



# Port Market Demand and Transportation Impact Study: Overview and Findings

Presentation to the Illinois Freight Advisory Council

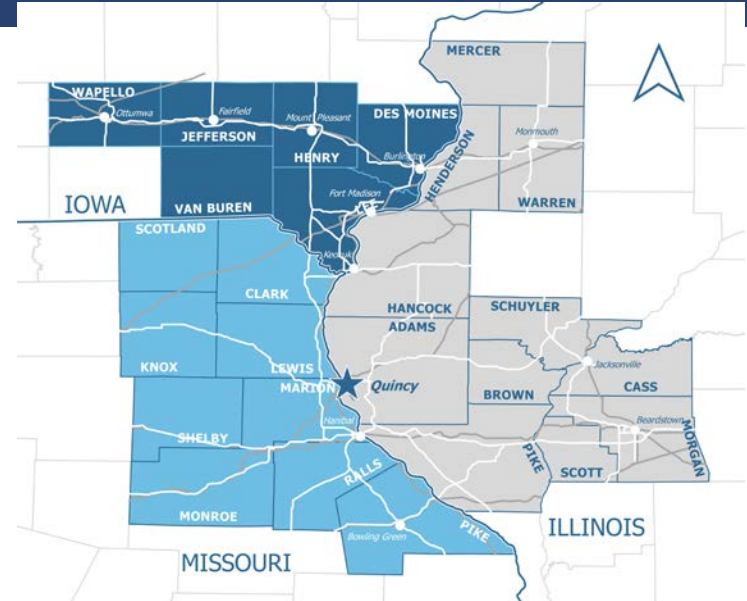
July 26, 2018

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# Mid-America Intermodal Port Authority

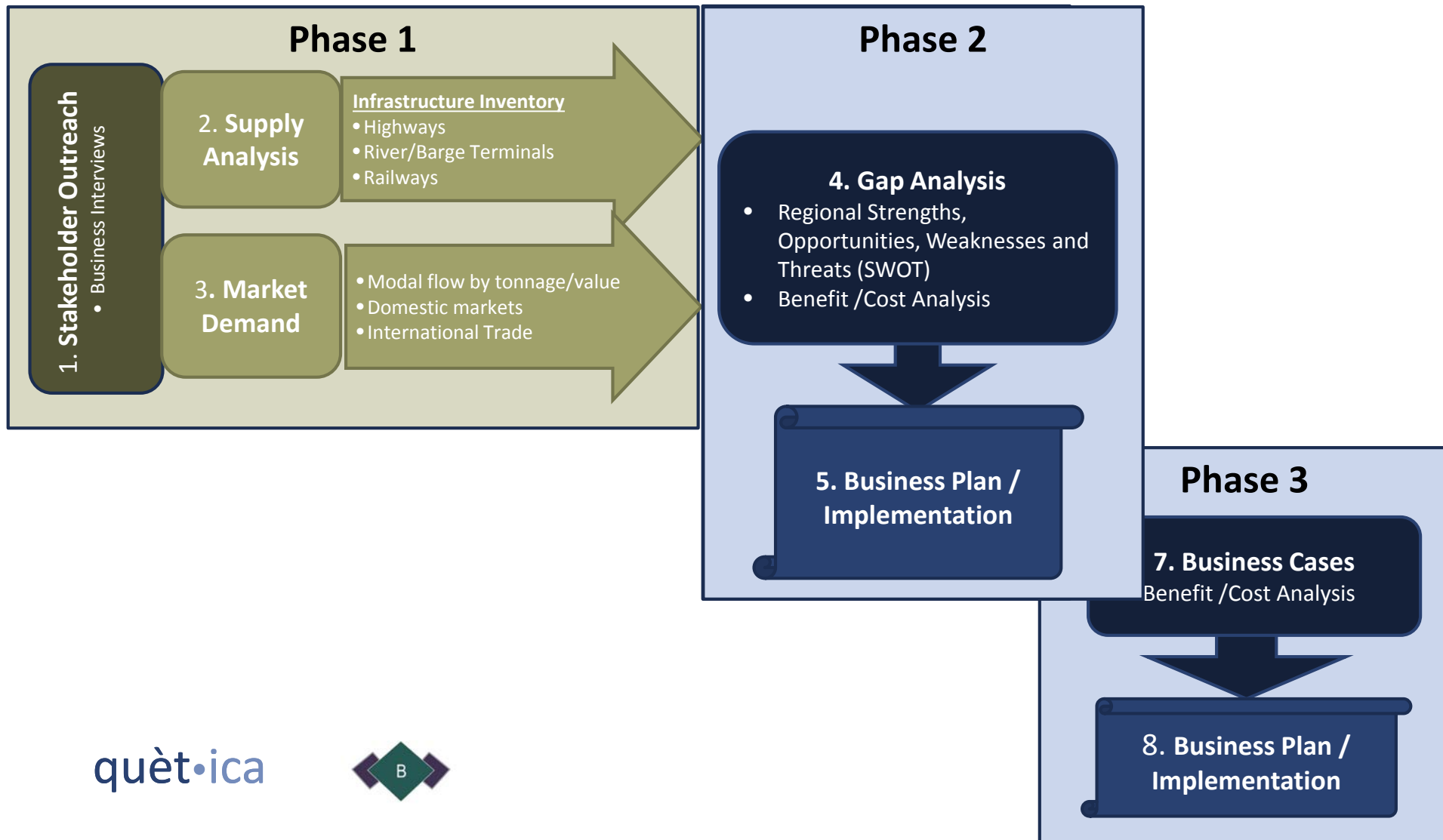
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- A three state compact
  - ▣ Illinois
  - ▣ Iowa
  - ▣ Missouri
- 26 counties
- Catalyst for economic growth
- Unsuccessful in federal grant applications to develop a new river port



# Port Market Demand Scope Overview

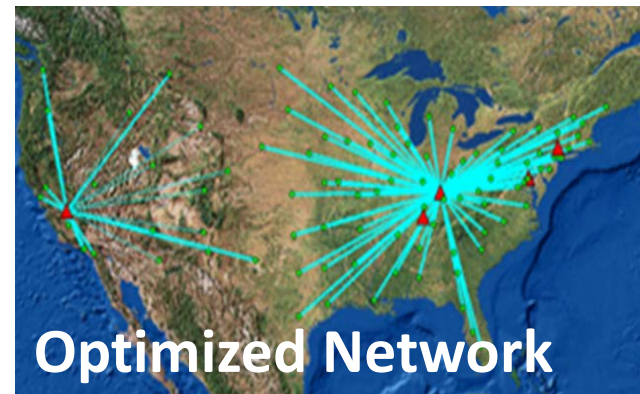
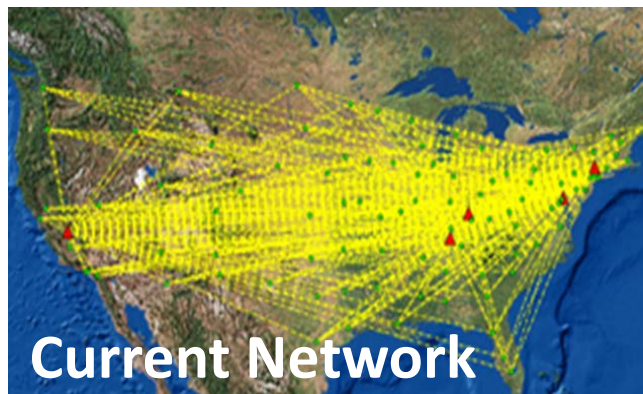
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# What is Optimization Modeling?

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- A math approach for finding the “best” solution
- A common practice in private sector transportation
  - ▣ Shippers use optimization to lower supply chain costs
  - ▣ Carrier’s apply optimization to routing issues
  - ▣ Terminals use optimization to improve operations



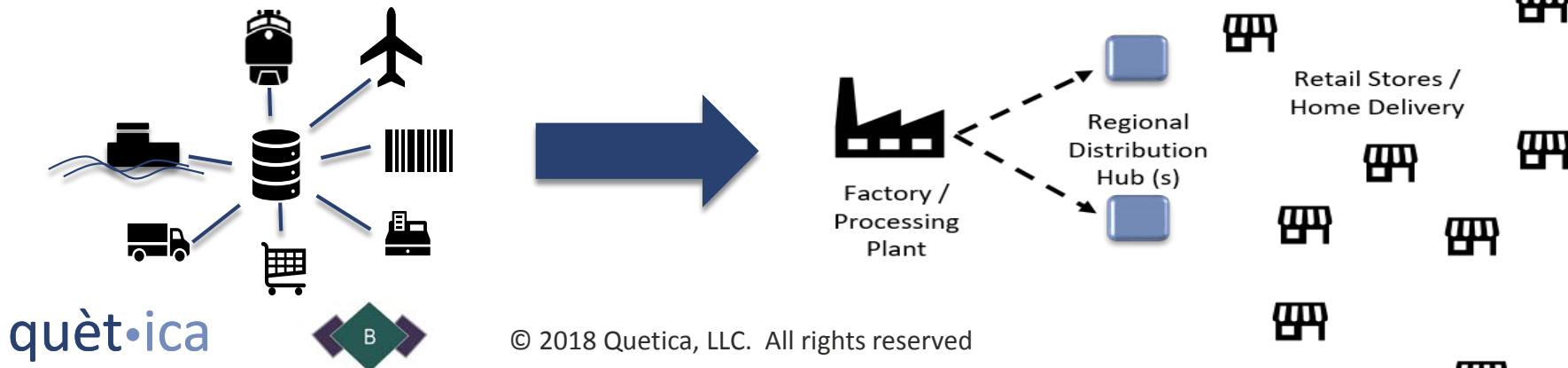




# Private Sector Optimization

□ Private firms rely on “in-house” data to run optimization analyses to reduce costs and improve customer service:

- ▣ Transportation Management System data (TMS)
  - ▣ Customer volumes by SKU (Demand)
  - ▣ Warehouse/inventory / transloading costs, etc.
  - ▣ Product/ customer metrics
- ▣ Modes and lanes used (Network)

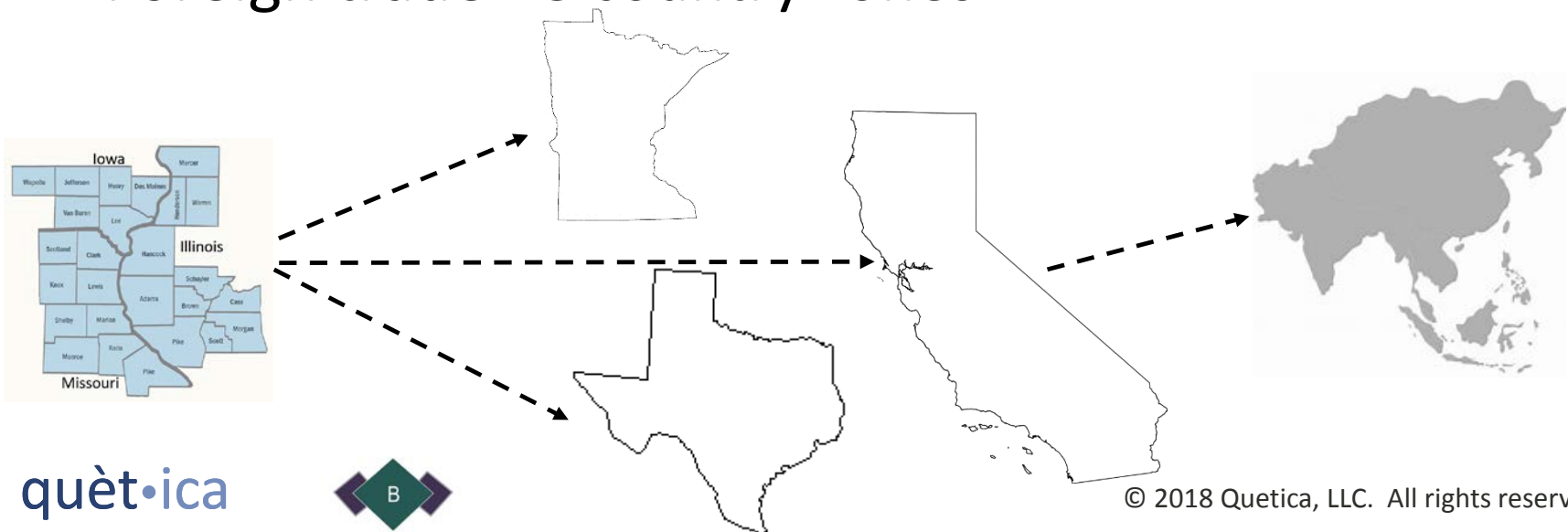


# Public Sector Freight Planning



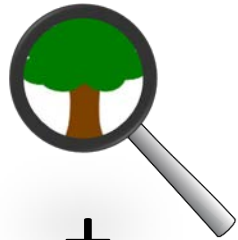
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- FAF Zone or state to state domestic flows
  - ▣ 2-digit STCG or STCC
  - ▣ Tonnage and value
  - ▣ 6 primary domestic mode/mode combinations
- Foreign trade - 8 country zones



# Integrated Supply Chain/Freight Planning

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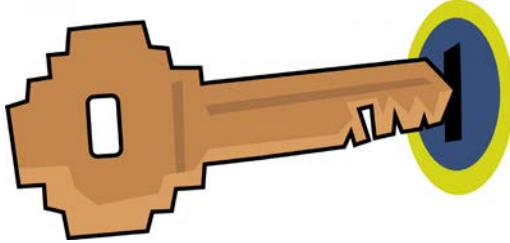
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- Private companies look at only **their** data and only see solutions affecting **their** supply chain
- Public agencies look at macro data for trade relationships/mode share/etc., which is difficult to translate to project level decisions



- ***Integrating commodity flow data with private shipment data enables optimization to identify opportunities across industries, across modes, and across public/private sectors***



# Integrating Public & Private Data

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## Freight Analysis Framework (FAF-4)

Reports commodity origin/destination (O/Ds) by tonnage and value for 132 domestic regions on 43 commodities & 7 modal categories.



**Foreign Trade** detailed import/export data provides better accuracy on true origin and destination of international shipments

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Quetica provides unparalleled knowledge of freight data; using both public and private sources

## Customized Freight Data Solutions

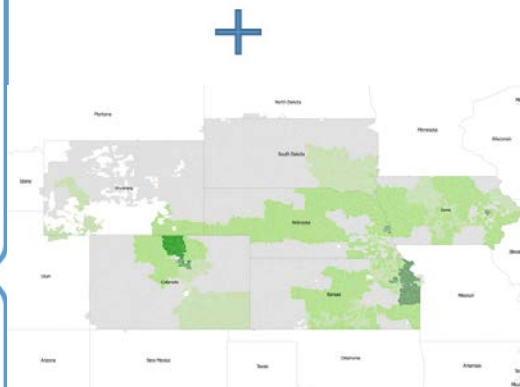
County / TAZ  
Commodity Flows

Equipment type from  
regional data sample

Meaningful  
performance metrics

## Quetica's Shipment Data

**Warehouse:** De-sensitized private shipment data and supply chain benchmarks.



## Regional Business Data and Analytics

Using our history and experience Quetica works with private sector companies to assemble freight document samples from the region under NDA.

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# Mid-America Optimization



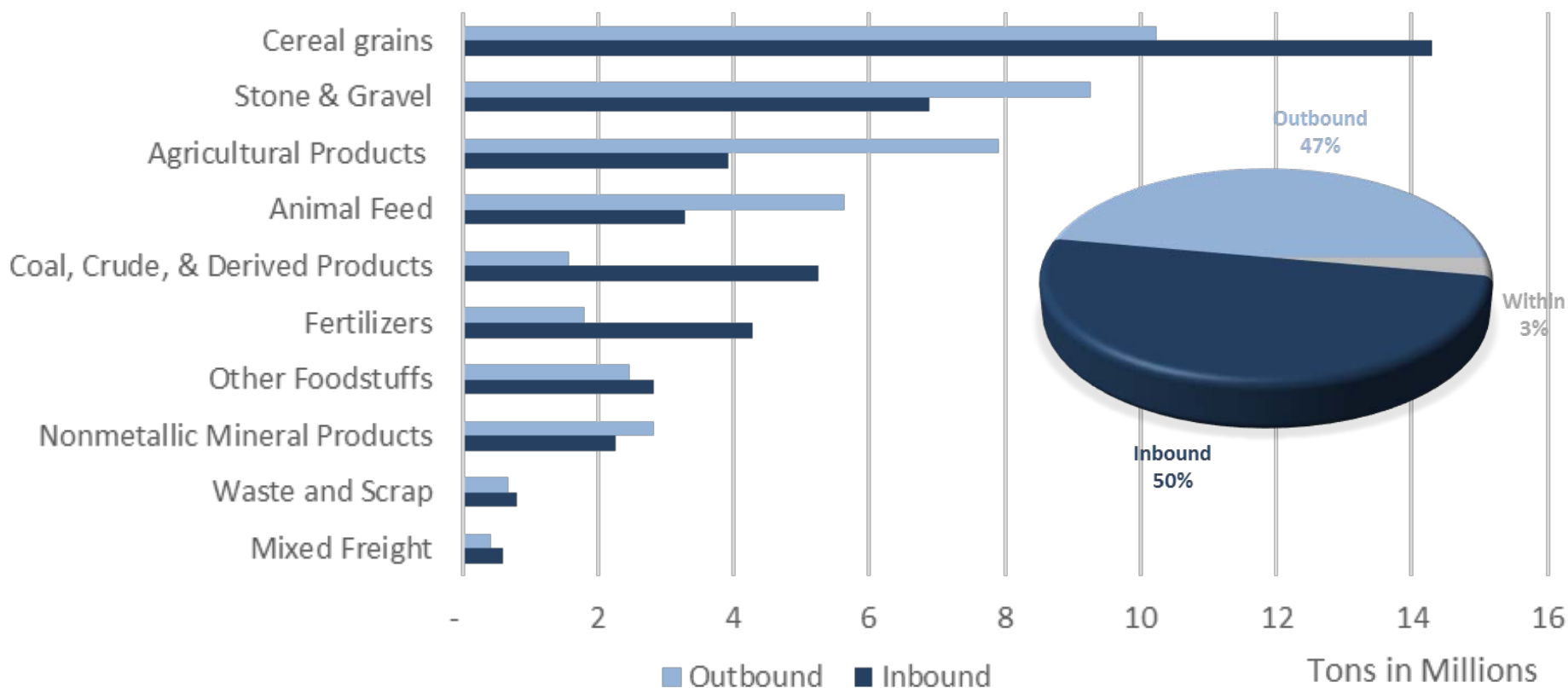
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- County to county domestic flows
  - ▣ 2-digit STCG or STCC, with focus on key commodities
  - ▣ Tonnage and value by mode
- Foreign trade (41 country/country groups)
- Private sector BOL data
  - ▣ Equipment type
  - ▣ Modal selections
  - ▣ Cost benchmarks



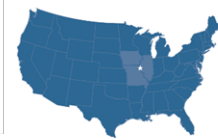
# Mid-America Regional Freight Flows - Baseline

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**Total- 97 Million tons**

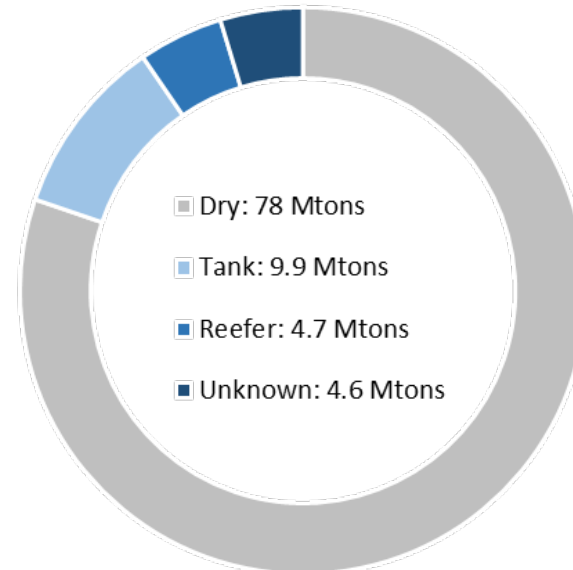
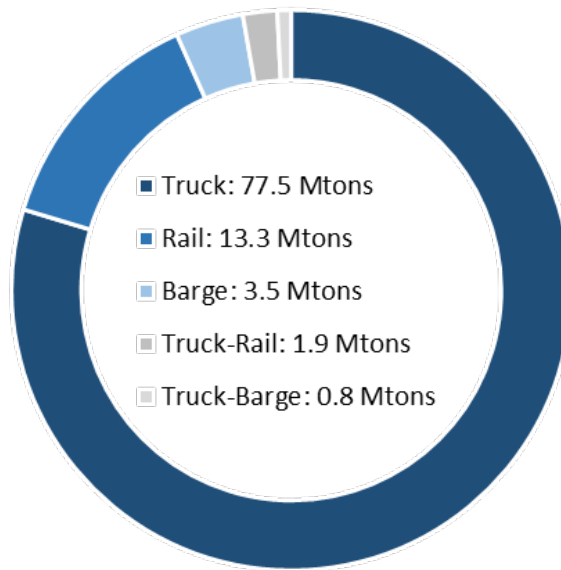
# Mid-America Region Freight Flows - Baseline



MID-AMERICA INTERMODAL PORT

*Your alternative port of entry*

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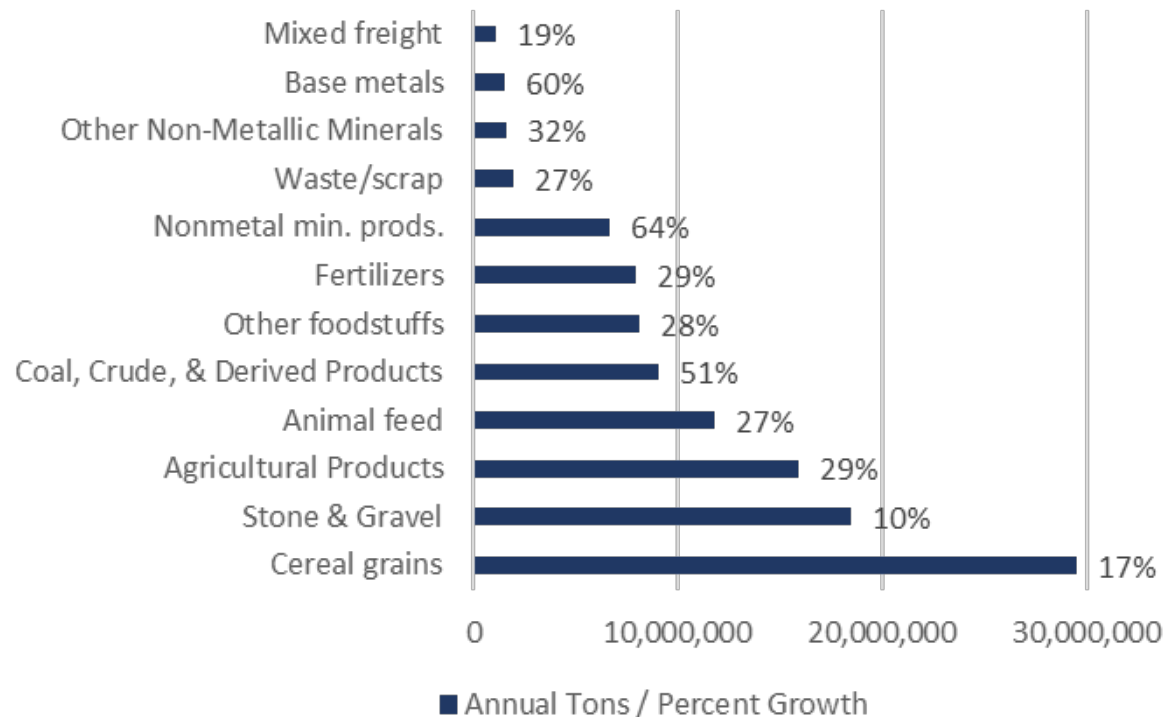


**80% of the MAIPA Region's freight moves by truck;**  
**66% of the nation's total freight is moved by truck.**

# Mid-America Freight Flows: 2025

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*The highest growth commodities for the MAIPA Region are well suited to barge and rail transport*



# Mid-America Freight Flows: 2025

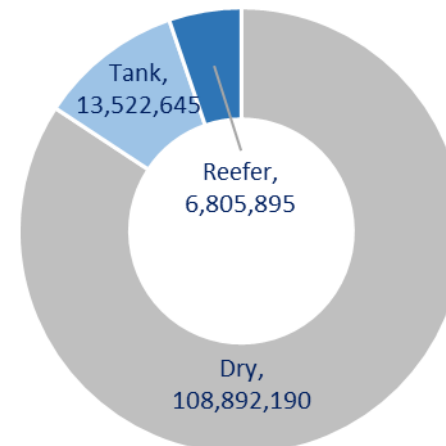
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## □ 2025 Forecast

Mode	Annual Tons	Share	Change	Percent	CAGR
Truck	97,200,309	75%	19,731,909	25%	2.08%
Rail	21,142,452	16%	7,880,539	59%	4.33%
Barge	5,654,692	4%	1,831,850	48%	3.62%
Truck-Rail	3,416,136	3%	1,486,465	77%	5.33%
Truck-Barge	1,807,141	1%	1,032,798	133%	8.01%
<b>Total</b>	<b>129,220,729</b>		<b>31,963,561</b>	<b>33%</b>	<b>2.62%</b>

## ▣ EQUIPMENT TYPES

- Dry ↑ 40% vs. baseline
- Tank ↑ 36% vs. baseline
- Reefer ↑ 44% vs. baseline





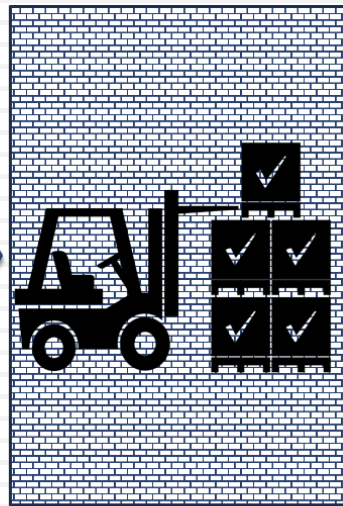
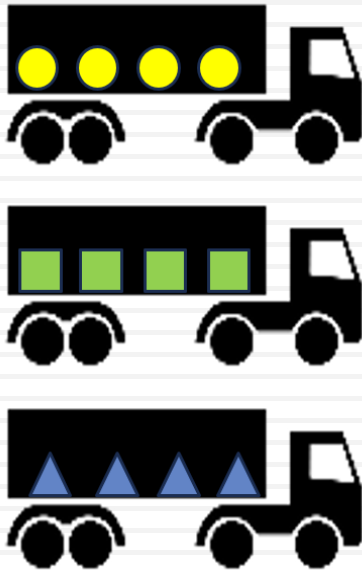
# “What-If” Scenario Analysis

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- Objective: Optimize networks to reduce transportation costs
  - ▣ Baseline analysis examines opportunities w/o network changes
  - ▣ What-if scenarios test network changes/investments
- “What-If” scenario analysis includes
  - ▣ Identify locations
  - ▣ Size the market
  - ▣ Cost savings for lane and total network improvements
  - ▣ Cost/Benefit and ROI analysis
- The MAIPA study scope included three scenario runs

# Freight Consolidation / Cross-dock Scenario

Inbound partial truckload



Cross-dock/Warehouse to  
unload, sort, and reload

Outbound full truckload



# Freight Consolidation

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- Price differences between full and partial loads can be substantial
  - ▣ LTL rates can be up to 4X truckload rates
- Partial container rates up to 3X full container rates
- Consolidation centers can reduce costs, improve equipment utilization and create additional capacity

# Freight Consolidation Scenario

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- Commodities
- Assumptions
  - Outbound Dry Van  
Freight Volumes  
> 500 miles
  - Freight Consolidation/  
Cross-dock Fee: \$350
  - Stop-off Fees: \$100/stop

Freight Consolidation	
<i>SCTG</i>	<i>Product Description</i>
03	Other ag prods.
04	Animal feed
05	Meat/seafood
06	Milled grain prods.
07	Other foodstuffs
24	Plastics/rubber
26	Wood prods.
28	Paper articles
29	Printed prods.
30	Textiles/leather
31	Nonmetal min. prods.
33	Articles-base metal
35	Electronics
38	Precision instruments
39	Furniture
40	Misc. mfg. prods.
41	Waste/scrap
43	Mixed freight

# Freight Consolidation Baseline

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## □ Top Commodities

Product	Annual Tonnage	Baseline Costs	Optimized Savings	Avg. Length of Haul	Percent
Animal feed	137,591	\$26,393,856	\$5,522,478	1,030	21%
Other ag prods.	74,990	\$18,663,867	\$4,356,195	1,337	23%
Other foodstuffs	23,720	\$6,480,464	\$2,329,855	1,108	36%
Mixed freight	16,262	\$3,920,288	\$1,034,776	1,143	26%
All Others	69,915	\$15,186,994	\$3,195,842	1,115	20%
<b>TOTAL</b>	<b>322,477</b>	<b>\$70,645,469</b>	<b>\$16,439,145</b>	<b>1,124</b>	<b>23%</b>

## □ Top Trade Lanes *(by savings)*

Destination	Annual Tonnage	Baseline Costs	Optimized Savings	Avg. Length of Haul	Percent
Washington	35,831	\$12,021,193	\$3,616,037	2,017	30%
Virginia	31,551	\$7,026,456	\$2,018,185	1,010	29%
Georgia	16,685	\$4,052,943	\$1,624,960	934	40%
Louisiana	59,553	\$9,430,963	\$1,395,766	836	15%
All Others	178,858	\$38,113,914	\$7,784,198	1,005	21%
<b>TOTAL</b>	<b>322,478</b>	<b>\$70,645,469</b>	<b>\$16,439,146</b>	<b>1,026</b>	<b>21%</b>



# Freight Consolidation Forecasted

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## □ Top Commodities

Product	Annual Tonnage	Growth	Baseline Costs	Optimized Savings	Percent	Avg. Length of Haul
Animal feed	180,837	31%	\$34,525,977	\$7,113,301	21%	1,066
Other ag prods.	101,651	36%	\$25,587,699	\$6,065,048	24%	1,336
Other foodstuffs	33,385	41%	\$9,267,179	\$3,398,883	37%	1,123
Mixed freight	17,573	8%	\$4,246,803	\$1,124,702	26%	1,143
All Others	87,316	25%	\$18,715,744	\$3,912,418	21%	1,122
<b>TOTAL</b>	<b>420,762</b>	<b>30%</b>	<b>\$92,343,402</b>	<b>\$21,614,352</b>	<b>23%</b>	<b>1,132</b>

## □ Top Trade Lanes *(by savings)*

Destination	Annual Tonnage	Growth	Baseline Costs	Optimized Savings	Percent	Avg. Length of Haul
Washington	52,920	48%	\$17,793,900	\$5,355,449	30%	2,016
Virginia	44,510	41%	\$9,916,798	\$2,855,361	29%	1,011
Georgia	23,289	40%	\$5,656,320	\$2,269,058	40%	928
Lousiana	83,074	39%	\$13,144,950	\$1,939,057	15%	835
All Others	216,970	21%	\$45,831,434	\$9,195,427	20%	1,443
<b>TOTAL</b>	<b>420,762</b>	<b>30%</b>	<b>\$92,343,402</b>	<b>\$21,614,352</b>	<b>23%</b>	<b>1,026</b>

# Transload Optimization Scenarios

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## □ Transload Scenarios

1. Rail Transload (Rail Unit Train)
2. Truck/Rail to Barge

### ■ Two Iterations

- Single Dray, Single Transload
- Double Dray, Double Transload

### ■ Two Equipment Types

- Dry
- Tanker

# Unit Train/Rail Transload Results



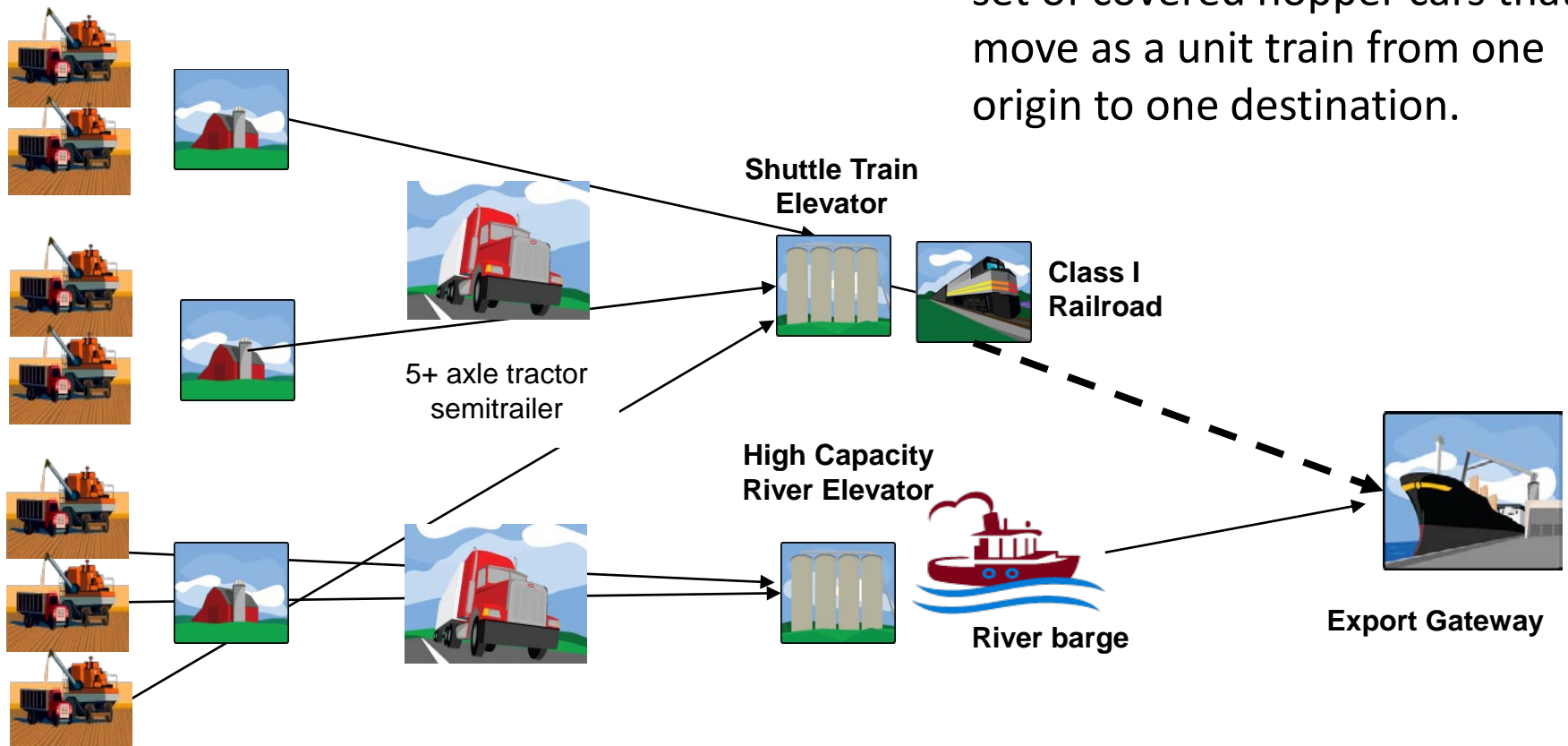
## Dedicated Train Service

- Excellent for large quantities of single-bulk commodities such as coal, grain, minerals, liquids, special project cargo and oversized commodities (i.e., wind blades)
- Non-stop service between a single origin and destination
- Enhances value of facility and equipment investments

BNSF Website <https://www.bnsf.com/customers/how-can-i-ship/dedicated-train-service/>

# Contemporary Export Grain Supply Chain

A grain shuttle is a dedicated set of covered hopper cars that move as a unit train from one origin to one destination.

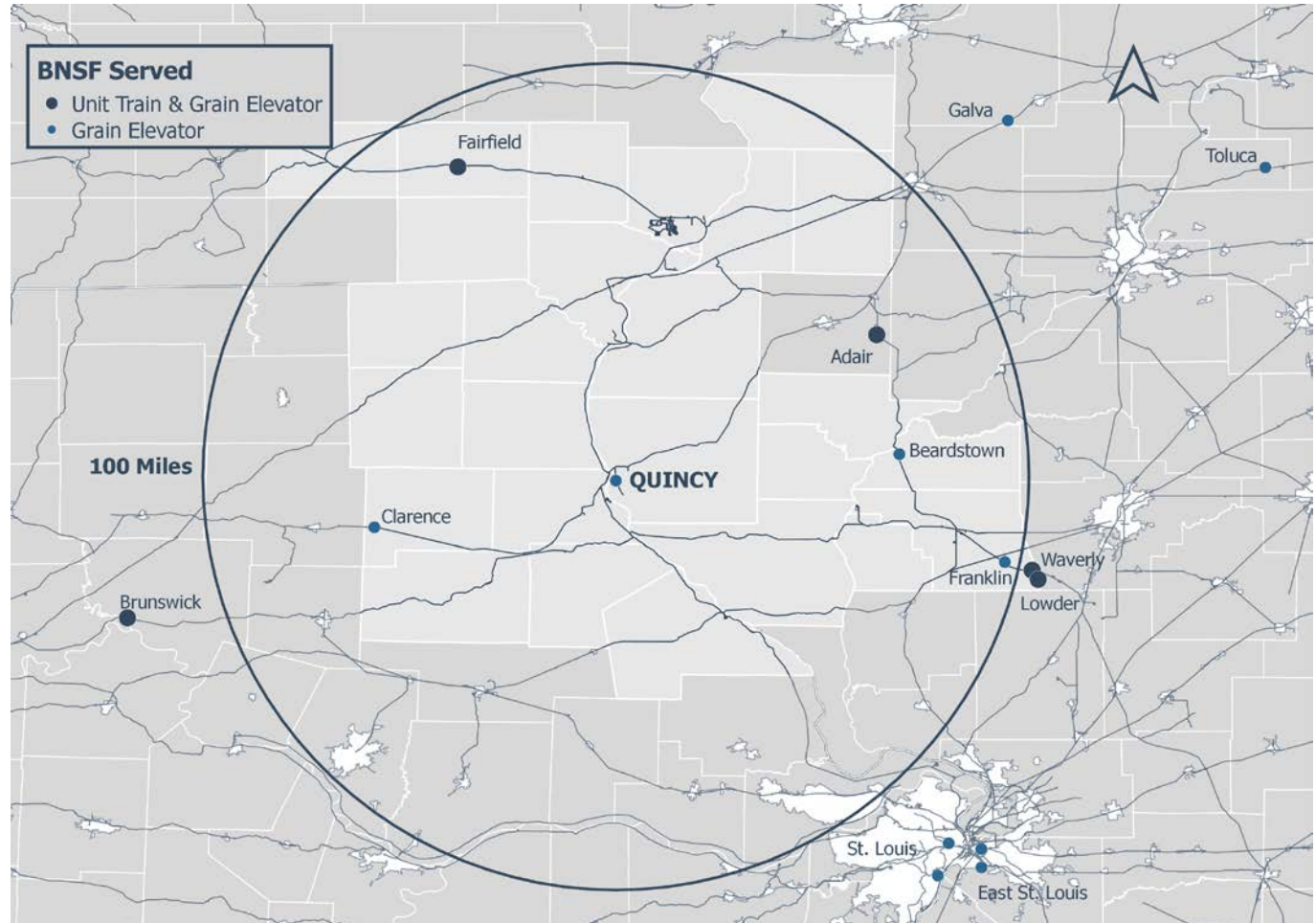


# Unit Grain Train Facilities in MAIPA Area

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*The data suggests only a few unit train grain facilities located on the edges of the MAIPA Region:*

- Fairfield, IA
- Waverly, IL (2)

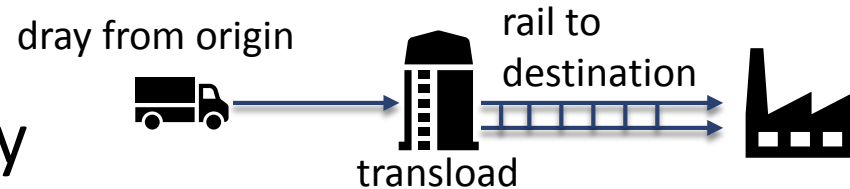




# Rail Transloading Shipping Cost Savings

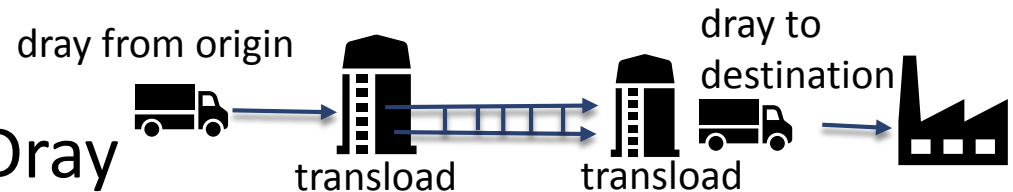
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## □ Transload/Single Dray



	Annual Tonnage		Baseline Costs		Optimized Savings		Percent	
	2014	2025	2014	2025	2014	2025	2014	2025
Dry	677,185	819,740	\$53,155,360	\$66,988,347	\$20,136,117	\$26,593,178	38%	40%
Tanker	127,174	172,697	\$19,952,532	\$25,826,050	\$11,155,583	\$13,861,316	56%	54%
<b>TOTAL</b>	<b>806,373</b>	<b>994,462</b>	<b>\$73,109,906</b>	<b>\$92,816,422</b>	<b>\$31,293,714</b>	<b>\$40,456,519</b>	<b>43%</b>	<b>44%</b>

## □ Transload/Double Dray



	Annual Tonnage		Baseline Costs		Optimized Savings		Percent	
	2014	2025	2014	2025	2014	2025	2014	2025
Dry	605,147	745,669	\$48,941,577	\$62,691,634	\$11,602,045	\$16,237,177	24%	26%
Tanker	127,174	172,697	\$19,952,532	\$25,826,050	\$9,502,320	\$11,616,250	48%	45%
<b>TOTAL</b>	<b>734,335</b>	<b>920,391</b>	<b>\$68,896,123</b>	<b>\$88,519,709</b>	<b>\$21,106,379</b>	<b>\$27,855,452</b>	<b>31%</b>	<b>31%</b>

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## Barge Transload Results



# Barge Transloading Summary

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## □ Single Dray and Transload

	Annual Tonnage		Baseline Costs		Optimized Savings		Percent	
	2014	2025	2014	2025	2014	2025	2014	2025
Dry	2,139,018	2,436,392	\$83,959,472	\$96,881,527	\$18,396,734	\$21,959,010	22%	23%
Tanker	209,769	289,635	\$21,503,223	\$28,760,700	\$13,417,906	\$17,781,196	62%	62%
<b>TOTAL</b>	<b>2,348,787</b>	<b>2,726,027</b>	<b>\$105,462,695</b>	<b>\$125,642,227</b>	<b>\$31,814,640</b>	<b>\$39,740,206</b>	<b>30%</b>	<b>32%</b>

## □ Double Dray and Transload

	Annual Tonnage		Baseline Costs		Optimized Savings		Percent	
	2014	2025	2014	2025	2014	2025	2014	2025
Dry	166,765	201,726	\$10,268,473	\$13,361,711	\$2,628,986	\$3,892,349	26%	29%
Tanker	193,119	265,293	\$20,647,110	\$27,514,046	\$10,823,605	\$14,201,871	52%	52%
<b>TOTAL</b>	<b>359,884</b>	<b>467,019</b>	<b>\$30,915,583</b>	<b>\$40,875,757</b>	<b>\$13,452,591</b>	<b>\$18,094,220</b>	<b>44%</b>	<b>44%</b>

# City Dock Project: Conversion of Truck to Barge- Project Costs

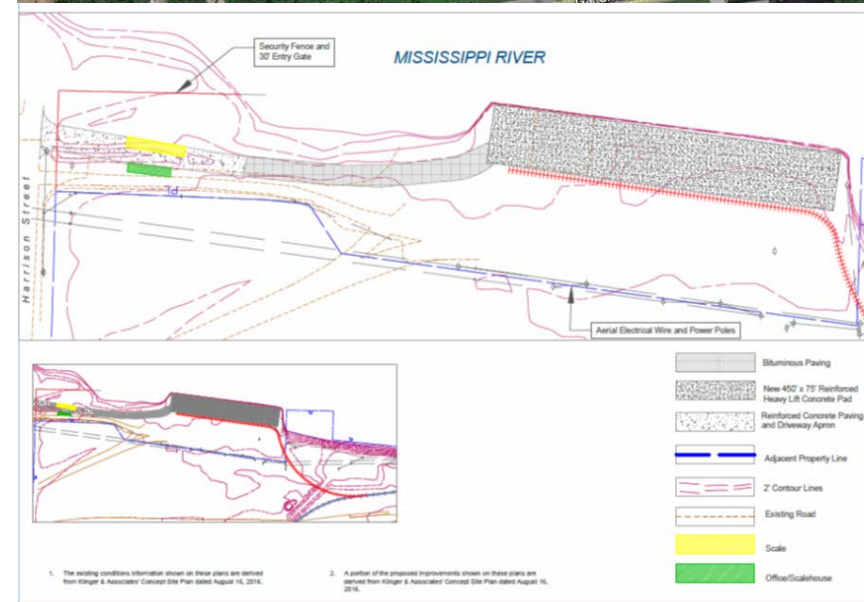


MID-AMERICA INTERMODAL PORT

*Your alternative port of entry*

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Property Corp of Eng ( 3.05 ac) + 100' ROW for Rail 500'( 1.15 Ac)	\$	100,800
Equipment	\$	750,000
Roads/ Parking	\$	736,500
Utilities	\$	1,240,000
Track	\$	746,500
Yard	\$	1,927,000
Floodplan Mitigation	\$	1,500,000
Construction	\$	6,150,000
Sales Tax		
Engineering/Proj Mgmt	\$	938,000
Contingencies	\$	1,035,000
Total Improvement including Equip	\$	8,873,000
<b>Total Project with Property</b>	<b>\$</b>	<b>8,973,800</b>



# City Dock Project: BCA Assumptions

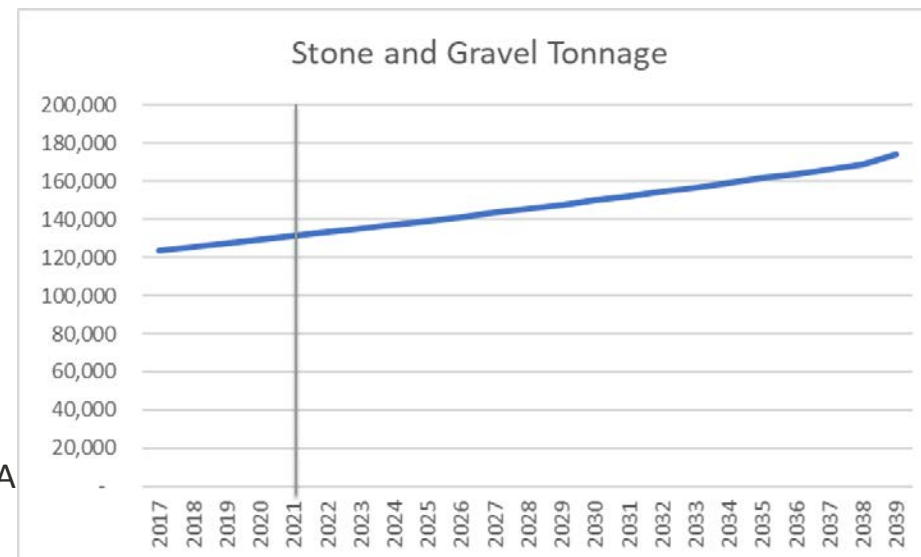


MID-AMERICA INTERMODAL PORT

*Your alternative port of entry*

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- Funding and Construction: 2019-2020
  - Transload operation begin: 2021
- Assumes city dock transload will capture 20% of local *Gravel and Stone* market .
  - *Stone and Gravel* tonnage grows at 1.5% per year.
  - 2021 - 1.5 barges/week
  - 2039 - 2 barges/wk





# City Dock Project: Conversion of Truck to Barge- Undiscounted Benefits Summary

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Stone and Gravel (20% Market) Savings Category		20 Year Cumulative Benefits	Annualized Benefits in 2021
	Freight savings to shippers	\$17.1 million	\$0.8 million
	Road Maint and Preservation savings	\$6.6 million	\$0.3 million
	Crash reduction / Safety benefits	\$6.2 million	\$0.3 million
	Truck Miles Reduction	55 million VMT	2.5 million VMT
	Emission reduction benefits	66,000 MT	3,000 MT
	Energy Savings	7.4 million gallons of fuel	0.3 million gallons of fuel

## Questions / Contact

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