



Statewide Freight Transportation Network Optimization Strategy – Project Update

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Agenda

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- Project Overview
- Key Recommendations
- Next Steps

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Project Overview

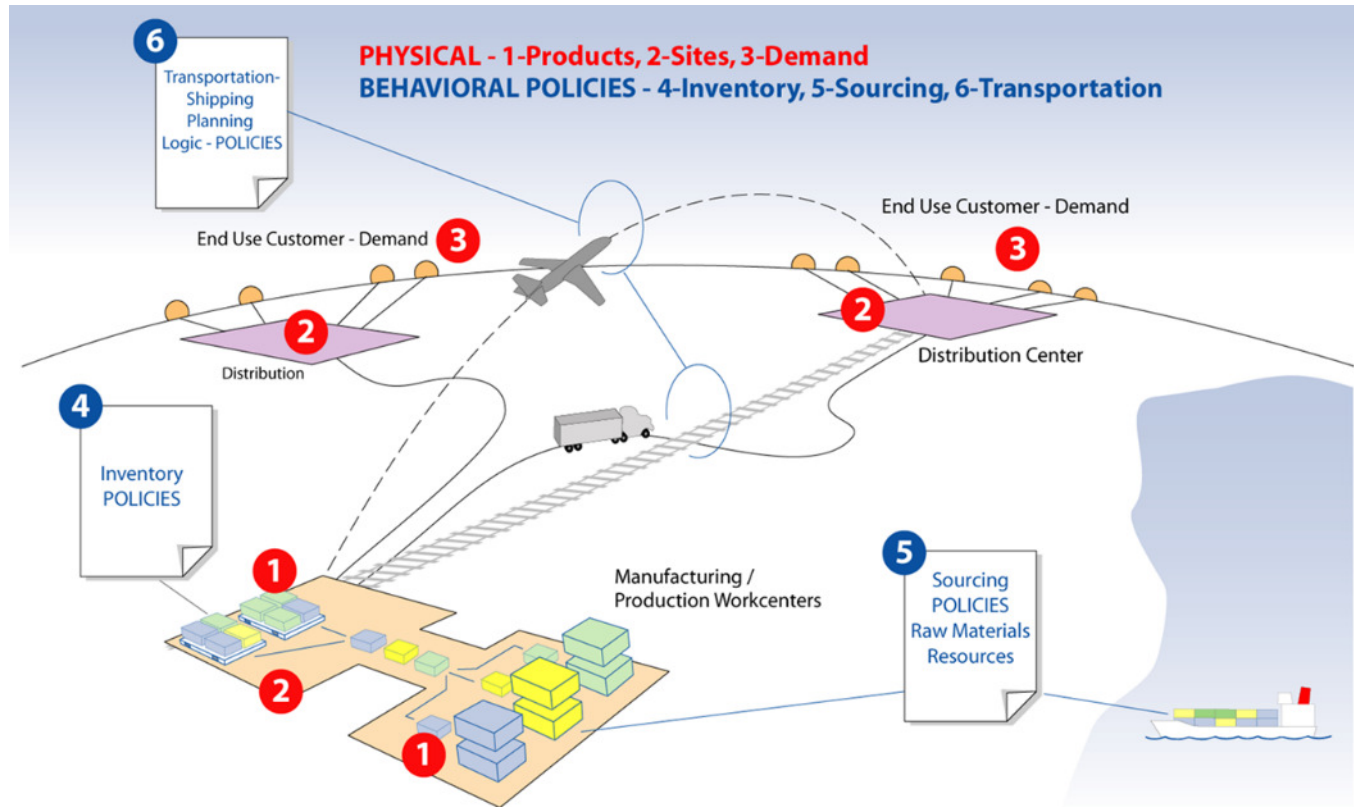
Iowa Statewide Freight Network Optimization

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- ***Vision:*** *To effectively identify & prioritize investment opportunities for an optimized freight transportation network to lower transportation costs & promote business growth.*
- Iowa DOT can optimize statewide freight transportation network to reduce transportation costs
 - ▣ Traditional approaches focus more on capacity planning
 - ▣ Traditional methods don't quantify cost saving opportunities in a multimodal network
- Project uses a demand-based supply chain network design and optimization approach to Iowa DOT planning

Supply Chain Network and Optimization

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- Up to 80% of the landed costs are locked in with the supply chain network

Demand-Based Supply Chain Network Design and Optimization Strategy Development

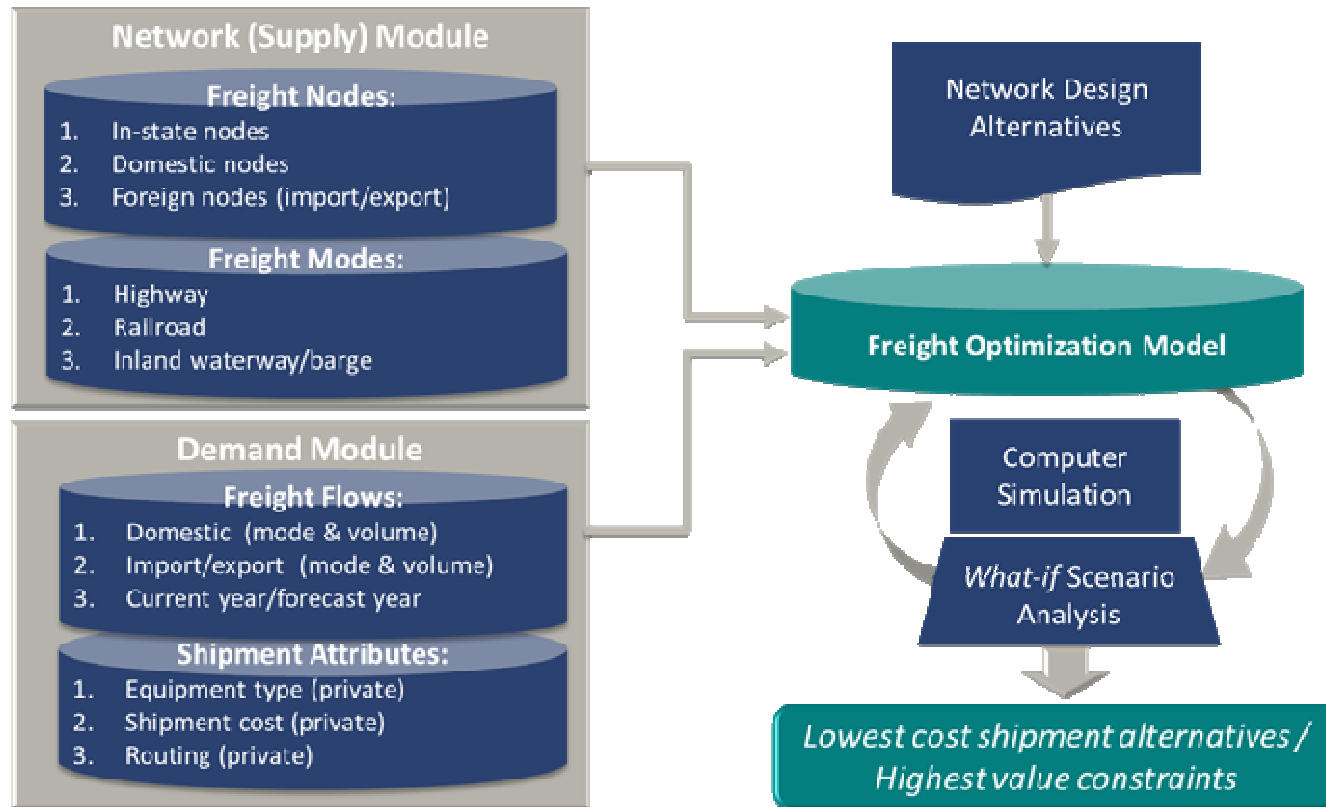
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- Commonly used to design and optimize global commercial supply chains
- Focuses on meeting end users' demand
- Identifies opportunities to invest in supply chain network



Business Architecture Overview

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Optimization Analysis

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□ Quantitative Analysis

- ▣ Cost and network capacity
- ▣ Economic viability
- ▣ Improved network resilience

□ Qualitative Analysis

- ▣ Strategic alignment
- ▣ Funding availability
- ▣ Job creation and local buy-in
- ▣ Service levels / transportation time
- ▣ Road mile reduction
- ▣ Etc.

Benefits of Multi-Modal Freight Network Optimization

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- Determine the highest value multi-modal infrastructure public and private investments
- Reduce road freight truck traffic
- Improve transportation network resiliency
- Provide a foundational model to help Iowa businesses optimize their supply chains

Complementary Tools for DOT Planning

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Travel Demand Modeling (iTRAM)

- Trip generation (how many trips will be made?)
- Trip distribution (where will the trips go?)
- Mode choice (what modes of transportation will the trips use?)
- Trip assignment (what routes will the trips take?)

- ✓ **Freight optimization uses network data from the travel demand model**
- ✓ **Optimization results fed back to the travel demand model to analyze traffic pattern changes**

Freight Optimization (iFROM)

- Analyze high value constraints
- Quantify opportunities to lower transportation costs and improve service levels
- Design multimodal and freight consolidation solutions to reduce truck miles and carbon emissions

Scope of the Iowa Freight Optimization Model (iFROM)

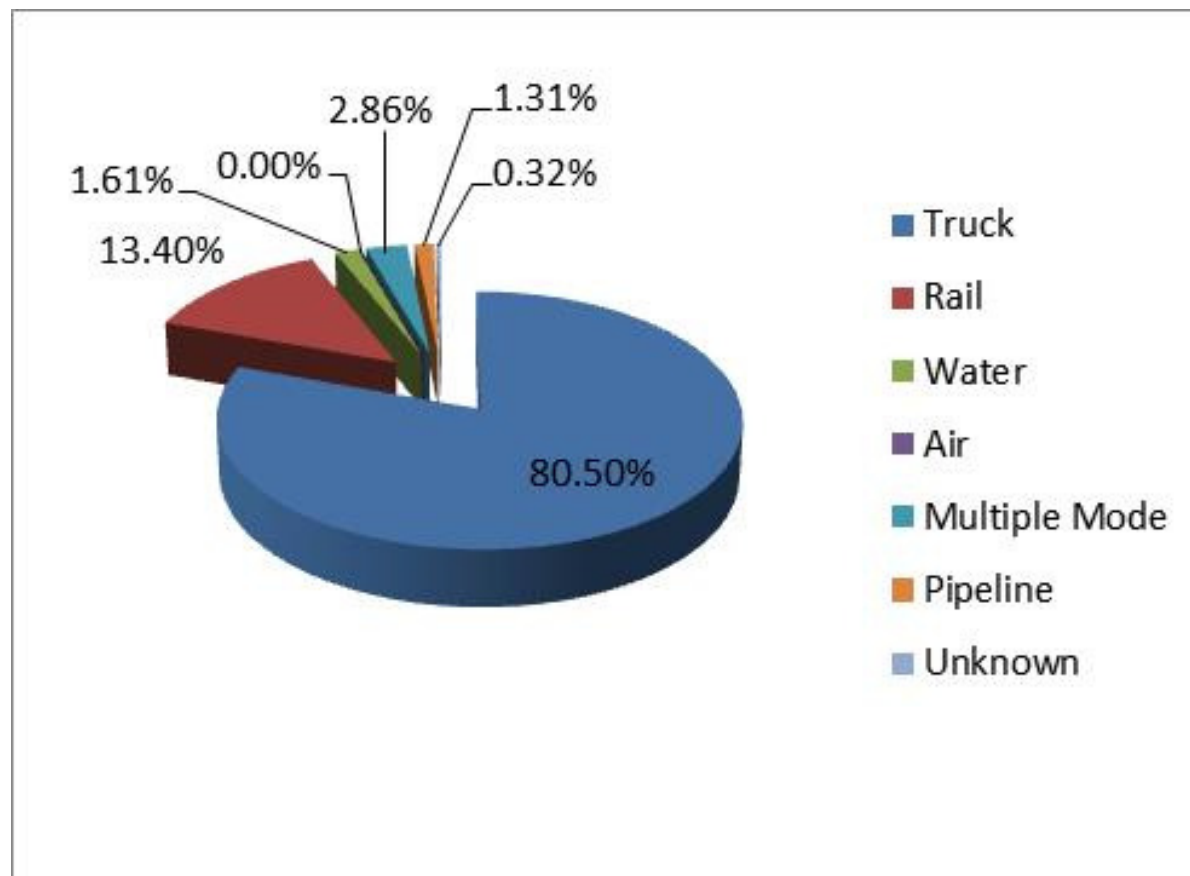
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- Modes included: Truck, Rail, Water, multimodal
- 43 commodities
- Data is disaggregated to 99 Iowa counties and 40 foreign countries/groups
- Domestic commodity flow data primarily from Federal Highway Administration's Freight Analysis Framework
- Import/Export commodity flow data from EDR Group/U.S. Customs & Border Protection
- Base year: 2010; Forecast year: 2040

Iowa Freight Volume by Mode

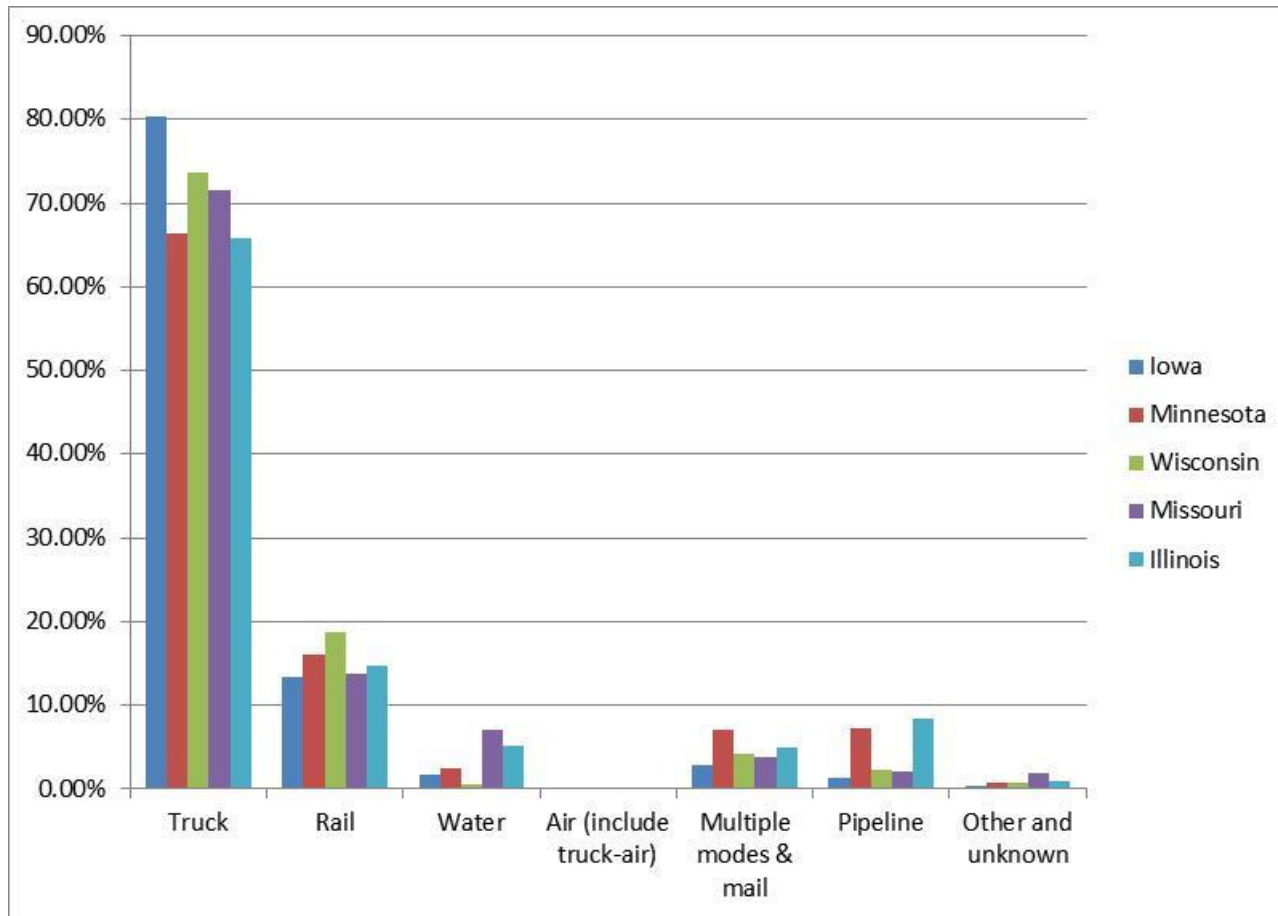
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Over 98% of the freight volume is included in the scope



Comparing Iowa Domestic Freight Flows with Adjacent States

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Data Source: FAF 3.5, Federal Highway Administration

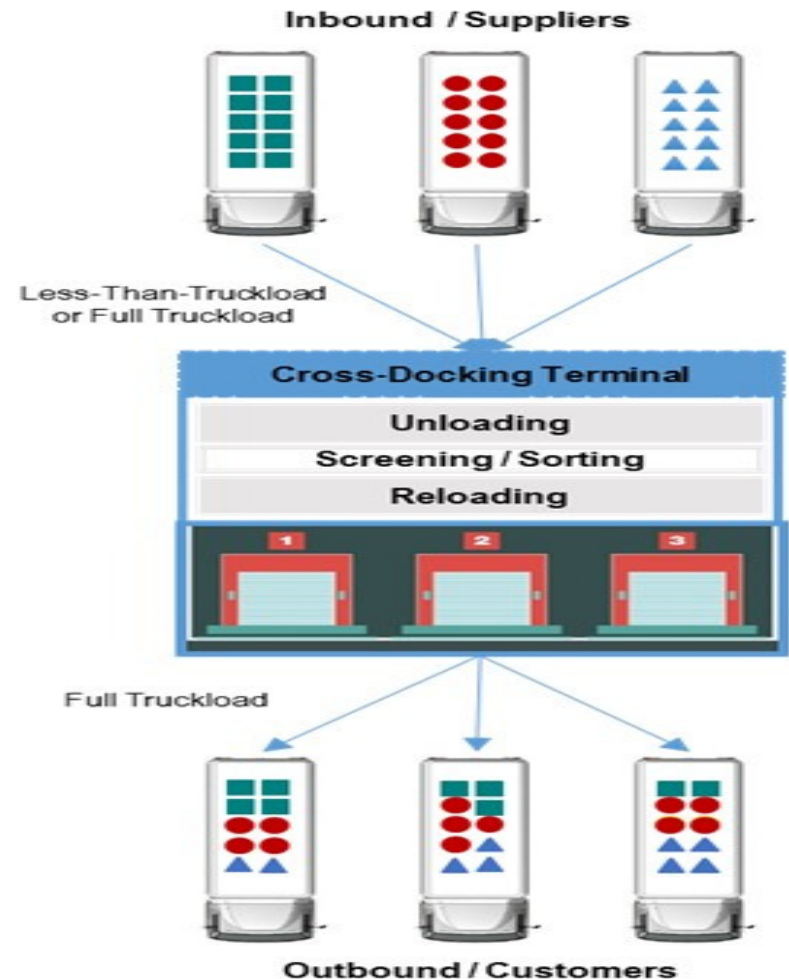
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Recommendation – Cross Dock Facility

Cross Dock Overview

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- Truck freight arrives via LTL or FTL
- Freight is unloaded and sorted based on destination
- Outbound trucks are loaded with freight going to the same area
- LTL freight is consolidated to long-haul FTL
- Can offer packaging / palletizing services



Cross-Dock Opportunity Analysis

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- Identified four regions based on freight density
- Central Iowa – S has the highest cost saving, but Central Iowa – A and Eastern Iowa are more viable options because of existing access to interstate highways
- Selected Eastern Iowa as the primary site candidate with the concept to co-locate cross-dock and intermodal facilities in a logistics park

Location	Total Annual Saving Opportunity
Central Iowa – A	\$867 Million
Central Iowa – S	\$870 Million
Eastern Iowa	\$852 Million
Western Iowa	\$670 Million

Target Market Segment in Eastern Iowa

Estimated 2021 Numbers

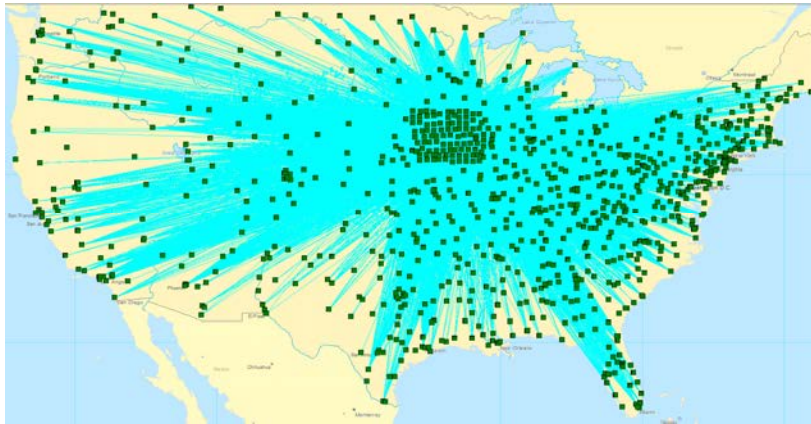
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Item	Within 100-Mile Radius	Within 50-Mile Radius
Estimated Annual Consolidated Loads	500,000	170,000
Average Distance to Cross-Dock	66 Miles	34 Miles
Average Weighted Distance to Cross-Dock	52 Miles	15 Miles

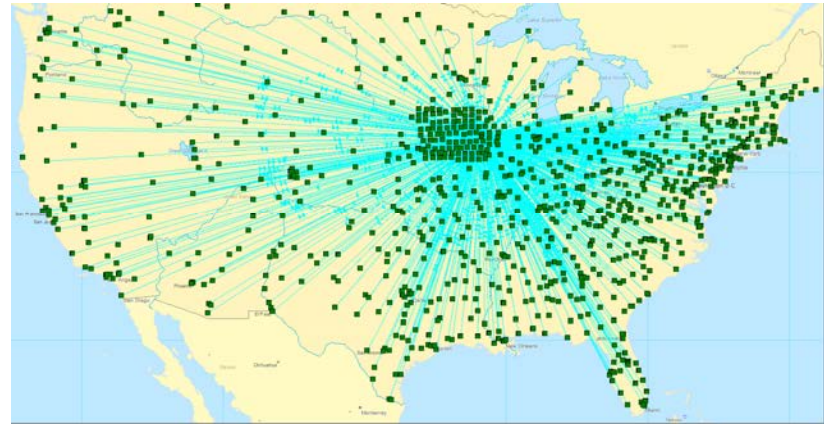
Cross-Dock Network Impact

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Current State



Future State



□ Benefits:

- Leverage freight consolidation to reduce transportation costs
- Reduce long distance truck traffic and improve environmental sustainability

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Recommendation - Intermodal Facility

Total Opportunity Size

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The total market opportunity for high volume traffic lanes:

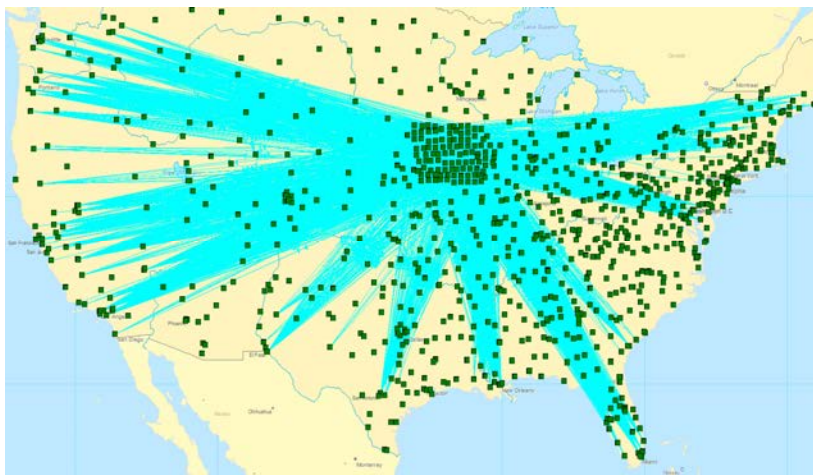
Item	Opportunity
Total Number of Outbound Container	377,000
Est. Number of Inbound Containers	139,000
Est. Container Shortage	238,000
Est. Annual Loaded Containers	516,000

Item	Opportunity
Annual Gross Transportation Saving	\$340 Million
Empty Container Reposition Cost	(\$143 Million)
Annual Net Savings	\$197 Million

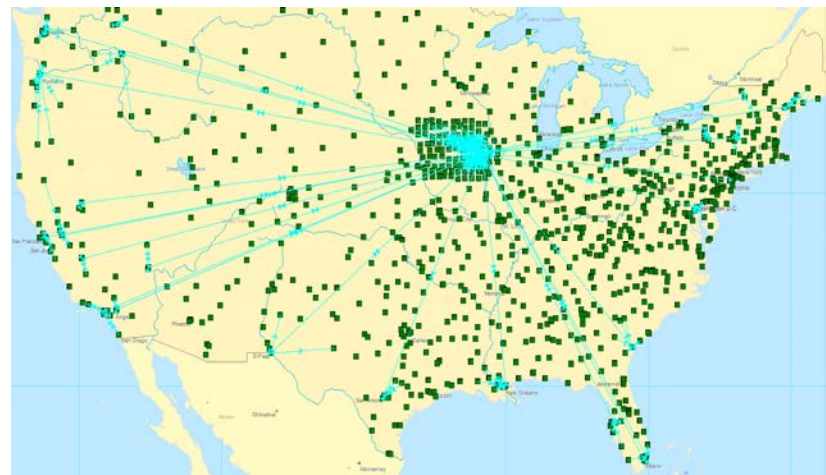
Case Study 2 – IM Facility Network Impact

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Current State



Future State



□ Benefits:

- Leverage rail network to reduce transportation costs
- Reduce truck traffic and improve environmental sustainability

Business Case – An IM Facility

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Volume Estimate

Total Number of Annual Lifts	68,488
Number of Outbound Containers	34,244
Number of Inbound Containers	11,527
Total Number of Loaded Containers	45,771
Total Number of Container Deficit	22,717

Cost Saving Estimate

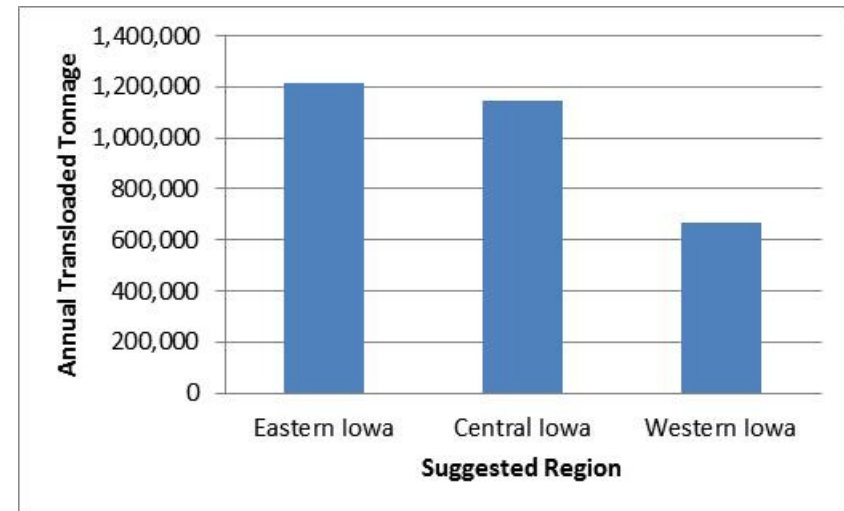
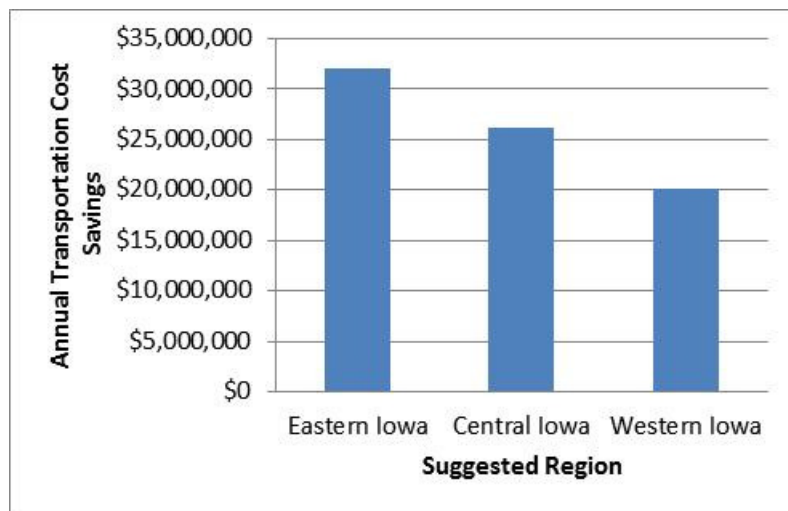
Annual Net Cost Saving Opportunities	\$15.5 Million
Estimated Transportation Cost Saving from Truck to IM Conversion	\$29.5 Million
Empty Container Reposition Costs	-\$14 Million

Recommendation - Transloading Facility

Opportunity Analysis

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- Transload facilities allow shippers to transfer freight between two modes and leverage lower cost shipment options
- In the statewide model, three locations are identified as candidates for transload facilities to provide largest cost saving opportunities



Business Case – A Transload Facility in Eastern Iowa

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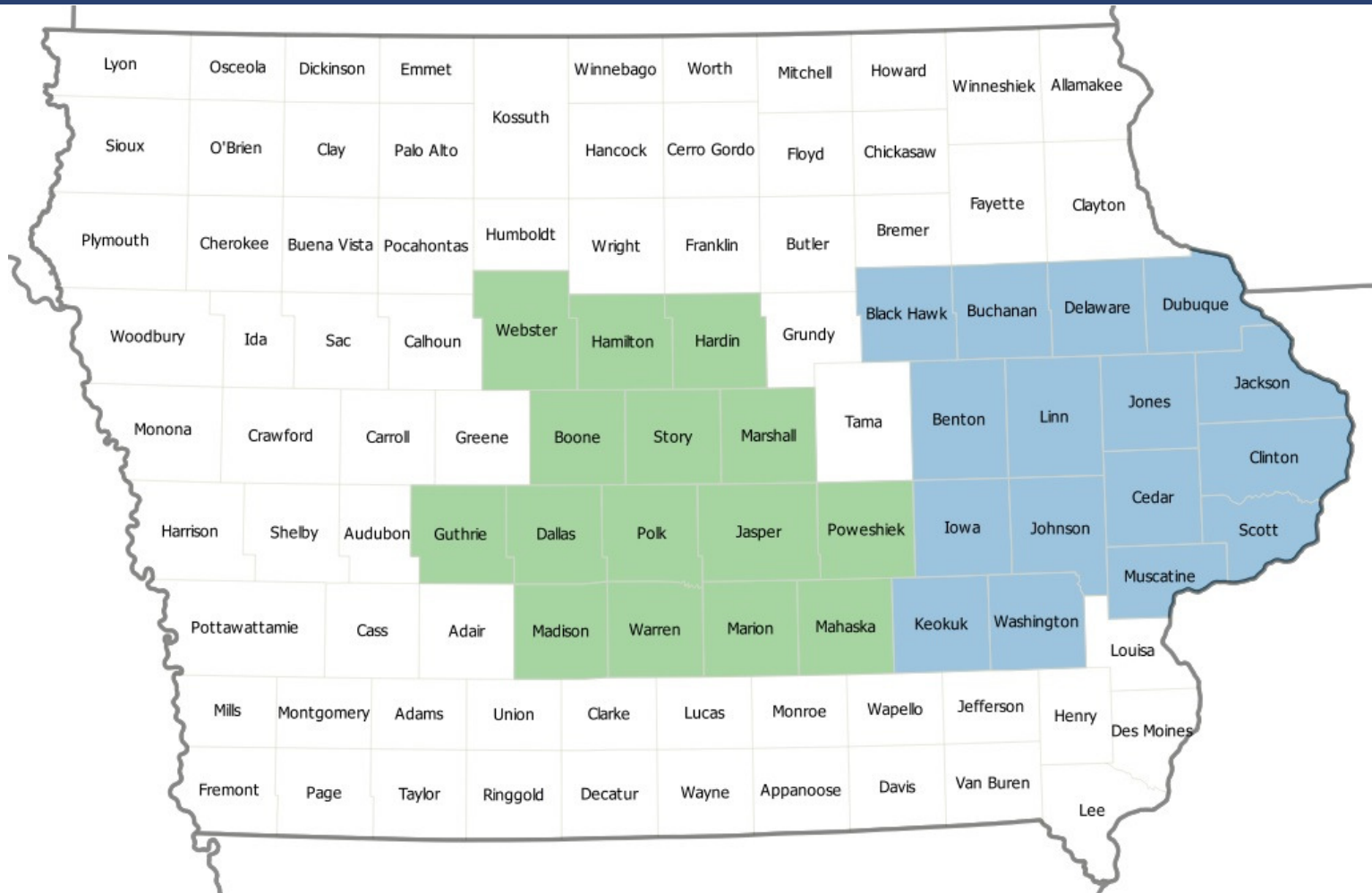
Scenario	% of Total Market Opportunity	Annual Railcar Number	Facility Size	Initial Investment	Annual Cost Savings
Conservative Case	7.78%	1,002	15 acres	\$5.5 million	\$2.5 million
Base Case	10%	1,837	15 acres	\$5.5 million	\$3.2 million

Note: \$8 per ton transloading fee is included in the cost estimate

Target Market Segment

Eastern Iowa vs. Central Iowa

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Recommendation – Logistics Park

A Logistics Park Business Case

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Facility	Base Case Est. Annual Savings	Conservative Case Est. Annual Savings	Base Case Est. Annual Loads	Conservative Case Est. Annual Loads
Cross-Dock	\$34.2 Million	\$22.4 Million	52,000	52,000
Intermodal	\$15.5 Million	\$12.8 Million	68,500	58,800
Transload	\$3.2 Million	\$2.5 Million	6,900	3,300
Combined Logistics Park	\$52.9 Million	\$37.7 Million	127,400	114,100

Additional Benefits

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Items	Annual Savings/Reduction
Crash Cost Savings in 2021	\$31.3 Million
Carbon Reduction Savings in 2021 (3% Discount Rate)	\$81.6 Million
Reduction of Long-Haul Truck Freight in 2021	170,000 Trucks
Truck Mile Reduction in 2021	150 Million Miles

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Next Steps

Next Steps

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- Data refresh
 - ▣ 2014 domestic commodity flow database from Federal Highway Administration
 - ▣ 2014 import/export data from US. Customs and Border Protection
 - ▣ Aggregated private datasets
- Expands the study's geographic scope
 - ▣ Includes counties within 100 mile radius of Iowa border in 7 adjacent states
- Reruns the iFROM
- Develops data visualization capabilities for freight data analytics

Richard Langer,
Managing Director
Quetica, LLC

www.quetica.com

651-964-4646 ext. 800

richard.langer@quetica.com

Weiwen Xie,
Executive Director
Quetica, LLC

www.quetica.com

651-964-4646 ext. 803

weiwen.xie@quetica.com