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Natural Gas: Economics, Strategy, and Organizational Design

by
Dr. Carlo J. Ninassi
Jacobs Consultancy - Utilities Practice

Presented at

The 2009 Pennsylvania Natural Gas Summit:
Planning for Progress-Infrastructure and Water in the Marcellus Shale

November 2009

Presentation Contents

- Introduction
- Approach
- Concept
- Economic Factors
- Strategic Factors
- Organizational Design
- Summary

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Approach

- What has to be considered?
- What are the issues/challenges?
- How can a strategy be formulated around the economics of the industry and organizations involved?

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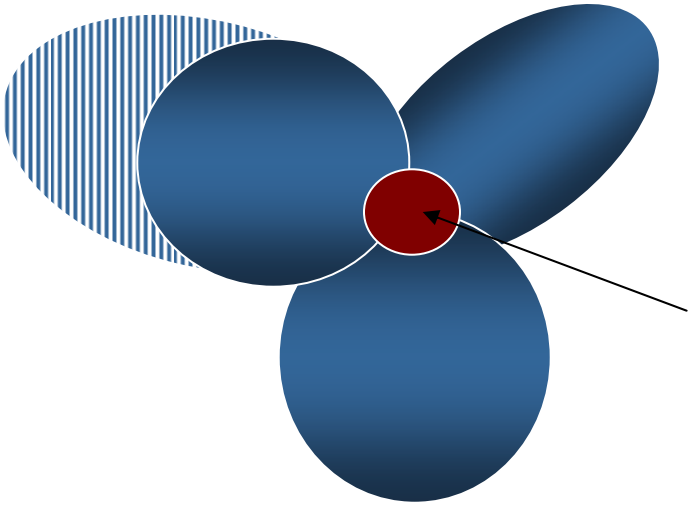
Concept

Economic Factors



Strategic Factors

Unified Outcome

Organizational
Design Elements

Source: Barney (Rumelt)

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Factors & Elements

- Economic Factors
  - Location, Logistics & Resources
  - Some Numbers – Investment to Return, Cost of Production to Volume
  - Porter's Five Forces – Buyers, Suppliers, Rivalry, Substitutes
- Strategic Factors
  - Political, Social, Competitive & Regulatory
  - Natural Environment
  - Technology, Processing & Infrastructure
  - Financial
- Organizational Design Elements
  - Organizational Structural Alignment (Assessment)
  - Types of Alliances
  - Approach Methods
  - Collaborative Teaming
  - Performance Metrics

Economic Factors

- **Location** - Where is the gas shale? ***Geology? Geography?***

Shale Gas Plays, Lower 48 States

Source: Energy Information Administration based on data from various published studies
Updated: May 28, 2009

Source: EIA

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Economic Factors

Some Numbers – *Cost Production to Volume &Price*

- 50 % of natural gas consumed in U.S. today is from wells drilled LESS than three years ago
- 25-30% of the gas produced today comes from wells drilled last year
- If there are 50% FEWER wells drilled this year (as noted by a drop in rig activity) resulting in gas shortages which lead to higher prices requiring an increase in drilling
- Price of Natural Gas

Source: FT and EIA

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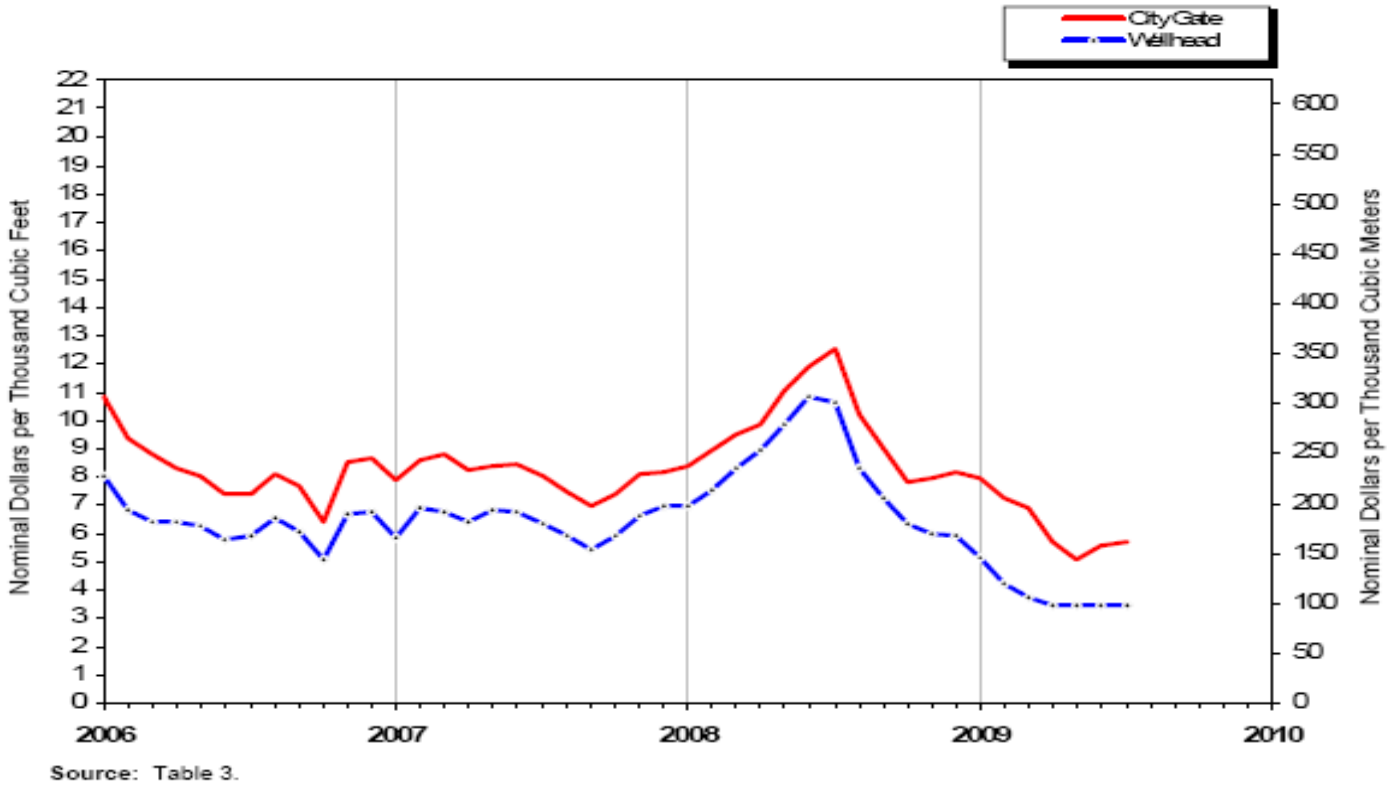
Economic Factors



Energy Information Administration/Natural Gas Monthly September 2009

Source: EIA

Average Price of Natural Gas in the United States, 2006-2009

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Economic Factors

- Gas Pipeline Company Operating ***Revenues & Incomes***

	Operating Revenues ($ 000's)	Net Income ($ 000's)
– 1999	14,616,949	2,545,043
– 2000	14,980,925	2,910,835
– 2001	14,407,467	2,246,109
– 2002	14,015,308	2,734,182
– 2003	15,082,011	3,260,797
– 2004	15,781,445	3,588,344
– 2005	16,375,921	3,863,331
– 2006	17,122,586	4,015,253
– 2007	21,736,725	4,765,815
– 2008	19,797,663	5,104,772

Source: FT and EIA

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Economic Factors

- Natural Gas Operators saw profits hit new highs in 2008 – up by more than 7% in 2007 despite a 9 % drop in revenues
- Net Profits equaled $5.1 Billion to $19.8 Billion in Revenues
- Natural Gas profits continue to go toward infrastructure

  - $12.2 Billion or an 89% increase from 2007 levels

Source: FT and EIA

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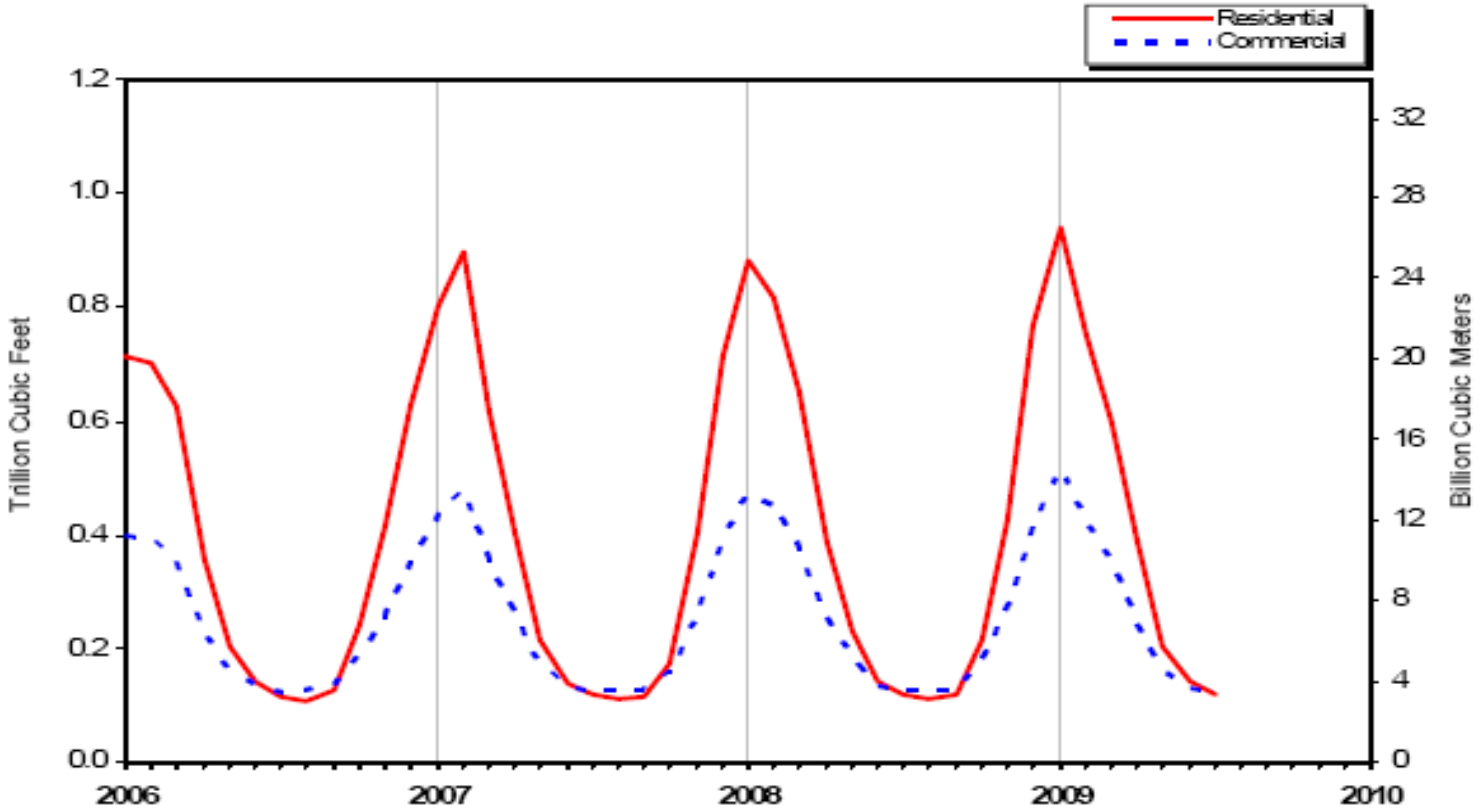
Economic Factors



Natural Gas Deliveries to Consumers in the United States, 2006-2009

Source: EIA

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Economic Factors

Source: Table 2.

Source: EIA

6 Energy Information Administration/Natural Gas Monthly September 2009

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Economic Factors

- U.S. Interstate Gas Pipeline Mileage – ***Production Infrastructure:***
  - 1999 180,489 (miles)
  - 2000 186,151
  - 2001 180,961
  - 2002 190,899
  - 2003 188,178
  - 2004 190,117
  - 2005 188,847
  - 2006 189,012
  - 2007 192,189
  - 2008 192,384
- In 2009, 2176 miles of pipe were proposed for land construction up from 900 miles in 2008 with a high of 2700 in 1998

Source: FT and EIA

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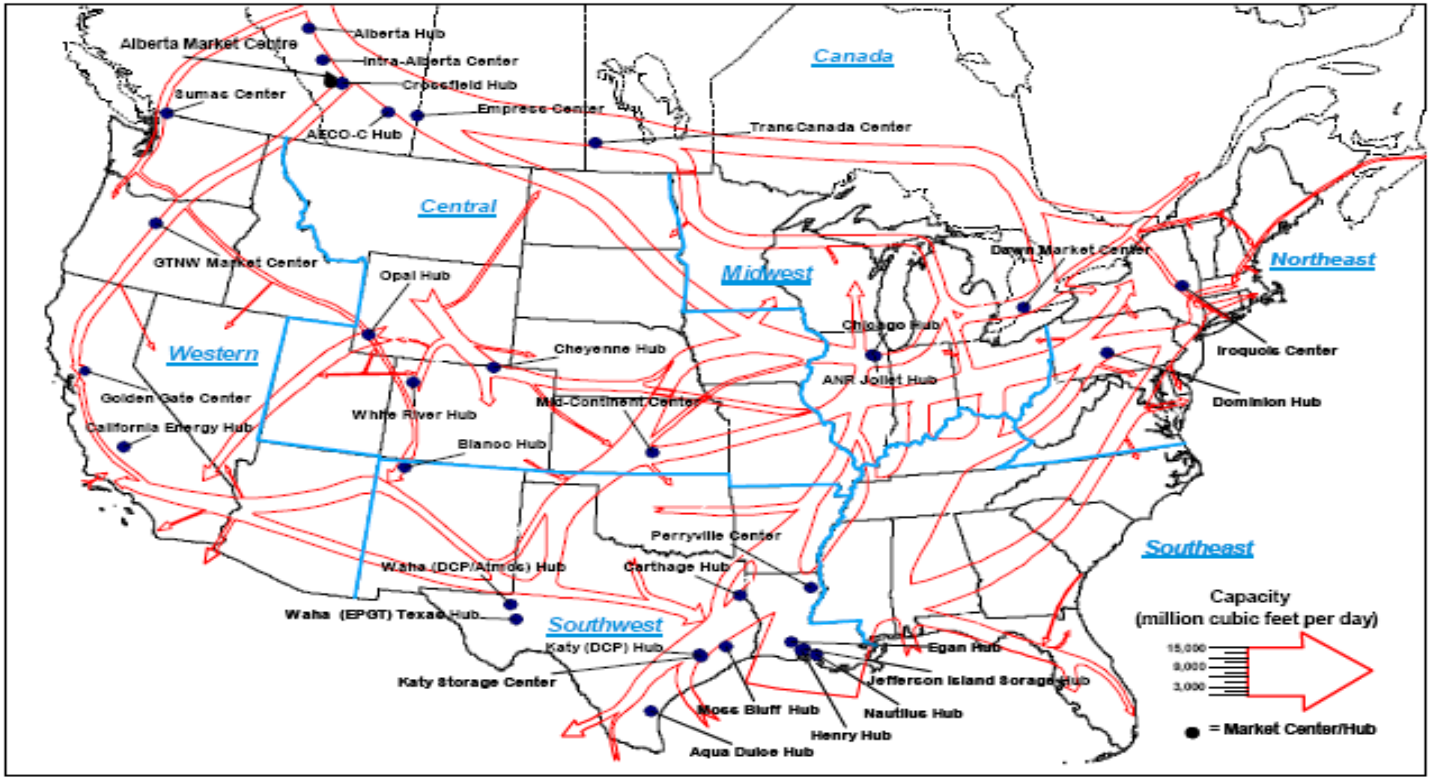
Economic Factors



DCP = DCP Midstream Partners LP; EPGT = Enterprise Products Texas Pipeline Company.
Note: The relative widths of the various transportation corridors are based upon the total level of interstate pipeline capacity (2008) for the combined pipelines that operate on the generalized route shown.
Source: Energy Information Administration, GasTran Gas Transportation Information System, Natural Gas Market Hubs Database, December 2008.

Natural Gas Centers/Hubs Relative to Natural Gas Transportation Corridors, 2008

Source: EIA

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Economic Factors

- Natural Gas Pipelines Gas-plant ***Investment***
  - 2000 $ 68 B
  - 2001 $ 71 B
  - 2002 $74.2 B
  - 2003 $ 78 B
  - 2004 $ 83 B
  - 2005 $ 84 B
  - 2006 $ 88.3 B
  - 2007 $ 95.5 B
  - 2008 $105.8 B
- New/Additional Compression proposed was 644,755 hp June 2009 up from 238,400 hp in 2008 but less than 713,000 in 2007
- Indicates the need to move natural gas resources to consumers despite soft demand

Source: FT and EIA

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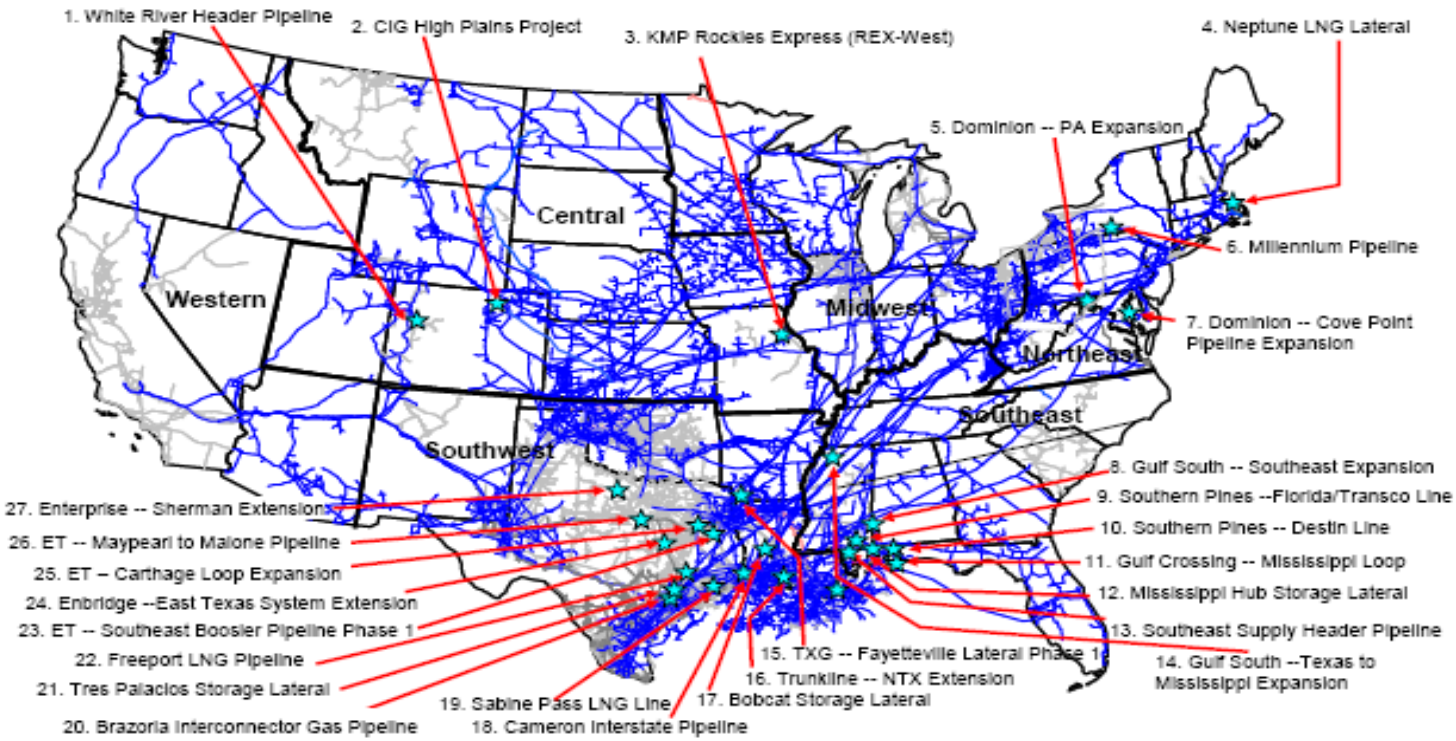
Economic Factors

General Locations of Natural Gas Pipeline Construction Projects Completed in 2008,
With Capacity of 500 Million Cubic Feet per Day and Larger



Notes: Map keyed to Tables 3 through 8. **Security**: EIA has determined that publication of this figure does not raise security concerns, based on the application of Federal Geographic Data Committee's *Guidelines for Providing Appropriate Access to Geospatial Data in Response to Security Concerns*; **Regions**: The six U.S. regions shown in this figure are based in whole or in part upon the 10 Federal regions as defined by the U.S. Department of Labor's Bureau of Labor Statistics. ET = Energy Transfer LP, CIG = Colorado Interstate Pipeline Co., KMP = Kinder Morgan Partners.
Source: Energy Information Administration, GasTran Natural Gas Transportation Information System, Natural Gas Pipeline Projects Database.

Source: EIA

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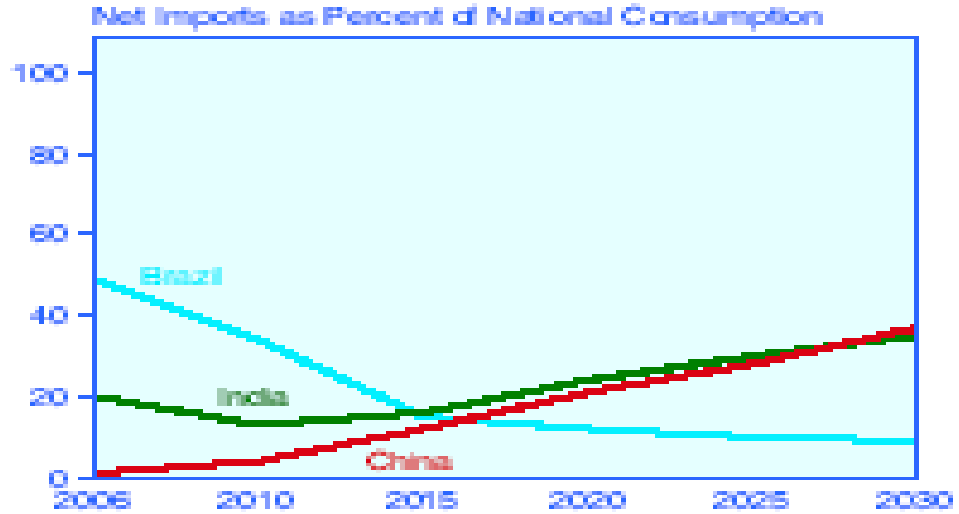
Economic Factors

- ***Consumption***

Figure 39. Imports as Share of Non-OECD Natural Gas Consumption by Country, 2006-2030



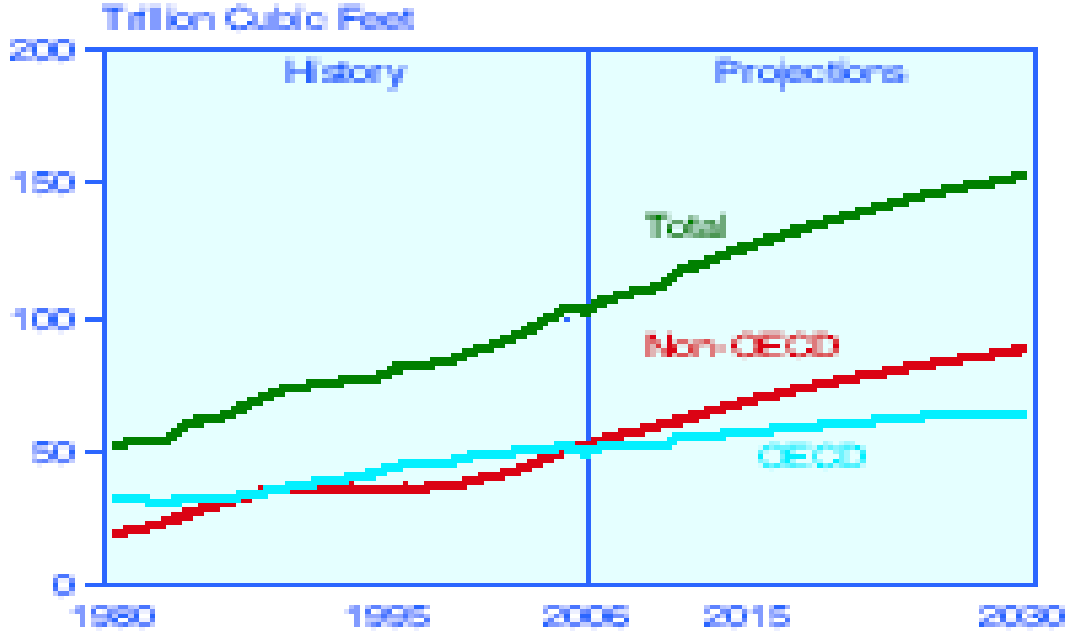
Sources: **2006:** Energy Information Administration (EIA), *International Energy Annual 2006* (June-December 2008), web site www.eia.doe.gov/iea. **Projections:** EIA, World Energy Projections Plus (2009).

Source: EIA

Economic Factors

- ***Consumption***

Figure 33. World Natural Gas Consumption, 1980-2030



Sources: **History:** Energy Information Administration (EIA), *International Energy Annual 2006* (June-December 2008), web site www.eia.doe.gov/iea. **Projections:** EIA, World Energy Projections Plus (2009).

Source: EIA

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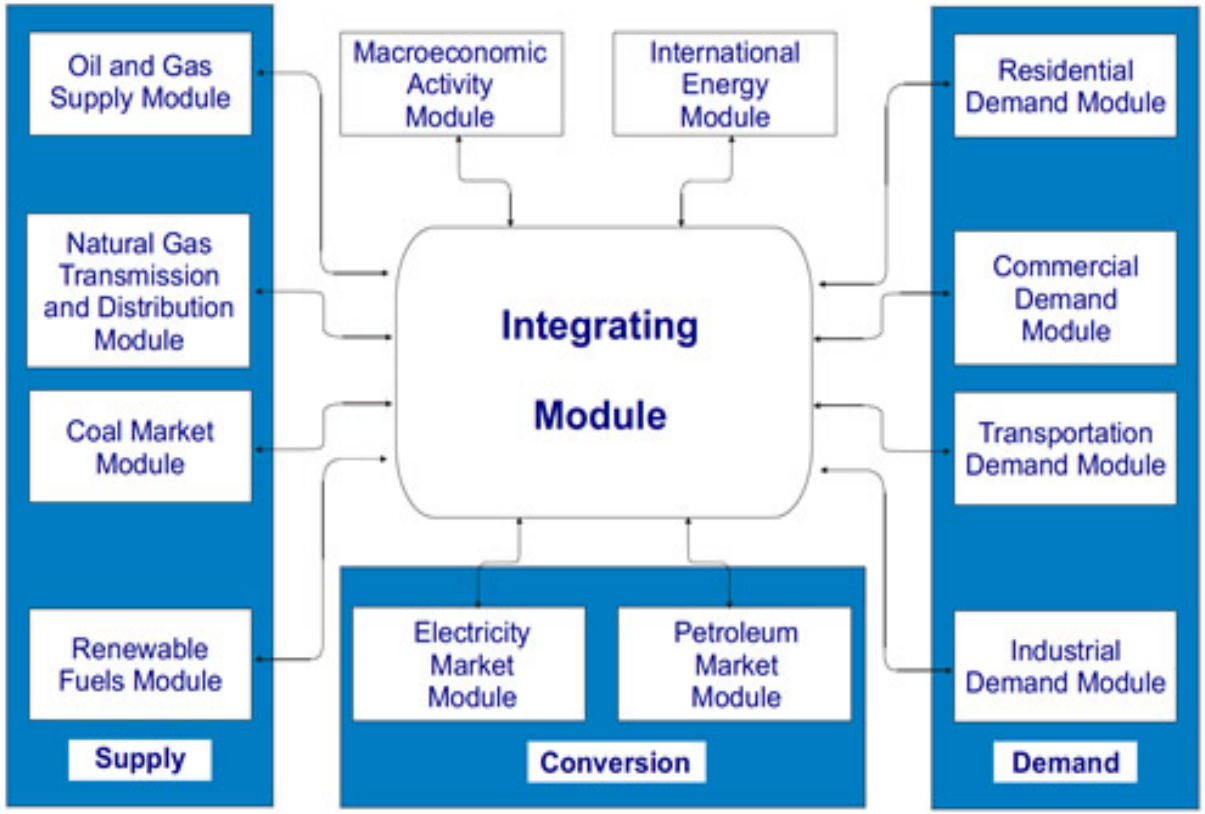
National Energy Modeling System (NEMS) - 2009

Figure 2. National Energy Modeling System



NEMS is used by EIA to project the energy, economic, environmental, and security impacts on the United States of alternative energy policies and different assumptions about energy markets.

Source: EIA

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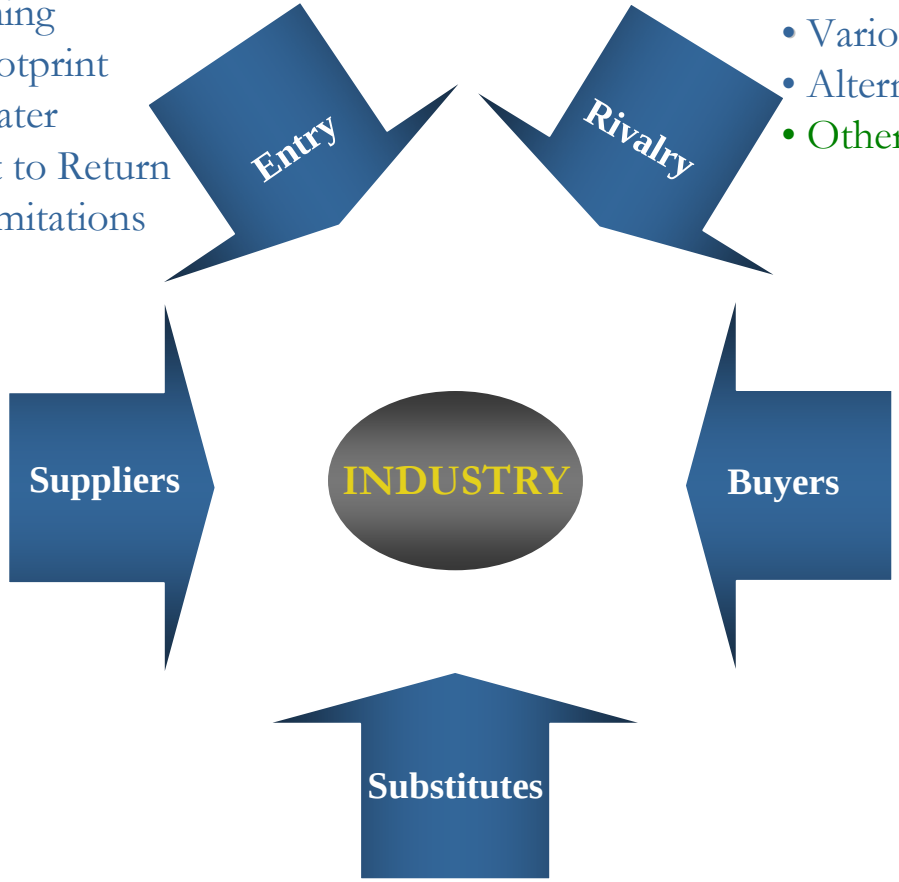
Economic Forces-Impacts

- Land Planning
- Carbon Footprint
- Ground Water
- Investment to Return
- Physical Limitations
- Other

- Various natural gas-related companies
- Alternative Utility Systems
- Other



- R & D
- Construction
- Equipment
- Extraction
- Distribution
- Storage
- Other

- Domestic
- Foreign
- Commercial & Product
- Industrial
- Residential
- Other

- Wind Power
- Solar
- Other

Porter's Five Forces Model

Source: Barney (Porter)

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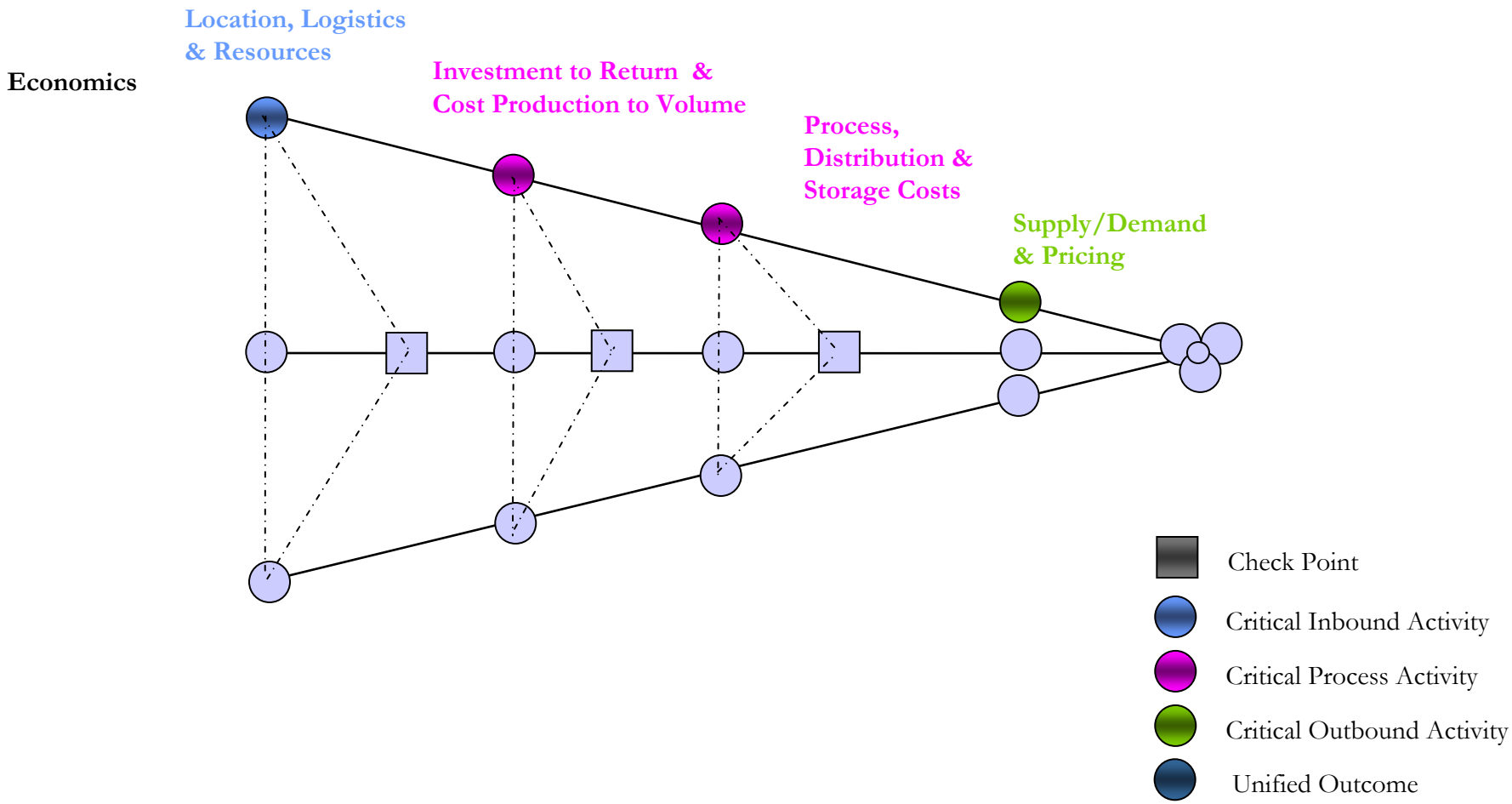
Strategic Factors



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Strategic Factors

Economic
- Location Logistics & Resources
- Supply-Demand (Price Elasticity)
- Investment to Return (Financial)
- Cost of Production to Volume
- Process Distribution & Storage

Natural Environment
- Land Planning – Physical and Aesthetic
- Carbon Footprint
- Water Management
- Other

INDUSTRY

Political, Social, Competitive & Regulatory
- Policy – U.S. & World-wide
- Regulatory Implications
- Land Management
- Foreign & Domestic Competitors

Technology, Production & Infrastructure
- Equipment, Efficiency, and Technique
- Combining Technologies
- Utility Systems – Advances and Blending

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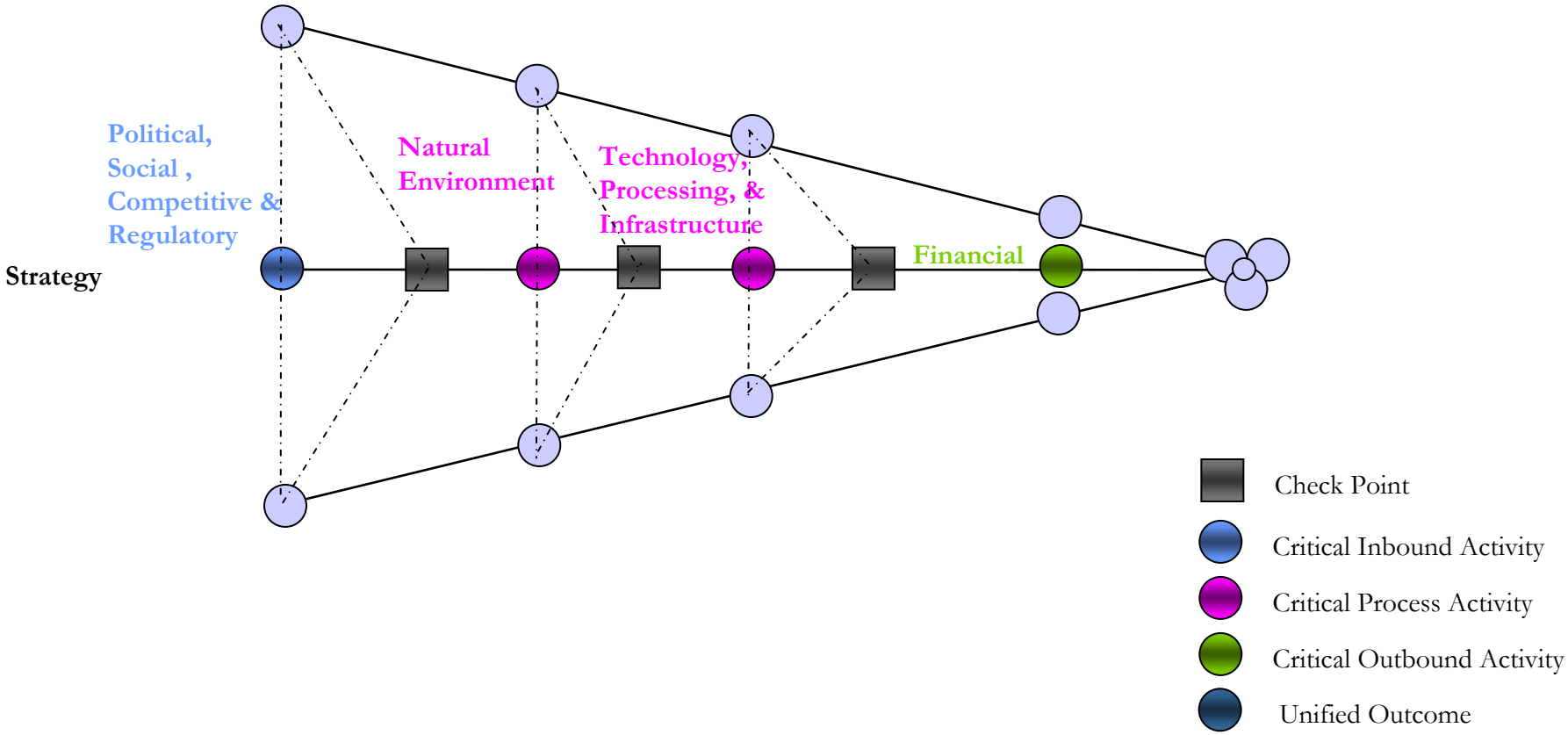
Strategic Factors



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Organizational Design

- Organizational Structural Alignment (Assessment)
  - Mission
  - Strategic Approach
  - Implementation
- Types of Alliances
- Types of Approach Methodologies
  - Balance Score Card (Kaplan & Norton)
  - Malcolm Baldrige
  - Other
- Collaborative Teams
  - High Performance Teams
  - Program Management Office
  - Other
- Performance Metrics (See Unified Outcome)

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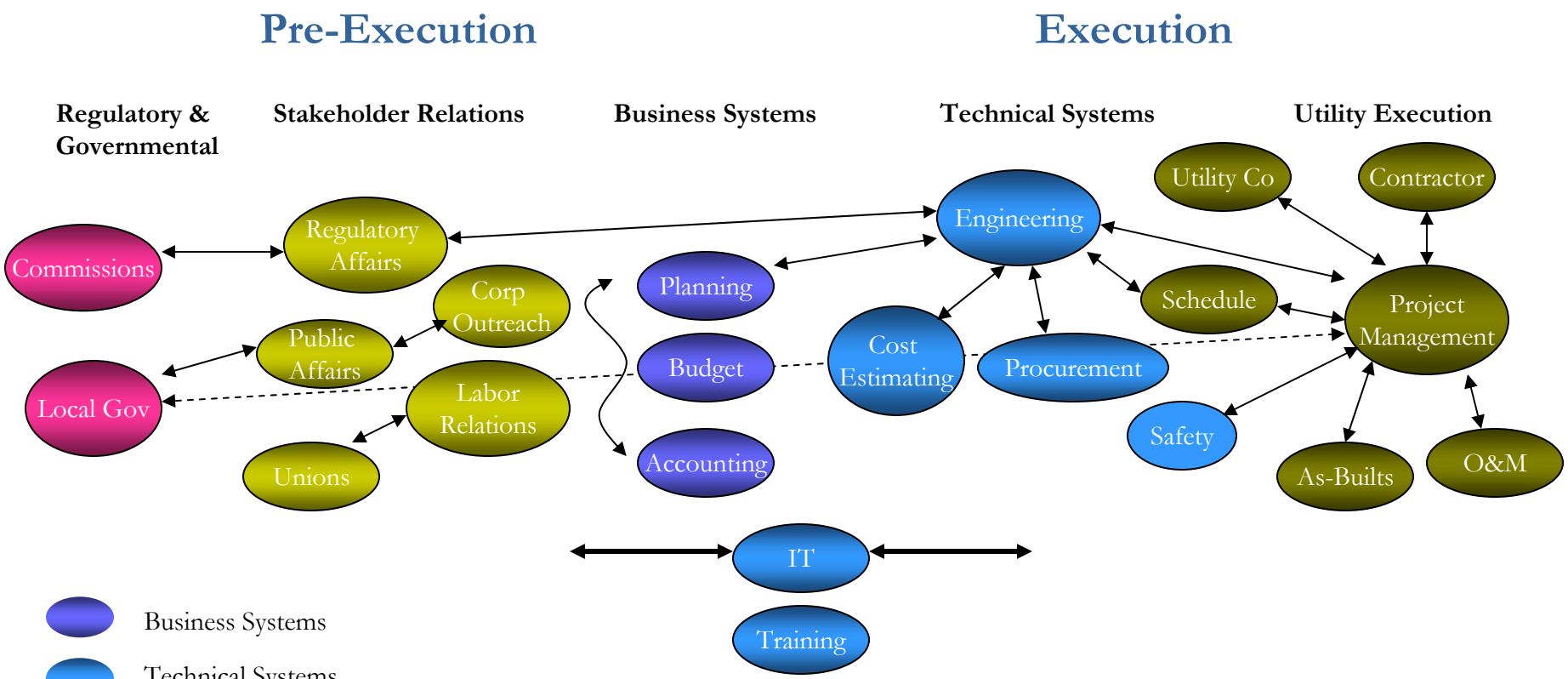
Organizational Design



- Business Systems
- Technical Systems
- Regulatory & Governmental
- Stakeholder Relations
- Utility Execution

Primary Functional Flow Chart

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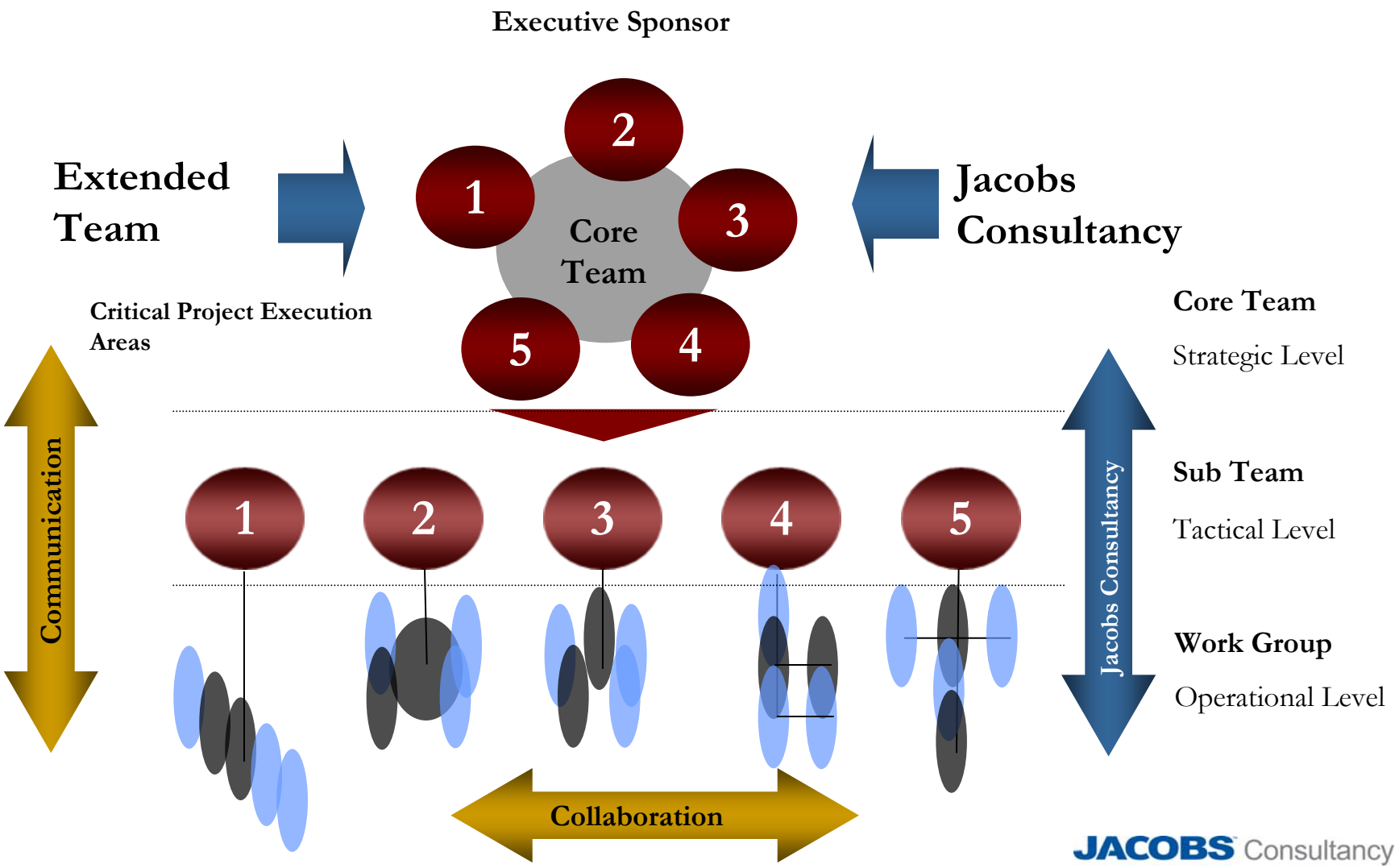
Organizational Design



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Organizational Design

Nested Program Management Office – N-PMO – The N-PMO is interwoven as a functional unit within the operational structure. All technical and support functions are shared through a high performance team environment that is collaborative BUT NOT dedicated toward implementing the main replacement program.

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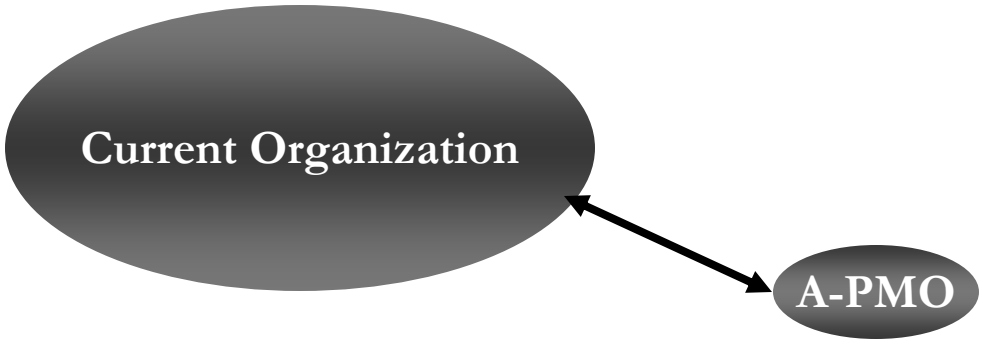
Organizational Design

Aligned Program Management Office – A-PMO – The A-PMO is a separate yet aligned functional unit within the operational structure. Most all technical and support functions will be acquired, developed and dedicated only to the main replacement program.



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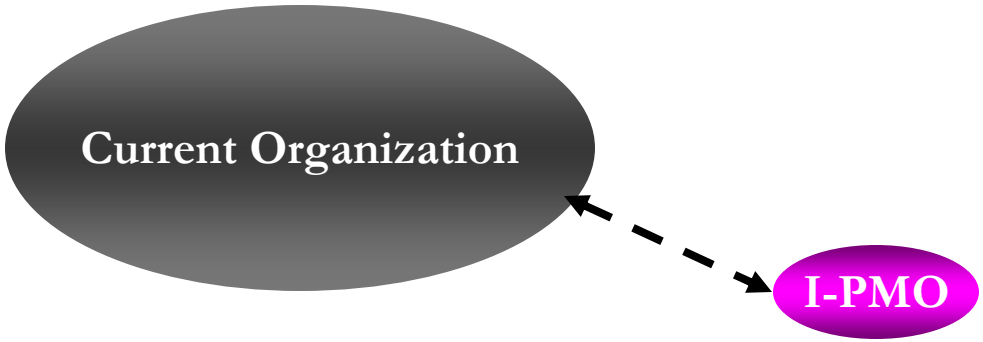
Organizational Design

Independent - Program Management Office – I-PMO – The I-PMO is contractor supported yet aligned as a functional unit within the operational structure. Most all of the technical and support functions will be provided outside of the host company to support the main replacement program (liaison positions back to the company will be coordinated accordingly).



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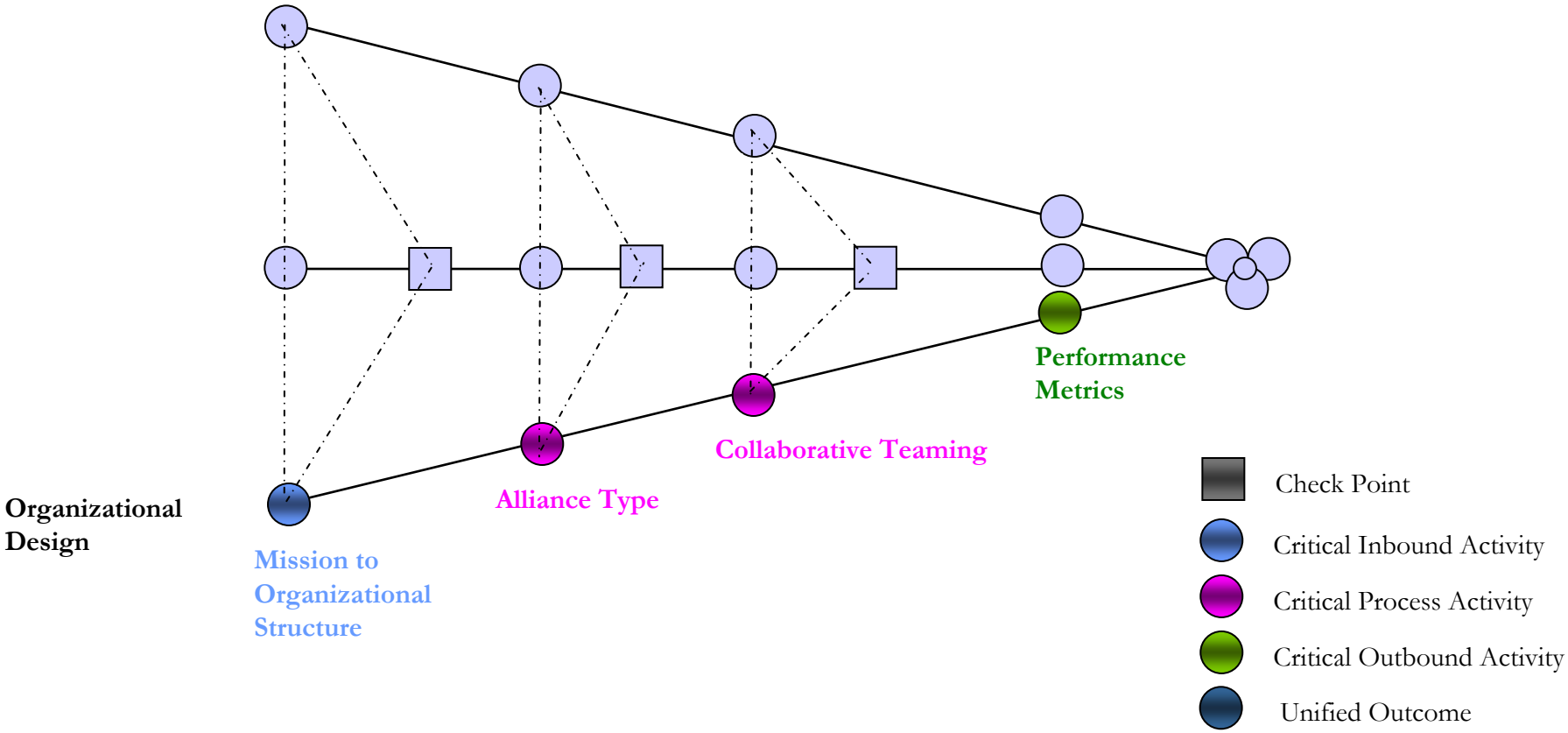
Strategic Factors



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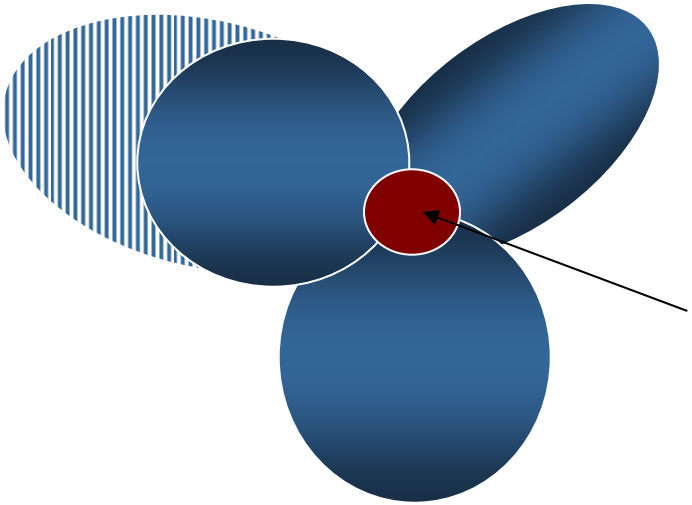
Unified Outcome Concept

Economic Factors



Strategic Factors

Unified Outcome

Organizational
Design Elements

Source: Barney (Rumelt)

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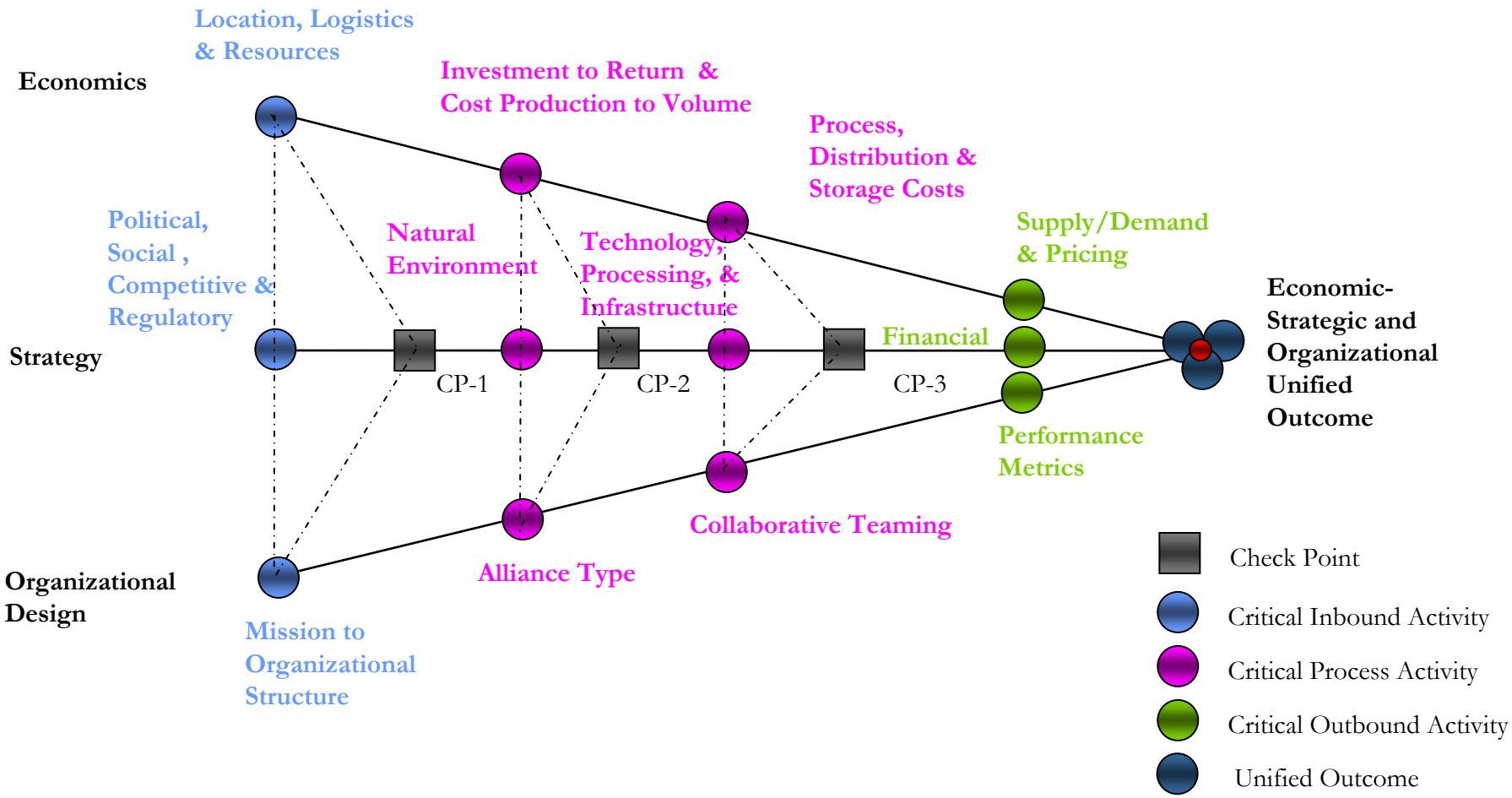
Unified Outcome



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Summary

- Evaluate Economic Factors
- Develop Appropriate Strategy
- Design Appropriate Organization to Reflect Intentions

Sources

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