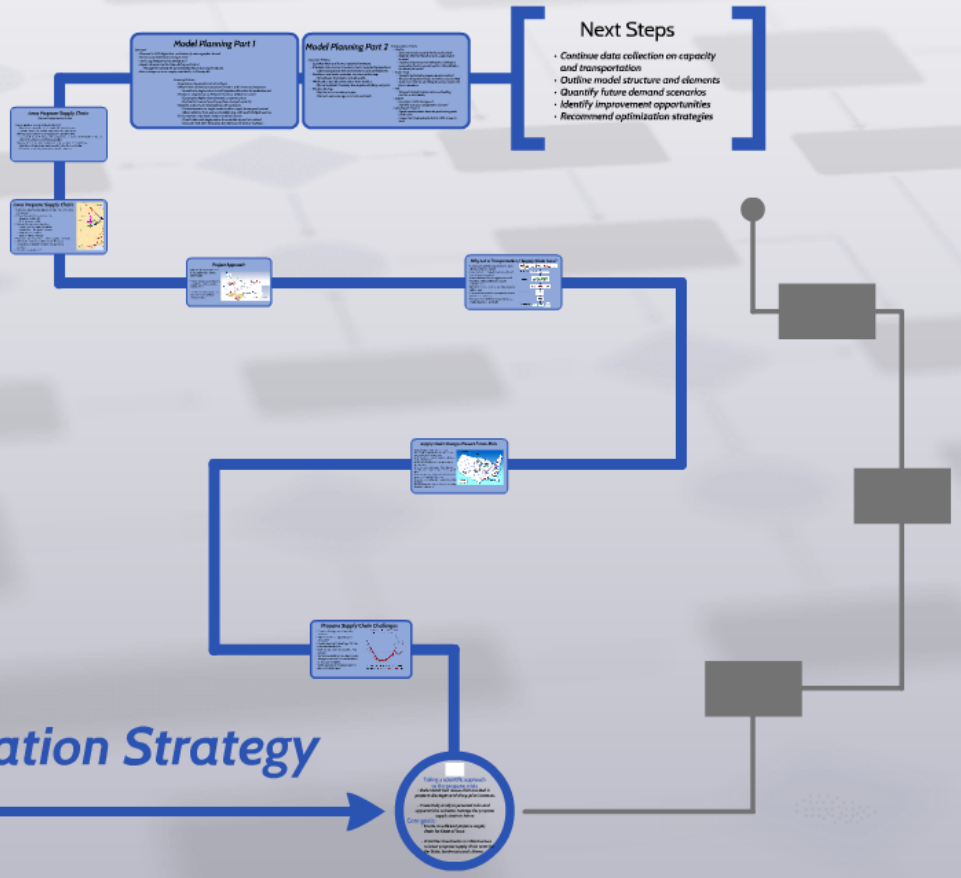

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Iowa Propane Supply Chain Optimization Strategy

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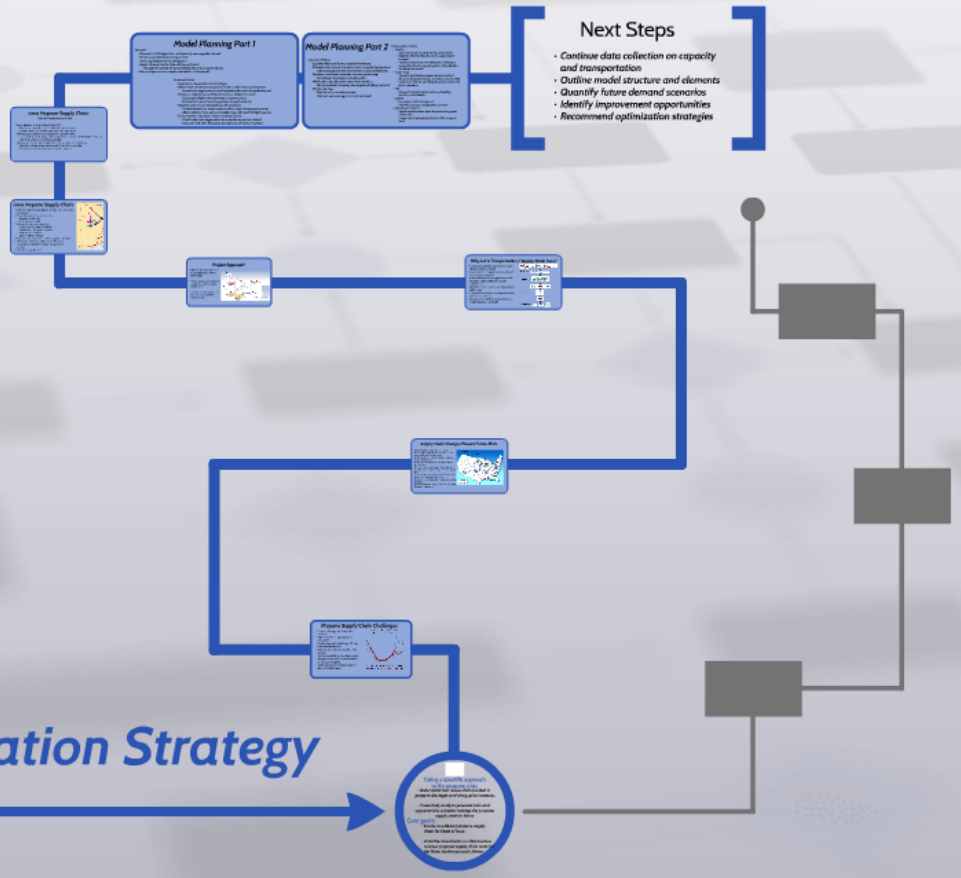
June 2014



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Taking a scientific approach to the propane crisis

- *Understand root causes that resulted in propane shortages and sharp price increases*

- *Proactively analyze potential risks and opportunities to better manage the propane supply chain in future*

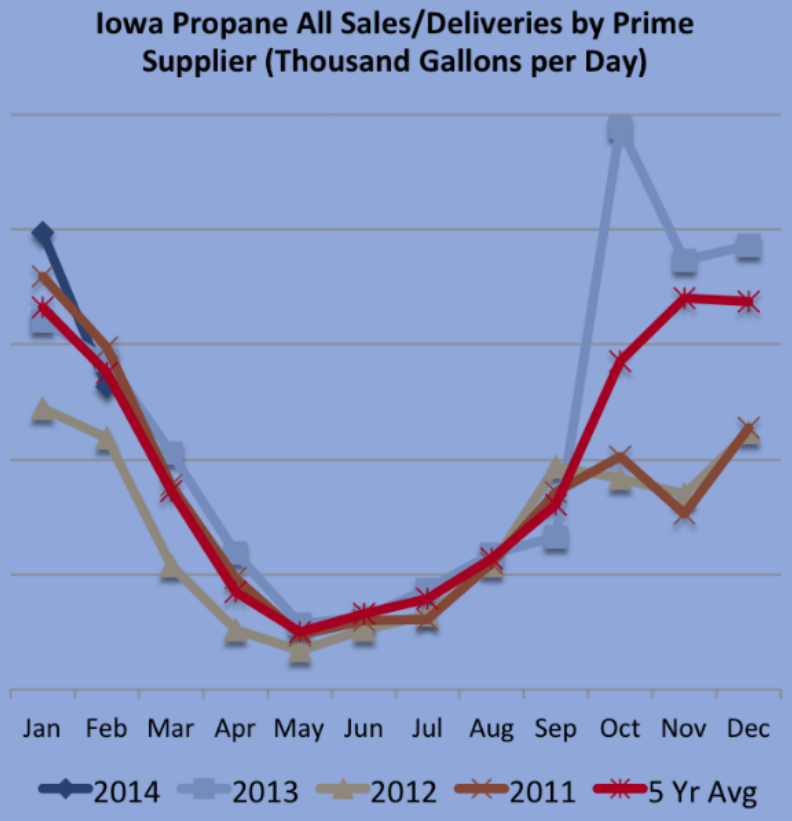
Core goals:

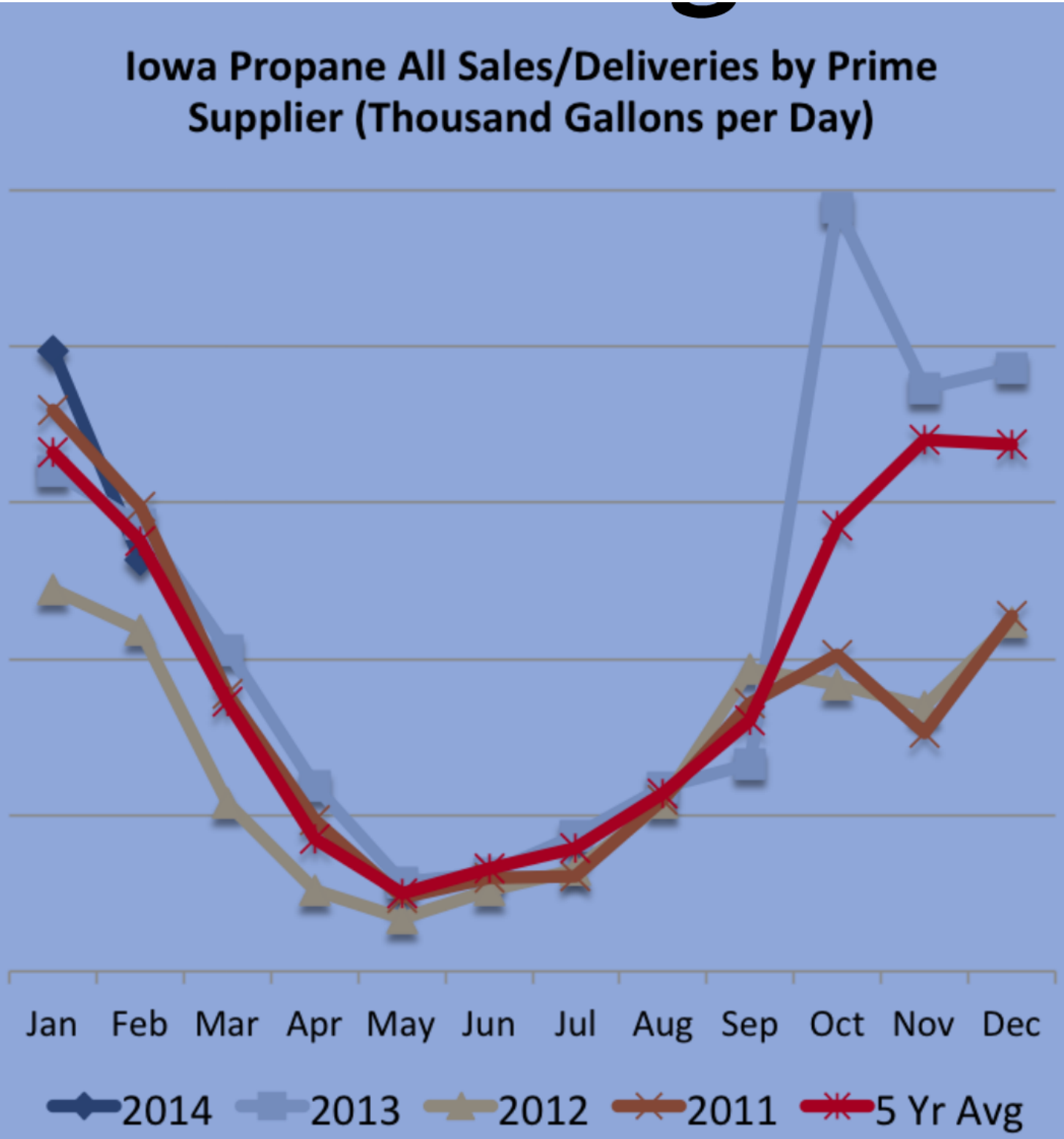
- *Create an efficient propane supply chain for State of Iowa*

- *Prioritize investments in infrastructure to lower propane supply chain costs for the State, businesses and citizens*

Propane Supply Chain Challenges

- Propane shortage and sharp price increases
- High demand for crop drying not anticipated
- Supply depleted; In shortage situation when cold weather hit
- 2011 and 2012 demand below 5-year average
- No focus on building inventory in Iowa
- No regular Conway summer build due to increase in exports
- Rail disruptions & temporary Cochin closure limited supply




Iowa Propane All Sales/Deliveries by Prime Supplier (Thousand Gallons per Day)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2014
2013
2012
2011
5 Yr Avg

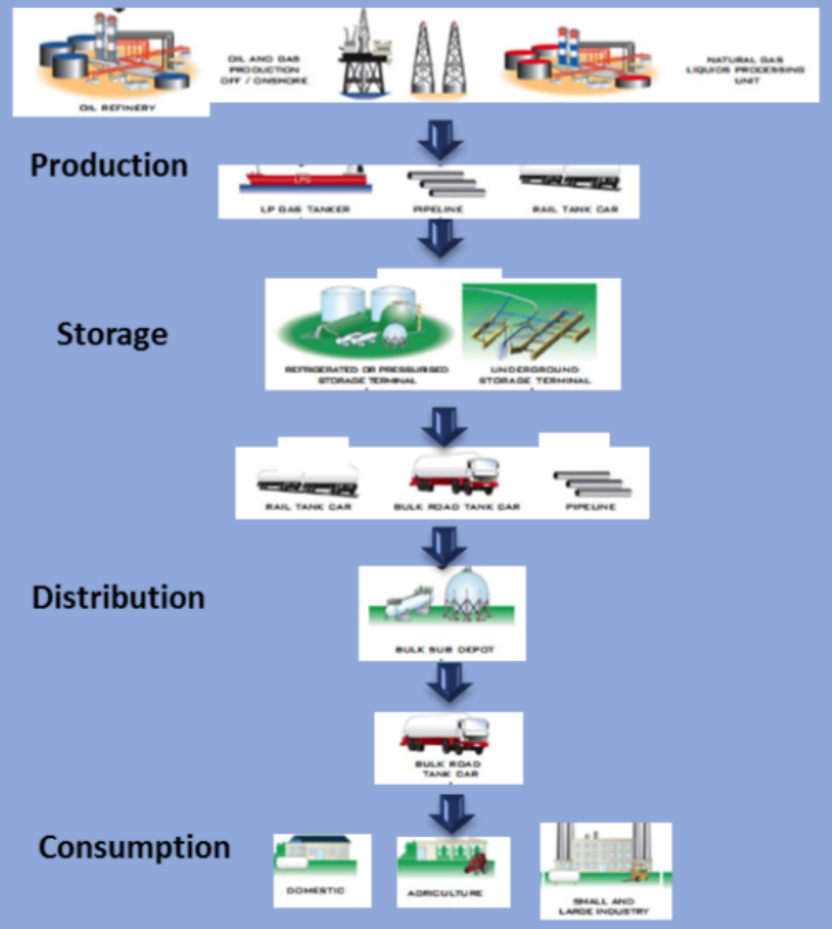
Supply Chain Changes Present Future Risks

- Demand higher in 2013, but not historic
- Main supply via pipeline from Conway; Runs at maximum capacity during peaks
- Cochin pipeline reversal eliminates flexibility to manage fluctuations
- Adding rail terminals; does not replace all lost pipeline flows
- Other states obtaining supply at Iowa pipeline terminals consuming capacity and increasing wait times
- Shale development and growth in oil and natural gas production globalizing market
- New terminals growing export capacity faster than production
- Supply at Conway not guaranteed with competing demand at higher price


Edmonton
Cochin
Invergrove
Heights
Storage
Jackson
Storage
Kaneb
Mapco
Kinder Morgan
Moab
Storage
Sylva
Storage
Aberdeen
Storage
Conway /
Hutchinson
Storage
TET
Adamana
Storage
Dixie
Mt. Belvieu
Hattiesburg
LPG Pipeline Systems
Pipeline
Terminal
Storage

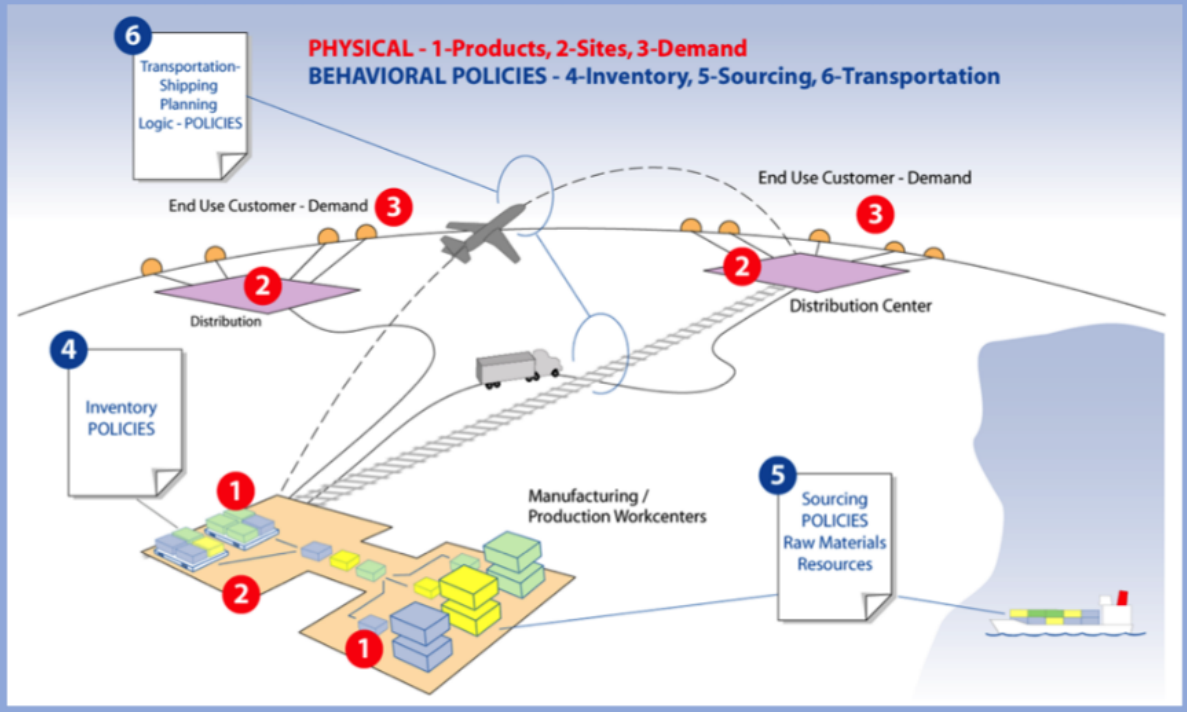
Why is it a Transportation / Supply Chain Issue?

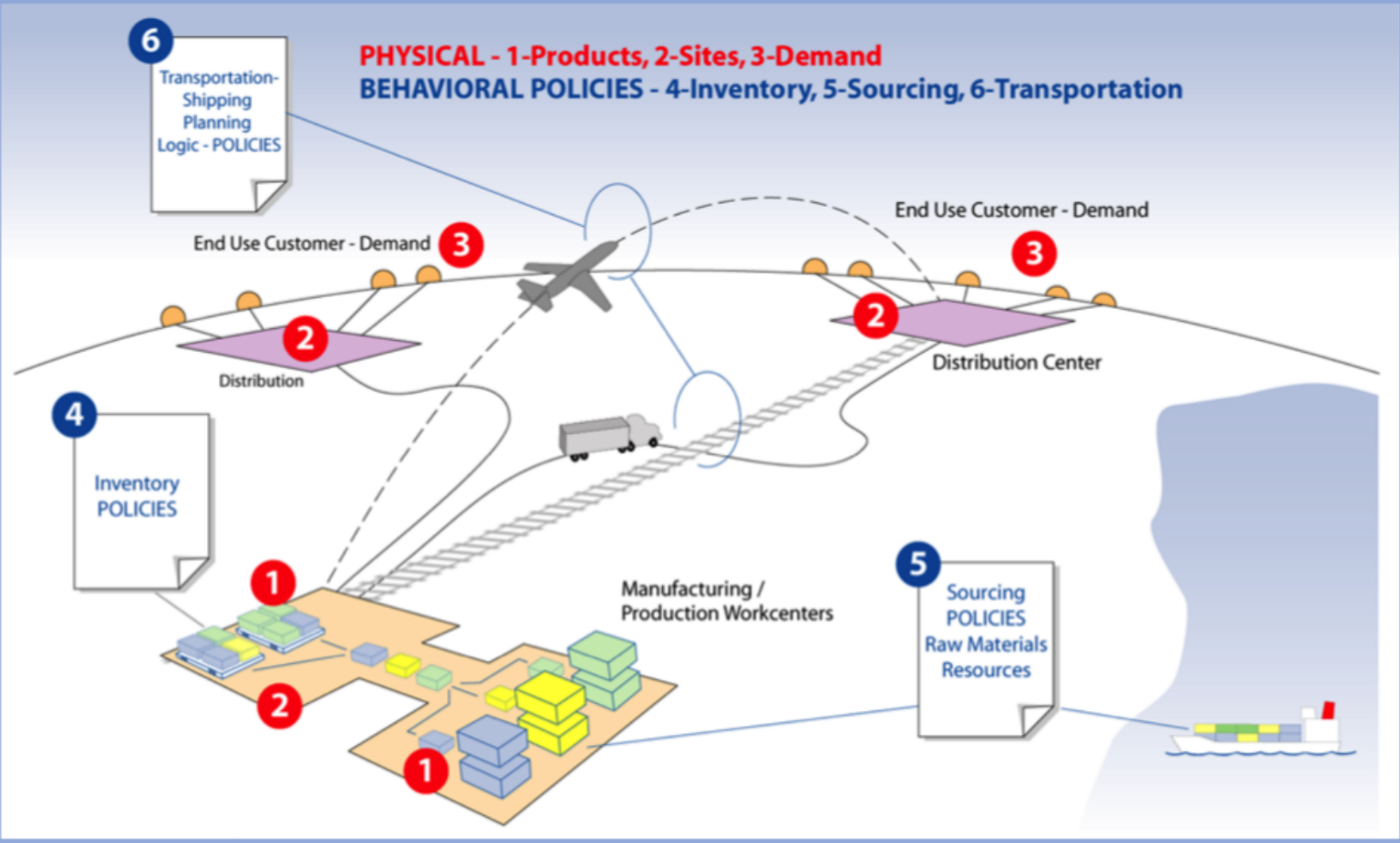
- Challenge is getting propane to end users where and when needed
- Constraints in transportation network and inventory management
- Causes bottlenecks during peak demand
- Requires understanding of propane infrastructure
- Demand and fluctuations by region/county within Iowa
- Storage requirements (e.g. capacity, reorder points, safety stock)
- Transportation fulfillment capacity across modes (pipeline, rail, truck)



Project Approach

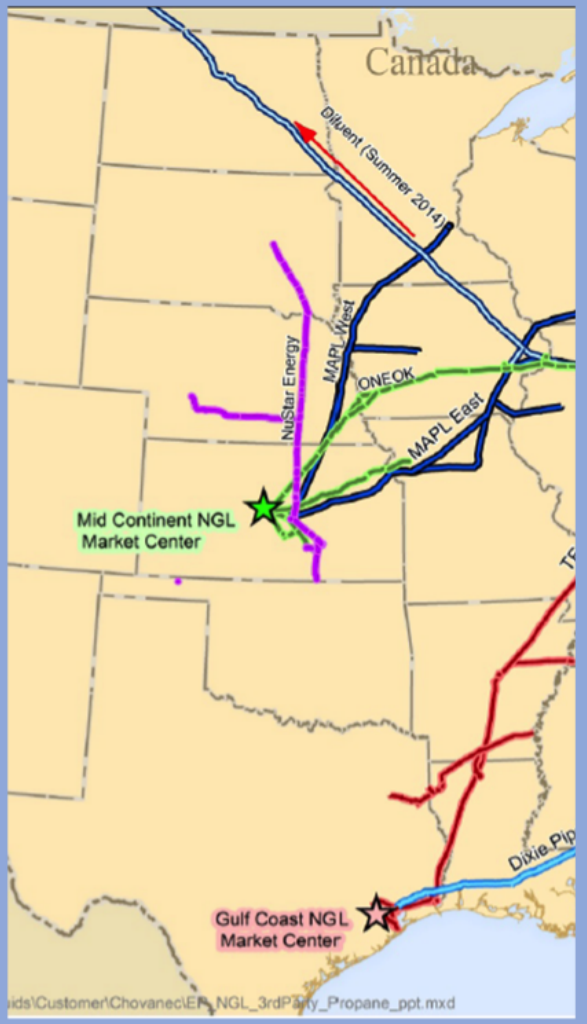
- Objectively analyze problem using supply chain network optimization
- Proven private sector discipline to optimize complex global supply chains
- Determines optimal location, size of facilities and flow through network




6
Transportation-
Shipping
Planning
Logic - POLICIES
PHYSICAL - 1-Products, 2-Sites, 3-Demand
BEHAVIORAL POLICIES - 4-Inventory, 5-Sourcing, 6-Transportation
End Use Customer - Demand
3
End Use Customer - Demand
3
2
Distribution
2
Distribution Center
4
Inventory
POLICIES
1
Manufacturing /
Production Workcenters
5
Sourcing
POLICIES
Raw Materials
Resources
2
1

Iowa Propane Supply Chain

- Producers ship and store propane at major market centers underground
- Wholesalers servicing IA source from
  - Conway/Bushton KS
  - Ft. Saskatchewan AB
- Delivered via 4 propane pipelines
  - MAPL East - Enterprise Products
  - MAPL West - Enterprise Products
  - ONEOK North System
  - Cochin - Kinder Morgan
- Propane loaded into tanker trucks at pipeline terminals
- Delivered to retailers/marketers for bulk storage
- Transported bia bobtail from bulk storage to end customers
- Orders based on demand



Iowa Propane Supply Chain

Planned changes to current state

Cochin pipeline reversal starting in July 2014

- Propane no longer flow to Iowa from Ft. Saskatchewan
- 18 month transition period; Iowa terminal is now closed

Adding propane rail service to replace some pipeline flows

- e.g. Iowa Northern Railway (INR) adding transload facilities in Manly IA and Butler County IA with Union Pacific Railroad (UP)

Impact of shale development domestic increases in oil and natural gas

- New terminals growing export capacity faster than production
- Other states obtaining supply at Iowa rail terminals

Model Planning Part 1

Demand

- *Demand in 2013 higher but not historic (previous graphic shown)*
- *No focus on building inventory in Iowa*
- *2013 crop drying was not anticipated*
- *Supply deleted and shortage during cold winter*
  - *No regular Conway KS summer build due to increase in exports*
- *Can no longer assume supply availability in Conway KS*

Sourcing Policies

- *Propane is a by-product of oil and gas*
- *Wholesalers source from producers/traders with inventory in Conway*
  - *Incentive to single source to build pipeline allocation for peak demand*
- *Producers shipping some Midwest inventory to Gulf for export*
  - *Export price higher than domestic consumer prices*
  - *Contractual commitment to portion of export capacity*
- *Retailers source from wholesaler(s) with contracts*
  - *Similar incentive to single source to drive supply during peak periods*
  - *Where delivery from source unreliable (e.g. rail) need mutlitple sources*
- *End customers may have single or multiple sources*
  - *If rent tank, must single source from retailer as part of contract*
  - *Some do "will call"; Shop price but delivery risk during shortages*

Model Planning Part 2

Inventory Policies

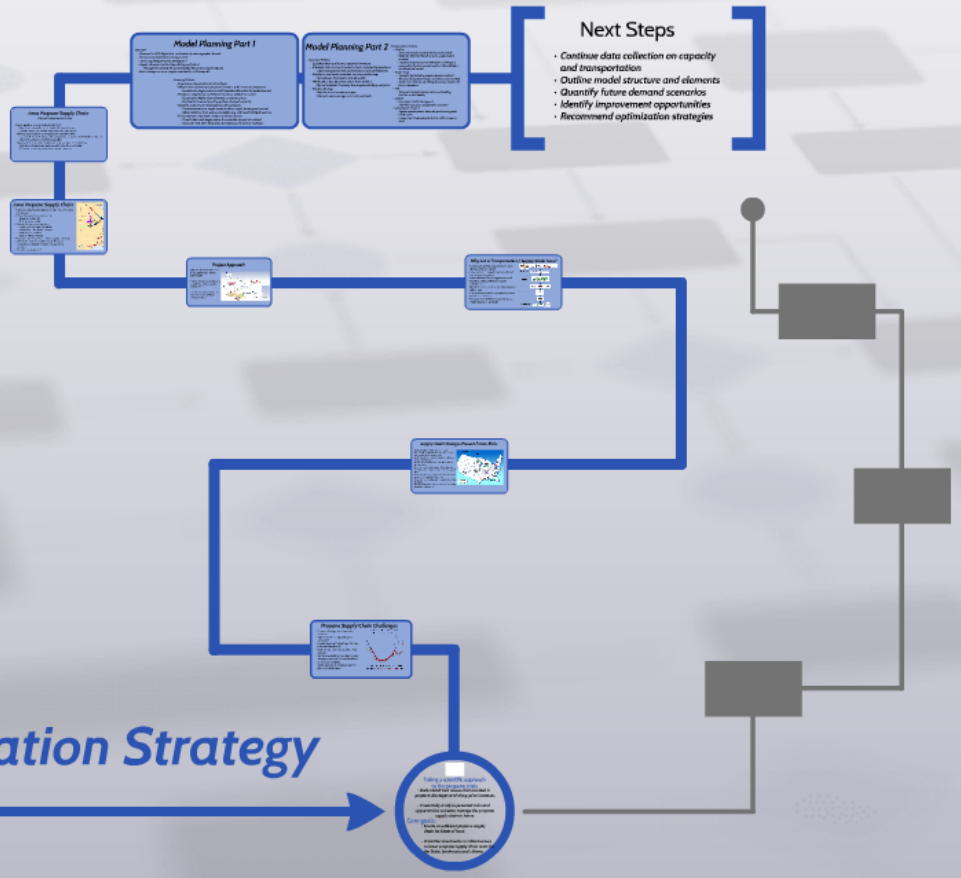
- *Specifies when and how to replenish inventory*
- *EIA data state level on inventory stocks; reported by producers*
  - *Little transparency into true inventory and commitments*
- *Producers and trader maintain inventory at Conway*
  - *Not exlusive to propane; not all usable*
- *Wholesalers buy based on orders from retailers*
  - *Do not maintain inventory due to price risk (buy-sell price)*
- *Pipeline Storage*
  - *Pipeline owns inventory in pipe*
  - *Maintain some storage at certain terminals*

Transportation Policies

- *Pipeline*
  - *Demand exceeds capacity during peak periods*
  - *Capacity allocated based on prior usage at each terminal*
  - *Pipelines target maximum utilization; challenge is seasonality (Cochin reversal results in 365 utilization for diluent (oil sands))*
- *Tanker Truck*
  - *Typically dedicated to propane (contamination)*
  - *No schedulling at terminals; wait times consume HOS*
  - *Trucks from MN, WI, etc. filling at Iowa terminals with Cochin shutdown*
- *Rail*
  - *Transport via rail in tanker cars; need loading facilities and reliability*
- *Bobtail*
  - *Constraint is HOS during peak*
  - *Half-fills increases transportation demand*
- *Ship/Export Terminal*
  - *Export capacity above domestic production growth for first time*
  - *2 export terminals added in Gulf in 2013, 2 more in 2014*

Next Steps

- *Continue data collection on capacity and transportation*
- *Outline model structure and elements*
- *Quantify future demand scenarios*
- *Identify improvement opportunities*
- *Recommend optimization strategies*



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