

- Customer Clustering
- Cost-to-Serve Analysis

### Network Modeling

- Location / Flow Optimization

### Make vs. Buy

- Value Chain Design and Optimization

### Strategic Planning

- Long term Objectives
- Portfolio Lifecycle Management

Operational Planning Layer  
(1 to 36 months)

Production Planning

Demand Planning

Inventory Planning

Supply Chain Planning

Financial Planning

Logistics Planning

Annual Budget /  
Sales Plan  
Scenarios

Operational Planning Layer  
(0 to 30 days)

Order Management

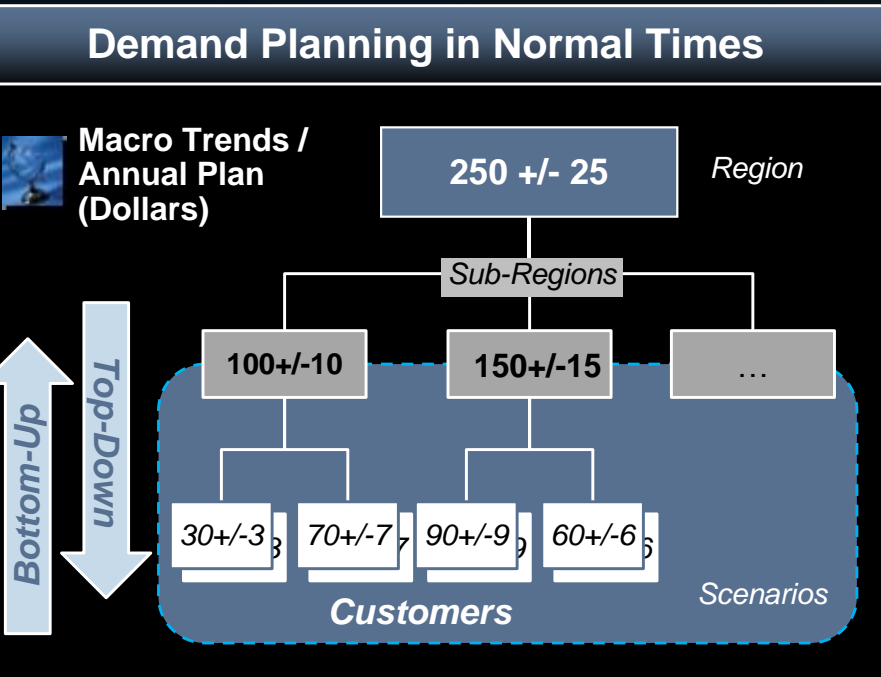
Purchasing

Logistics /  
Fulfillment

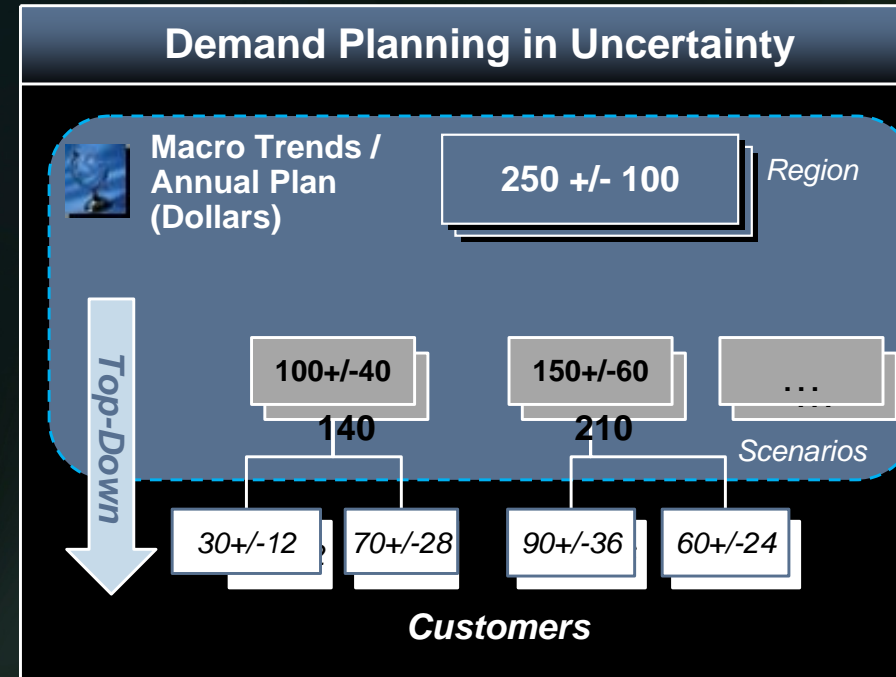
Production

# 2 Demand plan accuracy can be improved using top down macro-trends and specific market insights

## Expand Scope of Internal and External Inputs



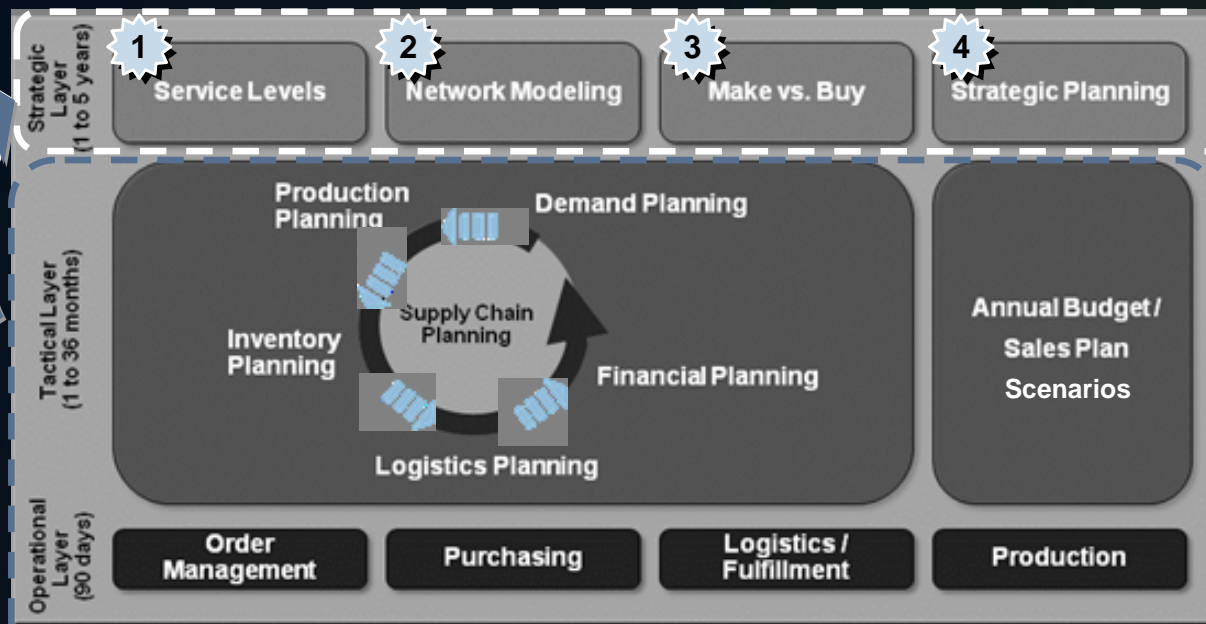
Volume and value based forecasting; focus can be on volumes  
 Demand plan reconciles bottom-up sales forecasts and top-down market trends  
 Scenarios comprise demand variations at the lower level of the demand plan



- Price volatility makes value forecasting more important
- Demand plan is primarily driven by expanded set of macro indicators
- Scenarios reflect differences in macro projections and show bigger variation

# 2 Planning more frequently enables you to better respond to a changing environment

## Increase Frequency of Planning Decisions and Shorten Planning Horizons



**Increase frequency and shorten time horizon to accommodate for rapid changes**

**Reevaluate strategic parameters more often**

- 1 Review relevancy of standard service levels
- 2 Re-)Evaluate supply network planning setup
- 3 Challenge existing make vs. buy decisions
- 4 Involve strategic planners in tactical planning

**Times of uncertainty require a shift of resources to more dynamic supply chain planning activities**

3

# Understanding both current and future customer service requirements is critical for effective supply chain design

**Customer Segments**

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graph TD; A[Customer Segments] --> B[Service Level Requirements]; B --> C[Network Implications];
```

- What impact do the long term trends have on your target:
  - Geographies
  - End use markets
  - Customer segments

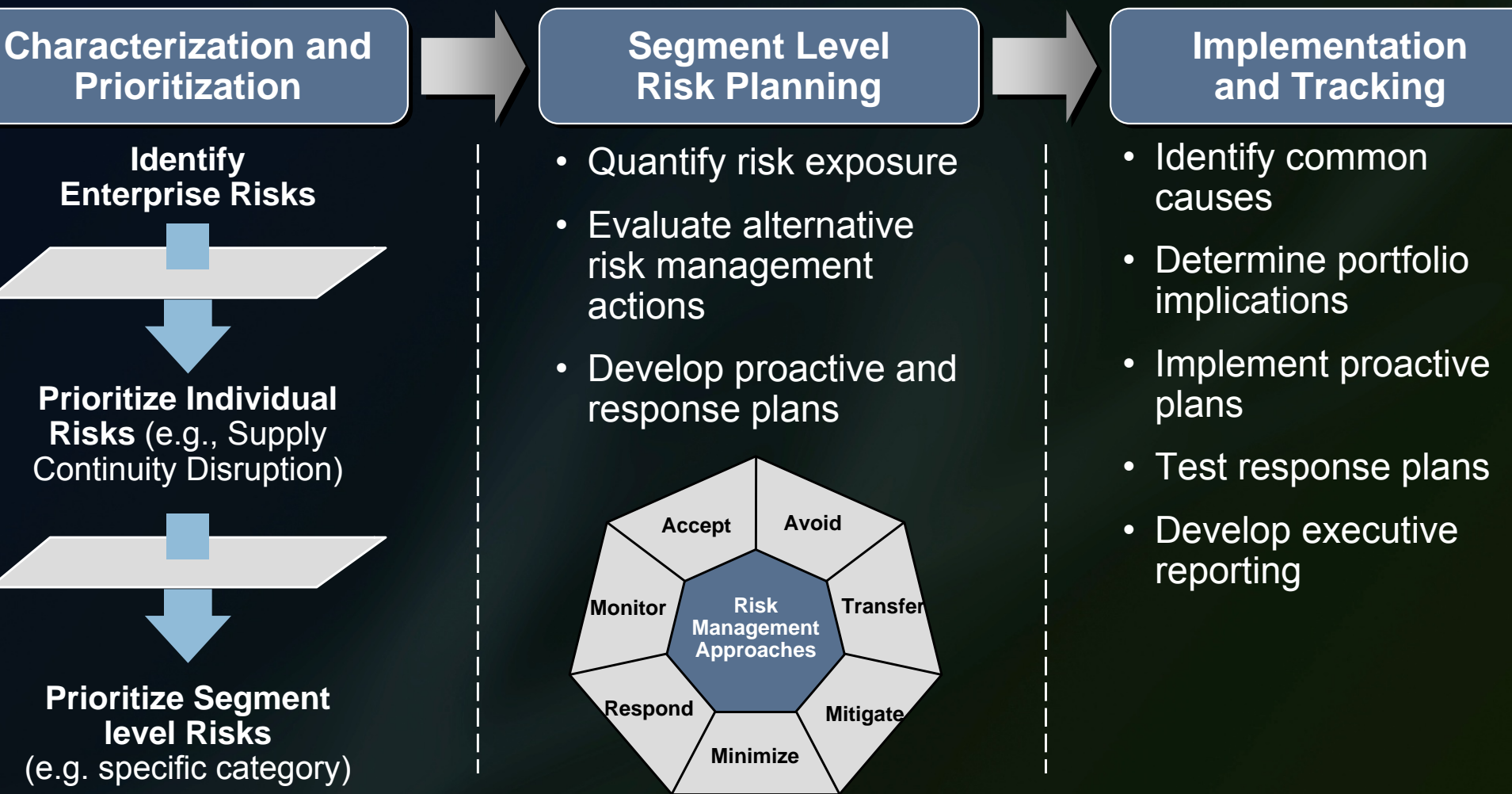
**Service Level Requirements**

- What factor (cost / lead time / reliability) is most important for each segment – both now and in the future?
- What are the implications to your business model?

**Network Implications**

- How many supply chains do you need to serve your customers effectively and efficiently?
- How are you positioned vis-à-vis competition?
- How do you design the network to better manage supply chain risk?

# 4 Effective risk management across the supply chain requires disciplined prioritization and detailed planning



The risk management philosophy needs to be embedded into both near term and long term supply chain decisions

**In every crisis there is opportunity – position your supply chain to take full advantage of the current turmoil**

**Have you analyzed the impact of long term trends on your business? Do you monitor key macroeconomic variables?**

**Do you have a robust market intelligence and analytics capability?**

**Do you use a top-down, value driven approach to demand planning?**

**Do you fully understand current and future customer service requirements?**

**Is the risk management mindset embedded across the entire organization?**