



Global Supply Chain Practice Methodology and Deliverables

- What is Supply Chain Network Design
- What are the trade-offs
- Methodology
 - Approach
 - 9 Step process
 - Key milestones
 - Key inputs and outputs
 - Financial model
 - Facility plan
 - Key deliverables
- Case Studies
- Pulling it all Together
 - TranSystems / CBRE Power
 - Experience in modeling

Supply Chain Network Design

Supply Chain Optimization

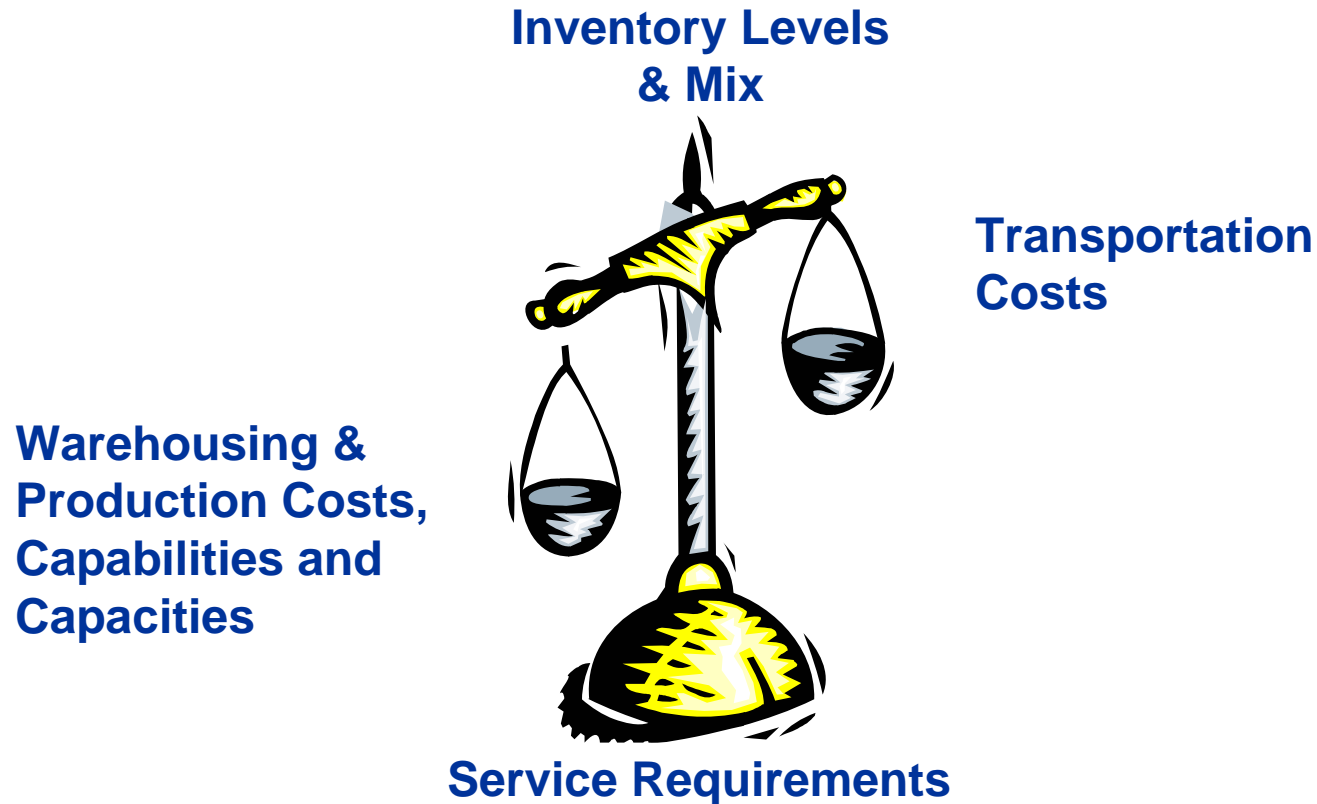
Characteristics – Trigger Points

- Recently merged or acquired other companies.
- Looking to cut costs
- Improve service levels
- New product introductions
- Expansion into new markets
- Network capacity issues
- New management team

Optimization Challenges

- What is the optimal number, location and capacities of suppliers, plants and production lines & processes?
- What is the right number, location and size of consolidation centers, forward DCs, cross-docks, etc.?
- How to best assign customers and products to DCs?
- What is the impact of changes to production and warehousing capabilities on cost and service?
- Determining the trade-offs between
 - Inbound and outbound transportation costs, duties, tariffs, etc.
 - Transportation costs and fixed facility costs
 - Costs and service levels

Network Optimization Objective



Given demand for a set of products, what is the optimal configuration of the distribution network to satisfy that demand at a specified service level and at the lowest cost?

Network Optimization Trade-offs

Network design strategies consider many trade-offs that need to be analyzed and weighed against the current operating model. The trade-off comparison becomes imperative in recommending an optimal, implementable solution. The following table illustrates some of the needs that are compared and analyzed.

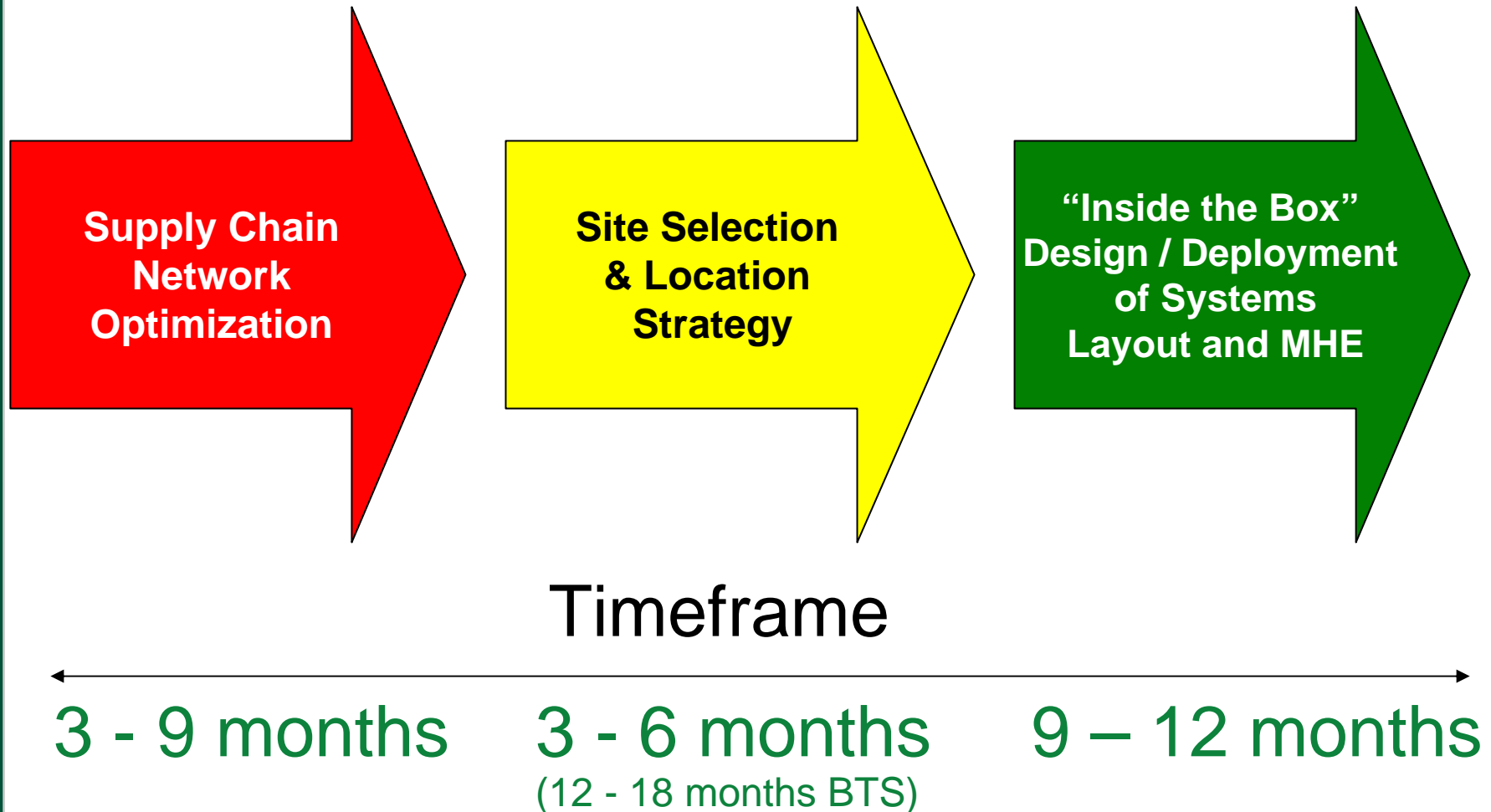
<ul style="list-style-type: none">• Total Cost Reduction	<ul style="list-style-type: none">• Scenario analysis weighing costs between facility, labor, transportation, tax implications, etc
<ul style="list-style-type: none">• Desired Service Level	<ul style="list-style-type: none">• Balance between number of facilities and premium freight
<ul style="list-style-type: none">• Reduction of costs while maintaining or bettering the current service level	<ul style="list-style-type: none">• Optimal location and number of facilities and average distance away from customer as well as, transportation strategy change recommendations
<ul style="list-style-type: none">• Reducing complexity of network	<ul style="list-style-type: none">• Facility, inventory, transportation, labor cost trade-offs

Network Modeling Uses

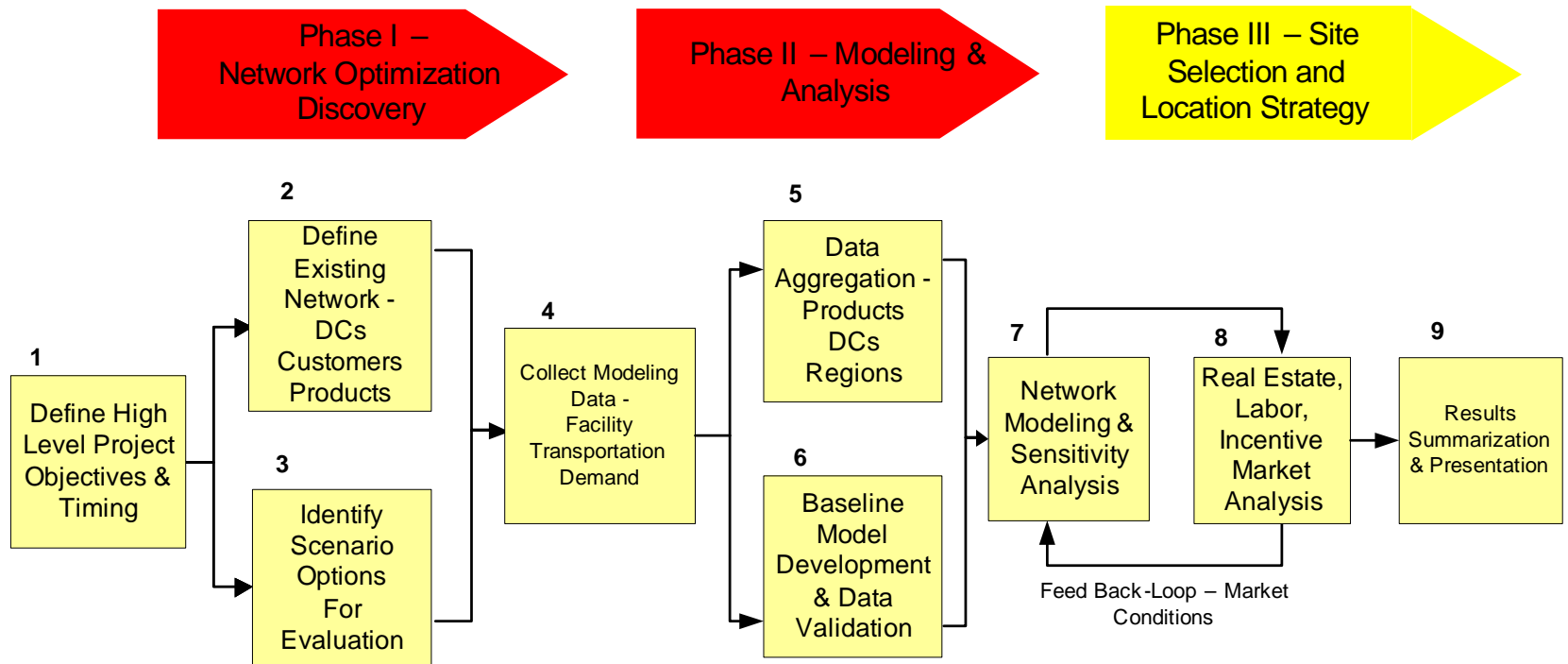
- Supply Chain Optimization
 - Consolidation or Expansion
- Port Selection
 - Economics and capacity
- Inventory Deployment
 - Family group level
- Node and Capacity Optimization
- Customer Assignment
 - Best place to service a customer from
- Source Point Optimization
 - Plant, vendor, etc
 - Much to be sourced from each
- New Product Introductions
 - Where to source and service from

Supply Chain Optimization Methodology

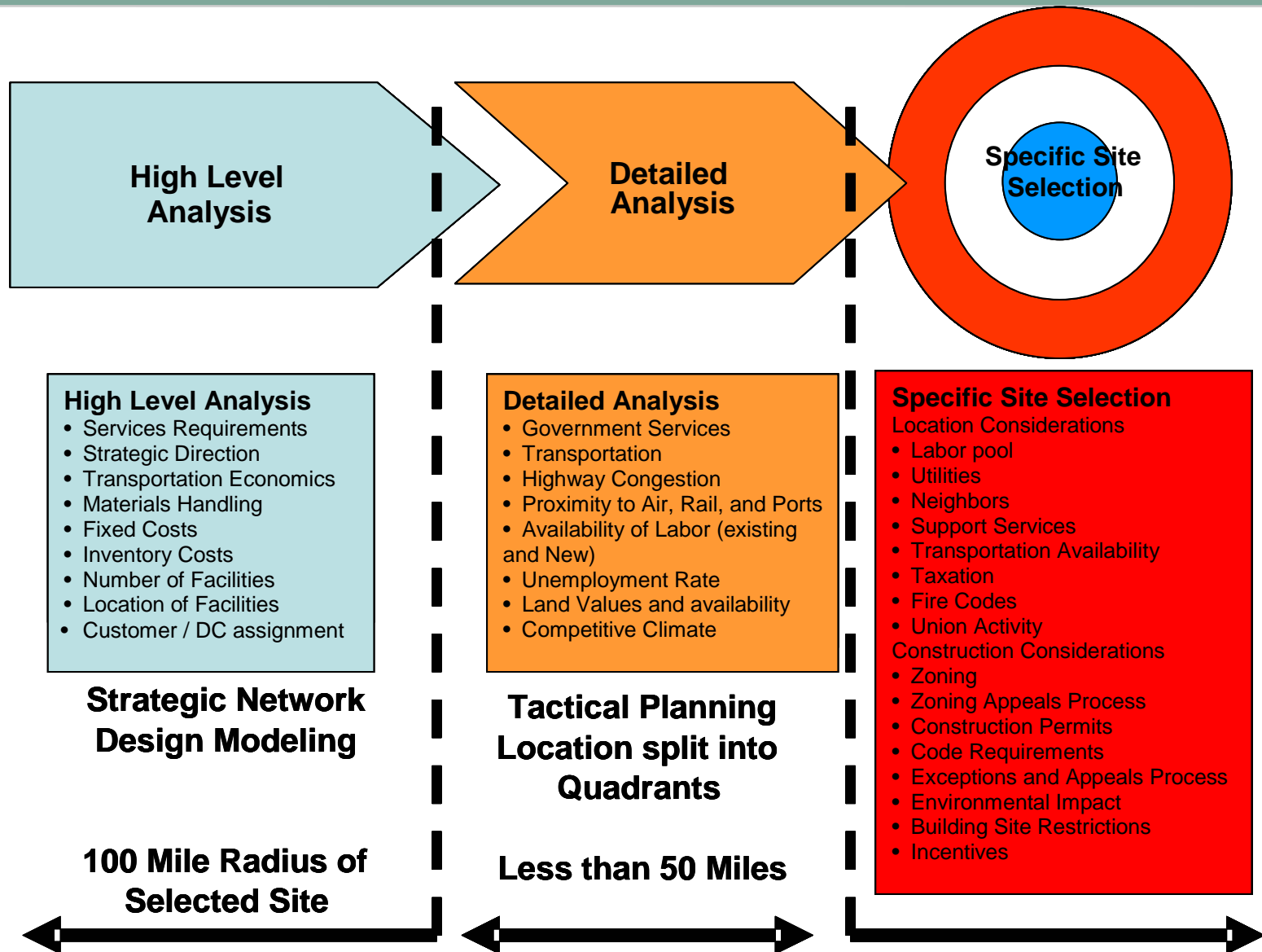
Network Optimization Simplistic Approach



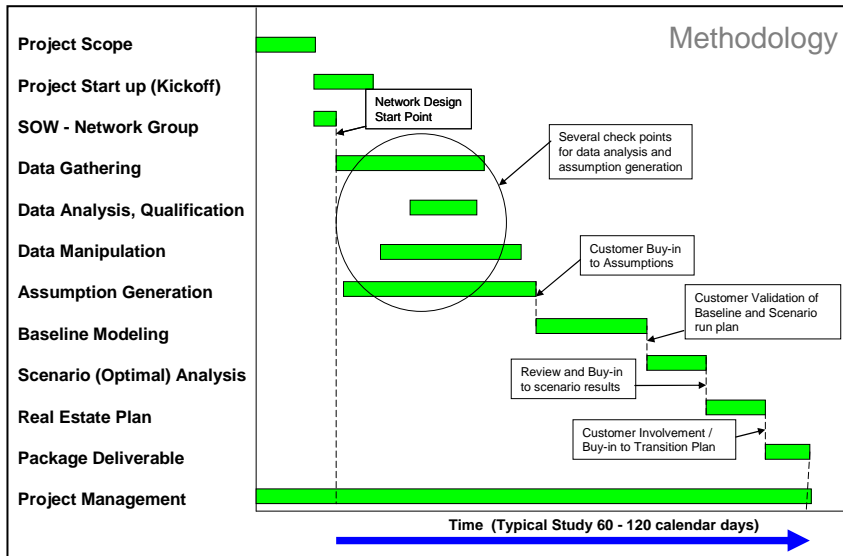
9 Step Network Optimization Process



Transition from Network Design to Site Selection



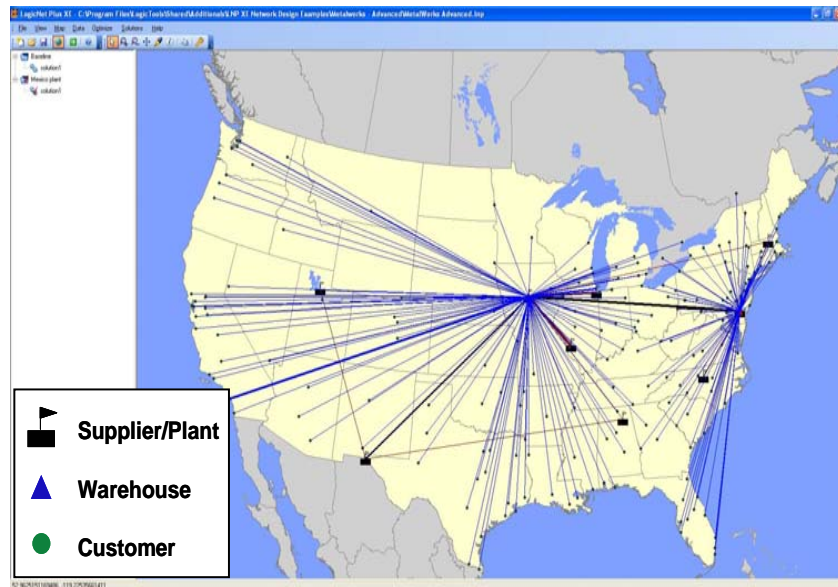
Network Design Methodology and Key Inputs/Outputs



Summary Reports		
Cost Summary Warehouses Plants Lines Products Time Periods Customers Diagnostics		
Overview		
Solution Type:	Minimize Cost	
Solver Run Time:	00:03:38	
Optimization Gap:	0.06%	
% Demand Met:	100.00%	
% Safety Stock Met:	100.00%	
Error Count:	0	
Warning Count:	0	
Financial Summary		
Revenue (\$):	0.00	
Total Cost (\$):	71,905,275.00	
Profit (\$):	-71,905,275.00	
Cost Totals		
Plant Fixed (\$):	0	
Line Fixed (\$):	0	
Manufacturing (\$):	19,173,054	
Transportation (\$):	31,452,685	
Warehouse Fixed (\$):	6,500,000	
Variable (\$):	7,957,727	
Holding (\$):	6,821,807	
TOTAL COST (\$):	71,905,275	
Manufacturing Cost Details		
Tooling (\$):	0	
Setup (\$):	0	
Production (\$):	19,173,054	
Line Item (\$):	0	
Tank (\$):	0	
Transportation Summary		
	Cost (\$)	Wid Avg Distance:
Plant to Plant:	2,314,224	368 mi
Plant to Warehouse:	1,440,652	191 mi
Plant to Customer:	0	0 mi
Warehouse to Plant:	0	0 mi
Warehouse to Warehouse:	0	0 mi
Warehouse to Customer:	27,697,809	755 mi
Duty Tariff:	0	
Variable Cost Details		
Warehouse Inbound (\$):	0	
Warehouse Outbound (\$):	7,957,727	
Warehouse Storage (\$):	0	
Holding Cost Details		
Warehouse Inventory (\$):	6,821,807	
Customer Inventory (\$):	0	
In Transit (\$):	0	

Financial Impact Analysis

Project Name: Southern California Analysis



Project Scope:

Scenario One - San Diego Moves and Anaheim consolidates into Irwindale CA in Year Two.

Scenario Two - San Diego consolidates into Anaheim Year One - Anaheim consolidates into Irwindale Year Two.

1. Move and Consolidation

	Scenario One	Scenario Two
1.1 - Transportation:	\$ (80,582)	\$ (266,517)
1.2 - Logistics:	\$ -	\$ 14,451
1.3 - Real-Estate:	\$ 512,741	\$ 625,168
1.4 - Inventory:	\$ 220,660	\$ 280,660
1.5 - Warehouse Staffing:	\$ 28,992	\$ (28,914)
1.6 - Staff Functions:	\$ 182,745	\$ 347,805
1.8 - Sales Revenue Impact:	\$ (58,325)	\$ (119,902)
- Annual Year Project Savings:	\$ 806,230	\$ 852,750

Capital Analysis:

1.7 - Capital & Project Management:	\$ (688,764)	\$ (464,082)
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Savings with Capital Amortized for Ten Years:

	\$ 737,353	\$ 806,342
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Savings with NO Capital Amortized of Ten Years:

	\$ 806,230	\$ 852,750
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Total Capital and Project Expense - One-time Payment:

	\$ 688,764	\$ 464,082
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Payback in Months:

	10.3	6.5
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Payback in Years:

	0.85	0.54
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	YEARLY SAVINGS / EXPENSE											Total	Annual
	One	Two	Three	Four	Five	Six	Seven	Eight	Nine	Ten			
SCENARIO ONE:	\$ 69,972	\$ 770,751	\$ 816,601	\$ 816,601	\$ 816,601	\$ 816,601	\$ 816,601	\$ 816,601	\$ 816,601	\$ 816,601	\$ 816,601	\$ 7,373,531	\$ 737,353
SCENARIO TWO:	\$ 191,759	\$ 752,362	\$ 889,912	\$ 889,912	\$ 889,912	\$ 889,912	\$ 889,912	\$ 889,912	\$ 889,912	\$ 889,912	\$ 889,912	\$ 8,063,418	\$ 806,342

Network Design – Facility Plan

Scenario - 20050526 - 17 H 14 B 31 FT - Cincinnati Chicago hub - UPS via Cincinnati - 3 rerun with feedback

In this scenario, we had 16 hubs, 15 branches and 29 Flow through locations

Danbury replaces Boston as a hub. Boston replaces Hartford as a branch. Hartford goes out completely.

Cincinnati serves Indianapolis, Columbus & Louisville. Chicago serves Milwaukee and Normal.

Union City is a hub, and serves Fresno and Sacramento

Baltimore serves Pittsburgh

17 Hubs (Cincinnati and Chicago)
14 Branches
31 Flow Through Centers
62 Total Locations

ID	Warehouse	Fairs to customer	Fairs to Branches	Fairs to Flow Throughs	Total Fairs Serviced	Fairs Produced	Sqft Required	Existing Sqft	Action	Facility Action Plan
31	Houston	3,267	2,356	3,628	9,251	6,894	93,794	29,695	Open	Need to move
36	Union City	2,606	1,649	886	5,141	3,492	49,620	57,920	None	Existing 10 yr lease, do nothing
88	Cincinnati	2,302	3,954	1,251	7,507	3,553	49,708	114,000	Reduce	Existing 10 yr lease, sublease 50K
116	Raleigh	2,668	2,210	1,983	6,861	4,651	64,304	63,000	None	New facility 10 yr lease
117	Kennesaw	4,439	-	4,732	9,171	9,171	124,977	48,330	Expand	Need to move
118	Florida	3,405	2,063	1,079	6,547	4,484	63,841	51,452	Expand	Extend lease for 3 years, them move to new location
119	Detroit	3,461	4,445	-	7,906	3,461	51,118	57,543	Reduce	No action - current 7 year lease
125	Chicago	3,569	2,567	1,273	7,410	4,842	68,700	45,652	Expand	Lease up this 2006 with no expansion space - relocate to new site
127	St Louis	3,148	1,948	1,263	6,359	4,411	62,357	50,443	Expand	Have FRoR, expand 12K current location
128	Dallas	5,155	-	4,003	9,158	9,158	126,395	48,023	Open	Need to move, 3 more years on lease
129	Denver	2,025	-	2,004	4,030	4,030	55,076	35,947	Expand	Current location has contiguous space
130	Portland OR	1,679	1,913	513	4,105	2,192	31,242	31,492	None	No action - Extend lease 5 years
132	Los Angeles	6,603	-	2,792	9,395	9,395	132,581	76,543	Expand	Have FRoR, 2nd year of 10 year lease. Expand 30K year one and 30K year 3
133	Minneapolis	2,723	-	1,860	4,583	4,583	63,568	38,930	Expand	Current location has contiguous space and lease up this year
140	Baltimore	4,595	5,952	954	11,501	5,549	79,850	69,400	Expand	Current 10 year lease, expand year 3 into contiguous space, FRoR
141	Newark	5,580	-	1,287	6,867	6,867	98,572	42,085	Open	Close existing Cranbury NJ location. Lease is up this year. Move to new location
143	Danbury	2,971	3,432	2,346	8,749	5,317	73,339	122,000	Reduce	Owned. Sublease 40 - 50K
		60,197	32,489	31,855	124,542	79,868				

Square foot requirement 889,114 479,862 399,929 1,768,905 1,289,043

- Logistics Strategic Plan for next 5 years.
- Optimal Number of Facilities.
- Location of Each Facility.
- Products Lines for Each DC.
- Customers Supplied From Each DC, Given Customer Service Objectives.
- Map Display of Customer Service Area for Each DC.
- Total Logistics Network Costs From Supplier to End Customer.
- Total Transportation Costs.
- Warehousing and Inventory Costs (Fixed and Variable).
- Transportation Mode Plan
- Real Estate Implementation Plan

Case Studies

Review website at
www.cbre.com/gscp

Pulling it all Together

The TranSystems/CBRE Differentiation

- Create and Recommend an Implementable Solution
- We can Implement the solution we Recommend
- Customer controls the depth of detail to take the study along with careful guidance from the CBRE/TranSystems team in delivering the solution
- We create more than just a one off model, we create a living network design and road map that can be fully integrated into the customers strategic and tactical business process

Experience

DELPHI



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 **SCHOLASTIC**

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