



I-70 Dedicated Truck Lanes Feasibility Study

Phase 1: The Business Case

2010 TRB Joint Summer Meeting
Minneapolis, MN
July 13, 2010



Today's presentation - Phase 1

- Background and approach
- Findings – Performance Measure Analysis
 - Public and private sector opinions
 - Conditions - congestion and safety
 - Conditions - freight and commodity analysis
 - Travel demand modeling & toll analysis
 - Cost
 - Financial capacity
- Next steps
- Discussion





Corridors of the Future Program (CFP)

- CFP an initiative under USDOT's “National Strategy to Reduce Congestion”
 - Explore innovative financing
 - Improve flow of goods
 - Enhance quality of life
- I-70 one of 6 corridors selected and funded
- \$5 million discretionary grant from FHWA
 - \$2 million to Missouri DOT - SEIS
 - \$3 million for I-70 Corridor Feasibility Study



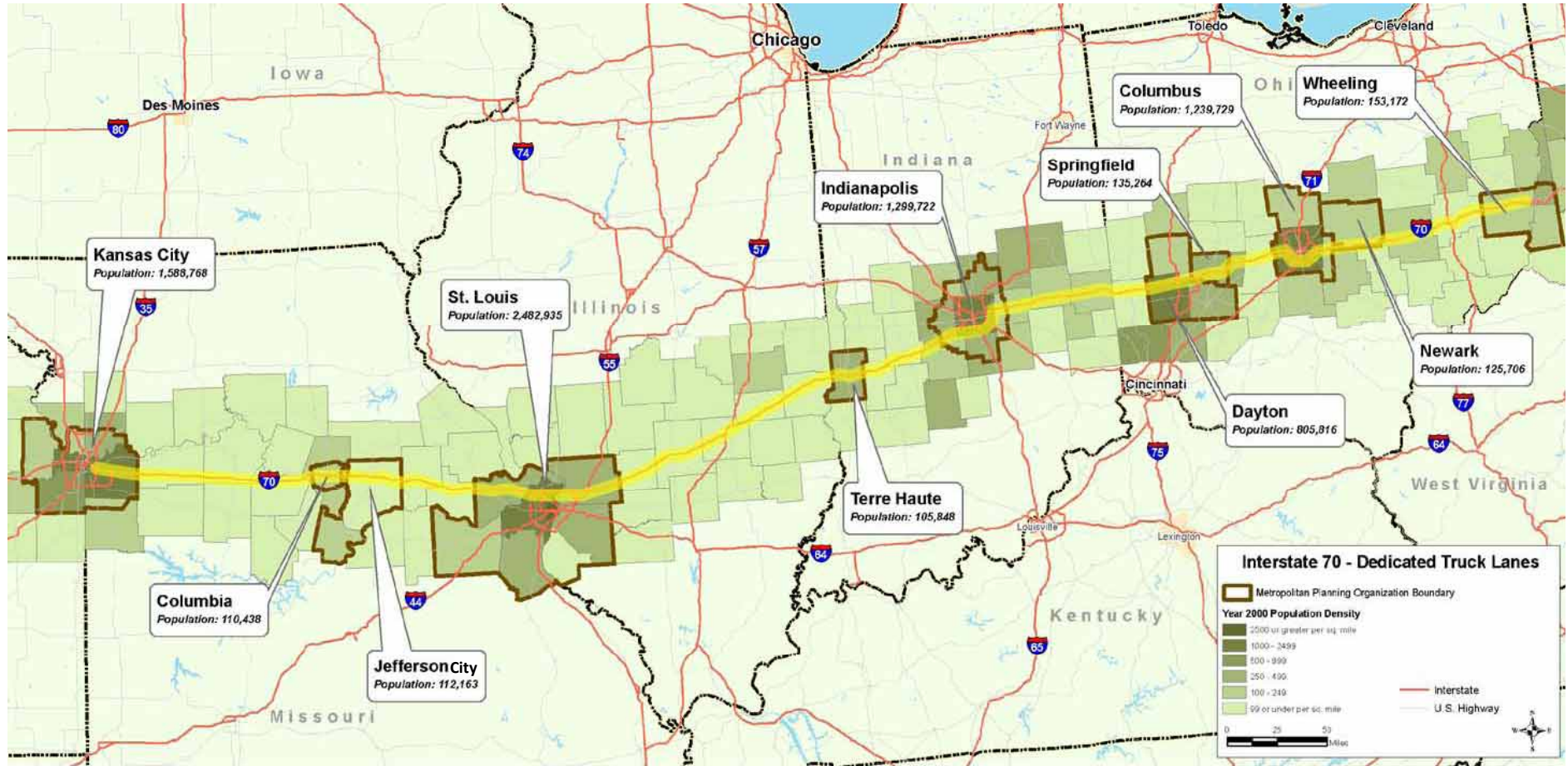


Overview

- I-70 Approx. 800 miles through MO, IL, IN, OH
 - Nearly 660 miles of rural interstate
 - 140 miles through urban areas
- I-70 Coalition Partners
 - MoDOT, IDOT, INDOT, ODOT and FHWA
 - INDOT serves as lead
- 2 - Phased Feasibility Study
 - Assessing feasibility of Dedicated Truck Lanes
 - Long-haul focus
 - Reduce congestion
 - Improve safety for trucks and passenger vehicles
 - Enhance regional economic growth
- Phase 1 = Business Case



I-70 Study Area





Consultant Team: over 100 staff worked on the project





Analysis and Findings:

- What is a business case analysis?
- What is the need and demand on the Corridor?
- Is a “truck solution” warranted?
- What scenarios make business sense?
- How should the scenarios be evaluated?
- What can be done to enhance the success of DTLs?
- How much will they cost?
 - How much revenue can they generate?
- Is there the financial capacity for DTLs?
- **Is there a business case for DTLs ?**



Analysis and Findings:

A Business Case analysis

Cost to Design, Construct, Operate and Maintain

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Return on Investment + Cost Avoidance



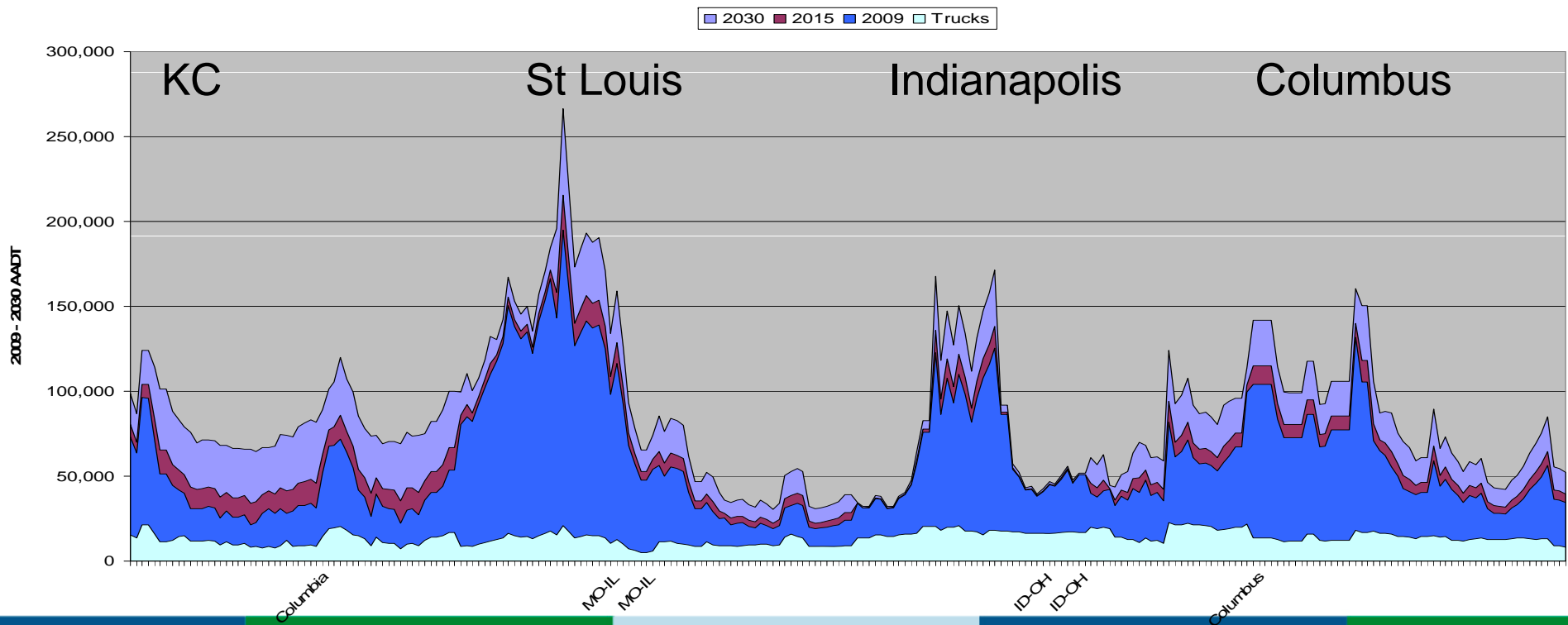
Business case:

- States a problem
- Identifies a solution
- Quantifies costs to implement the solution
- Estimates the
 - Return on investment (ROI)
 - Cost avoidance (CA)
 - Reduced current or future cost
- Determines the financial capacity of the solution



I-70 Corridor Traffic Volumes

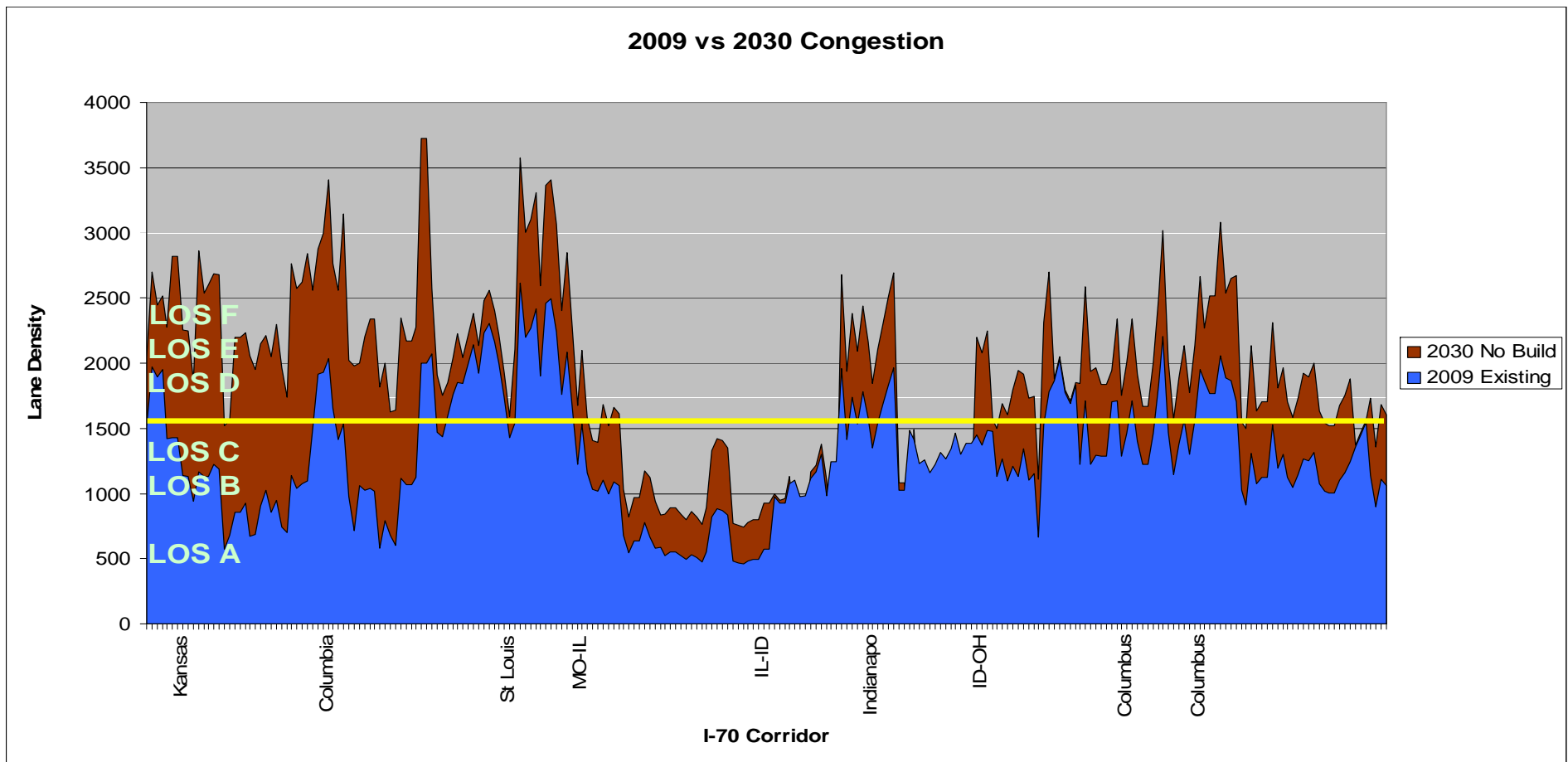
- 2009 AADT from 20k to 200k
- 2030 AADT from 30k to 266k
- Percent Trucks 6.5% to 51%





I-70 Corridor Traffic Congestion

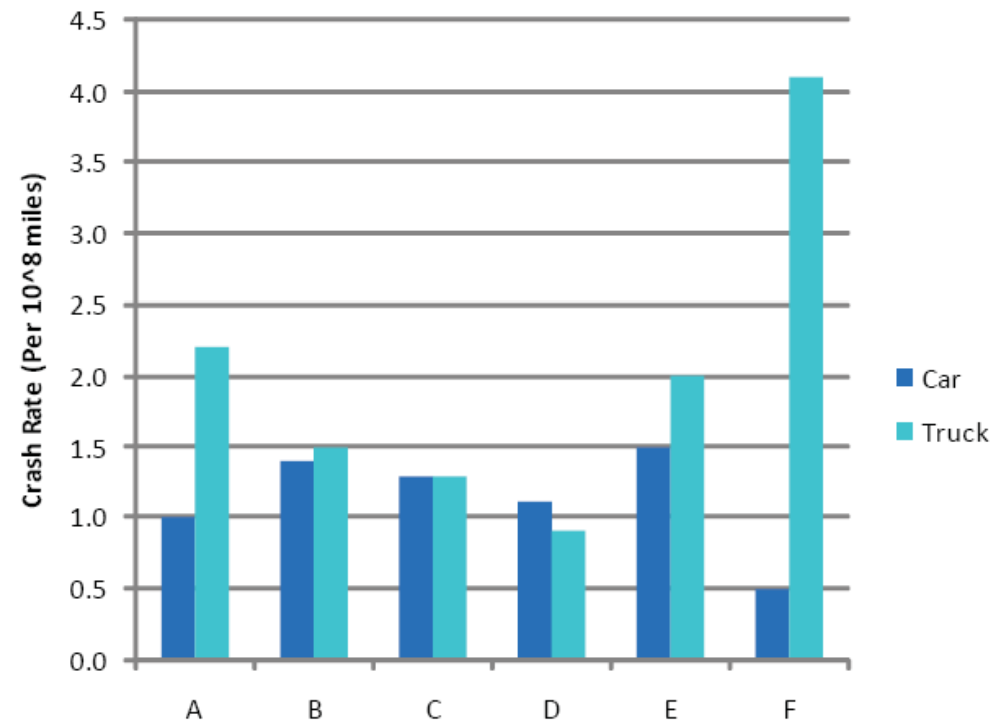
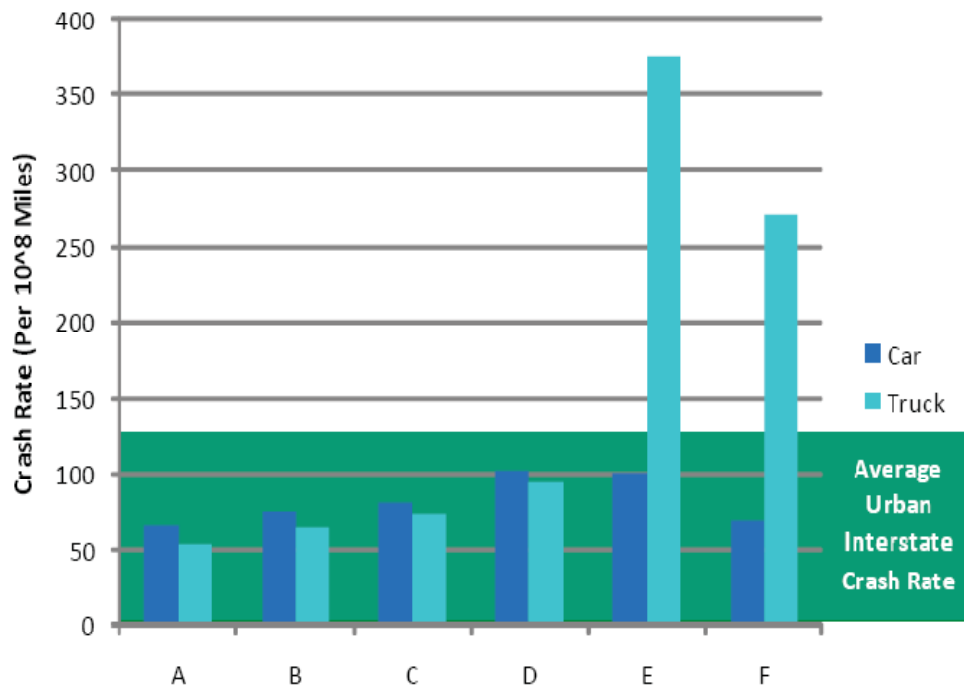
- 2009 - 184 miles moderate to heavy congestion
- 2030 - 325 miles moderate to heavy congestion





I-70 Corridor Traffic Crashes

- Trucks crash rates x3 in heavy congestion
- 98% of truck related fatalities involving passenger cars are the car occupants



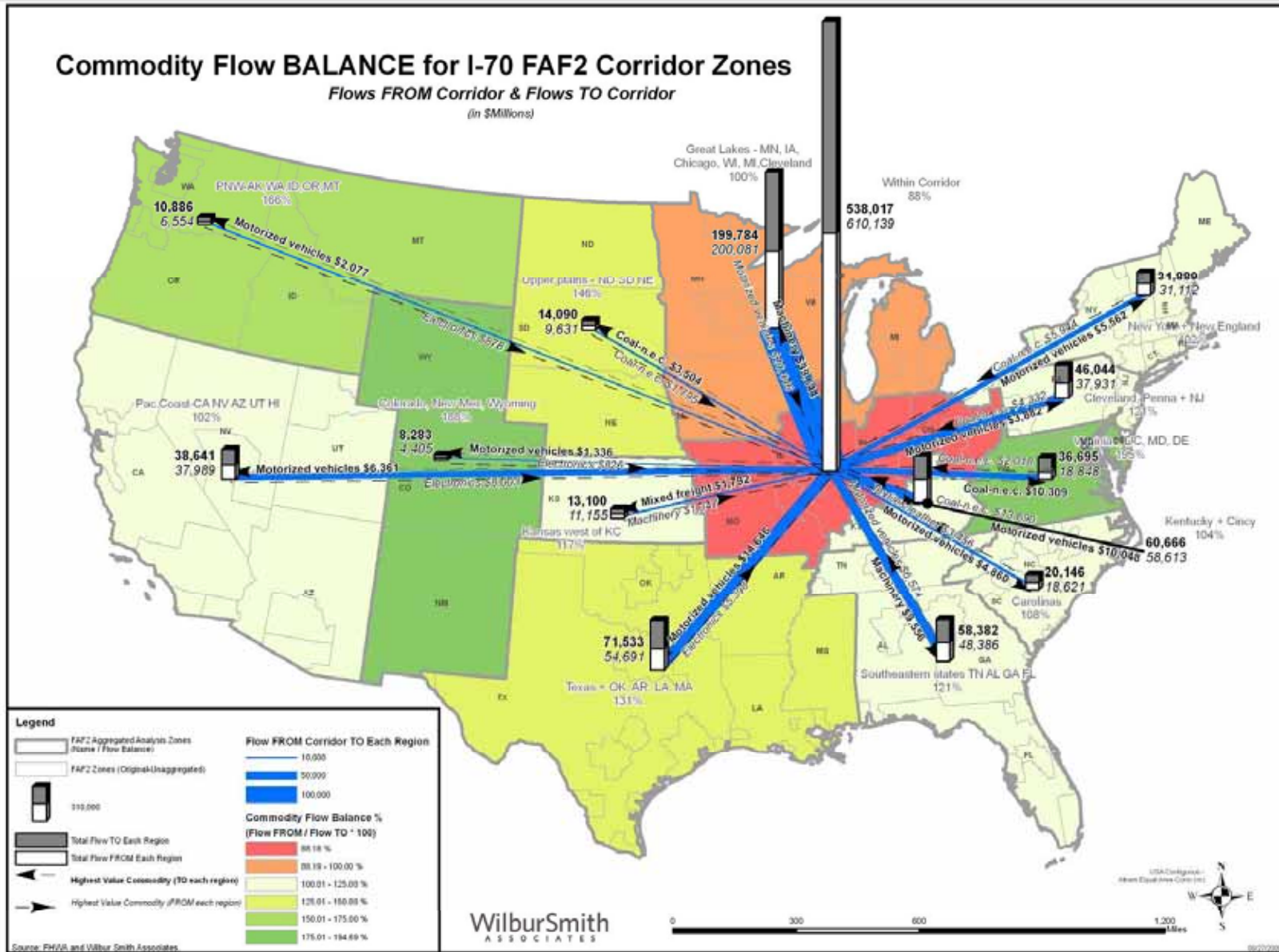


Commodity Movements - this section I-70

- 60% all drivers < 350 miles
- 4.1% trips > 1,000 miles
- 35.5% truck trips - originate and terminate completely within the four-state corridor
- 15.1% truck trips - originate and terminate completely outside the four-state corridor
- Intra-corridor movements
 - Account for much of the goods traffic in the corridor
 - Ohio and Illinois – significant O/D
- Texas - most significant O/D for traffic not completely within the corridor
- Motor vehicles, machinery and mixed freight account for much of the value of goods movement in the corridor

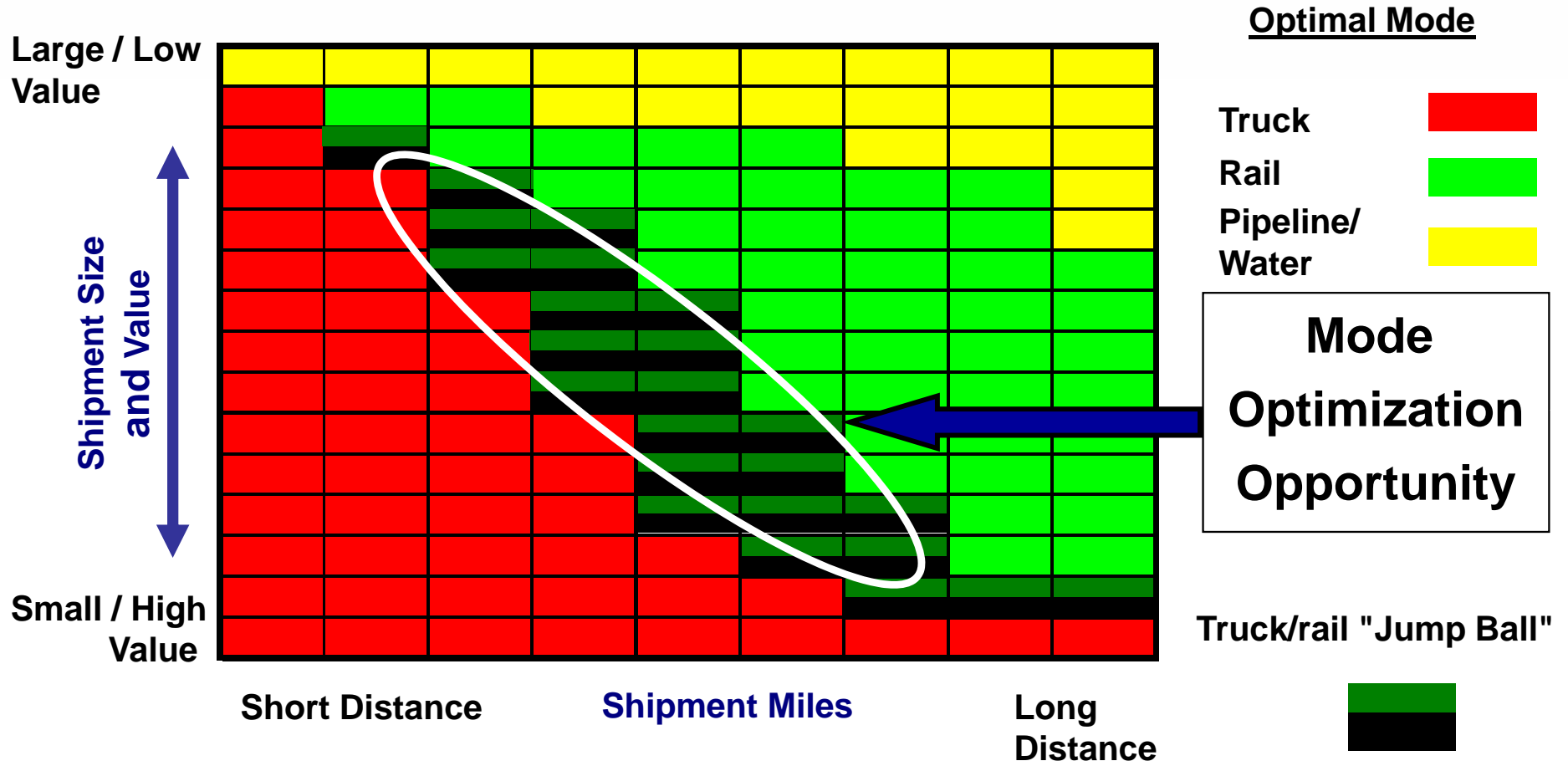


Flows to/from Corridor





Freight Mode Share Matrix



Source: Matt K. Rose, Pres. CEO BNSF Railway, congressional testimony, 2009



Scenarios considered:

1. Dedicated truck lanes on existing alignment
2. Dedicated truck lanes on new alignment
3. Add general purpose lanes as warranted
4. Designate and improve parallel roadways
5. Dedicated truck lanes only in rural areas
6. Create a totally closed system – only 2 to 5 access points

NOTE: multiple options considered



Scenarios eliminated:

- New alignment
- Use of parallel roads
- Only in rural area
- Totally closed system with access at east and west termini





Scenarios (w/options)

	Scenario 1	Scenario 2	No-Build Scenario
Truck lanes inside the existing I-70 alignment and adjacent beltways	x	x	
Add capacity to general purpose lanes as planned / needed			x
Physically separate the lanes with barriers and medians	x	x	
Separated truck and car interchanges-Urban	21	18	
Separated truck and car interchanges- Rural		25	
Slip Ramps - Rural	49		
Design different configurations in urban vs. rural areas	x	x	
Design corridor to follow I-70 through urban areas			x
Design the corridor to follow either north or south beltline routes in major urban area	x	x	
Do not toll the facility	x	x	x
Toll the facility	x	x	
Operate as a single facility	x	x	
Each state works independently			x



Evaluation criteria - Performance measures

1. **Safety**
2. **Freight Movement Productivity**
3. **Cost and Financial Feasibility**
4. **Economic Benefit**
5. **Stakeholder Acceptance**
6. **Technology Integration / Security**
7. **Pavement Life Cycle**
8. **Other Incentives and Amenities**
9. **Environmental Impact**
10. **Political / Legislative**
11. **Intermodal Connectivity**





I-70 Corridor Crashes – No-build

No Build Annual Crashes

	Total	PDO	Injury	Fatality
2009	10,562	8,330	2,276	165
2015	12,752	9,937	2,871	197
2030	18,351	14,183	4,241	242



I-70 Corridor DTL Crash Reduction

	Total Vehicle Crash Reduction			
	Total	PDO	Injury	Fatality
2015	-1,063	-682	-367	-14
2030	-626	-415	-210	-1
15 years	-12,668	-8,228	-4,328	-113
40 years	-28,318	-18,603	-9,578	-138



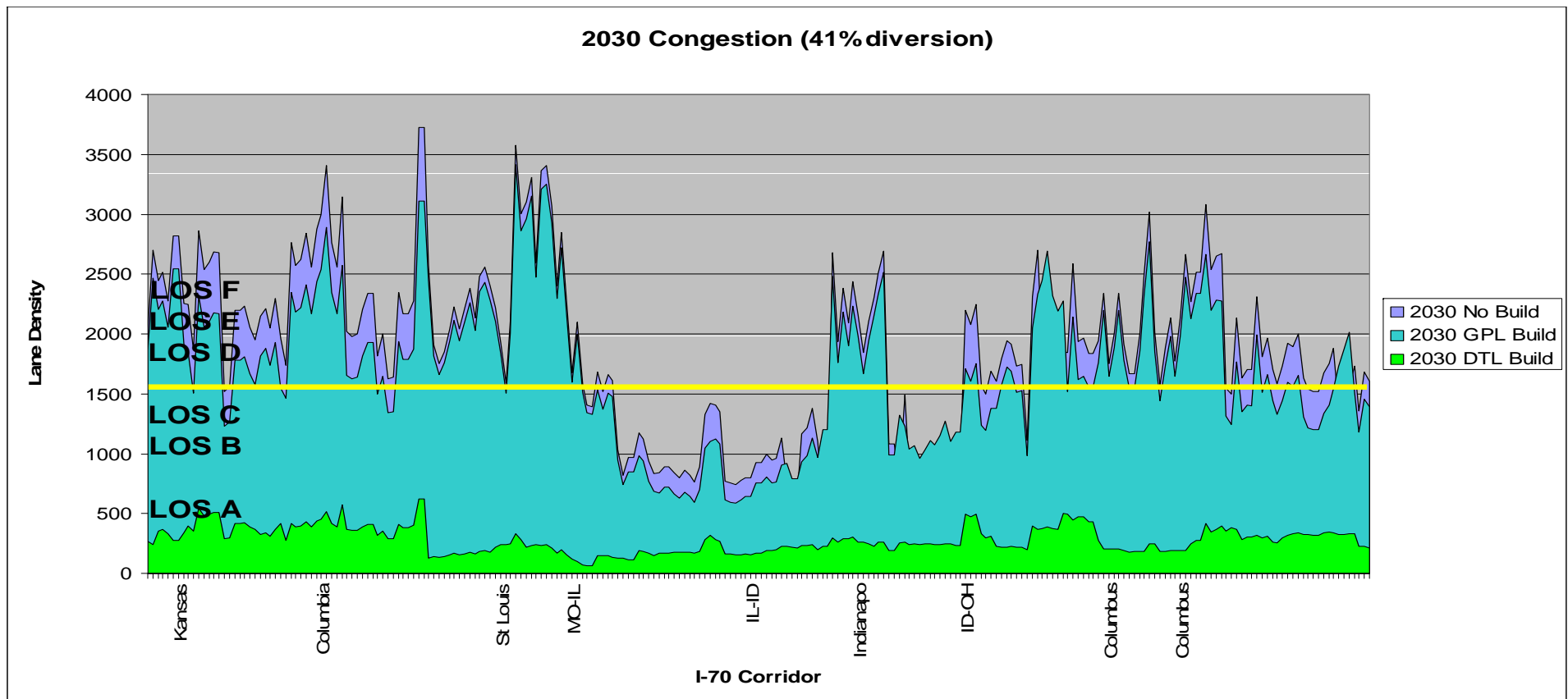
Potential I-70 Corridor DTL Crash Reductions

- 15 years
 - 100 to 150 fatalities
 - 4,000 to 5,000 injuries
 - 8,000 to 10,000 property damage
 - **\$1 Billion in savings**
- 40 years
 - 130 to 180 fatalities
 - 9,000 to 10,000 injuries
 - 18,000 to 20,000 property damage
 - **\$2 to \$2.5 Billion**



I-70 Corridor Future Congestion

- Moderate GPL improvement
- Dramatic operational improvement for DTL



Findings - Summary (table)

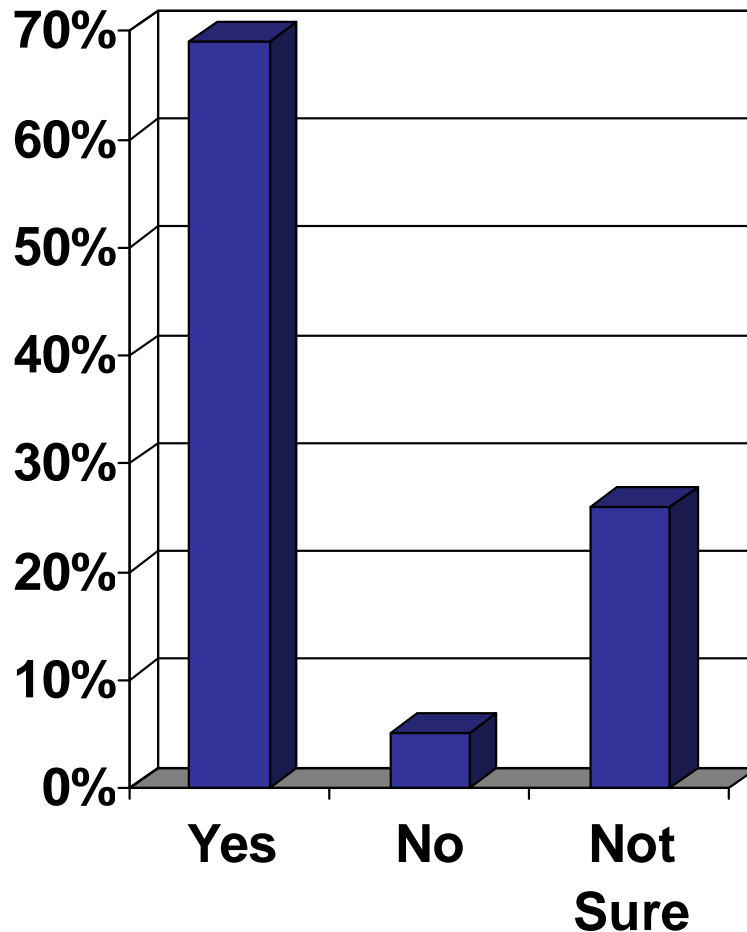
Impact Type	2011	2015	2020	2025	2030	2011-2030
Economic Output (in millions of 2010\$)						
DTL Tolling	\$ -	\$ (240)	\$ (320)	\$ (400)	\$ (480)	\$ (5,740)
Construction and O&M	\$ 8,310	\$ (430)	\$ (150)	\$ (150)	\$ (150)	\$ 29,430
Travel Efficiencies	\$ -	\$ 650	\$ 710	\$ 780	\$ 860	\$ 12,010
Total	\$ 8,310	\$ (20)	\$ 240	\$ 230	\$ 230	\$ 35,690
Employment (in job-years)						
DTL Tolling	0	(1,230)	(1,660)	(2,090)	(2,520)	(29,970)
Construction and O&M	59,770	(3,130)	(1,100)	(1,100)	(1,100)	211,310
Travel Efficiencies	0	4,120	4,540	5,000	5,500	76,490
Total	59,770	(240)	1,780	1,810	1,880	257,830

\$36 billion in outputs
258,000 jobs

Note: Select year snapshots;
economic output is rounded to nearest: \$10m, and employment is rounded to the nearest: 10



Overall do you support the concept of dedicated truck lanes on I-70?



- Support: safety, faster and more reliable travel times, reduce congestion
- Not sure: cost, adequate alternate routes, design issues



Motor Carrier Perspectives

Highlights:

- Nearly 70% of carriers interviewed support the concept of DTLs on Interstate 70
- 84% stated that drivers would use an I-70 DTL corridor the same amount or more than the current facility
 - None stated that drivers would decrease use
 - Drivers would “likely prefer” travel on DTLs



Motor Carrier Perspectives

What do motor carriers see as benefits?

- Safety
- Mobility/level of service
 - Less congestion
 - Greater reliability
 - Better travel times
- Cost savings
- Possible HPVs?



Motor Carrier Perspectives

- Design needs
 - Access: Sufficient on/off ramps
 - Pass through traffic only
 - Lane separation
 - Minimum two lanes
 - Access to parking facilities



Motor Carrier Perspectives

Ensuring motor carrier use/support of I-70 DTL:

- Safety message
- Mobility message
- Free use/access (only 20% support tolls)
 - Increased diesel tax was #1 financing choice
- Truck-friendly design
- Outreach to truck routing departments/software companies



Shippers' Perceived Value of DTLs

VALUE	PERCENTAGE
Productivity	74.2%
Safety	74.2%
Reduced Cost	61.3%
Service	54.8%
Intermodal	9.7%
Driver Interest	6.5%



Productivity/Cost Savings Desire for Increased Size and or Weight

	%	Comments
Yes	93.5	Respondents said yes to size and/or weight
No	6.5	Respondents said no to both



Shipper Summary

- **Value**
 - **Productivity/cost savings, service and safety and value to supply chain**
- **Cost savings and productivity from size & weight.**
- **Intermodal not viable factor**
 - **Decided on price, service performance, and transit time.**
- **Funding aside**
 - **Shippers support DTLs for its potential value to them**
- **Funding support**
 - **Contingent on cost/productivity improvement. Split between tolls and fuel tax**



Public Acceptance

What is needed to attract public use and support?

- General support for DTLs if they improve:
 - Safety
 - Mobility
 - Efficiency
- Concerns
 - Funding (especially relative to competing needs and priorities)
 - Managing DTLs in urban areas





Technology / Security Integration

Operate as a single corridor:

- Future technology test facility
- Commercial vehicle operations
 - Paperless tracking of goods movements
- Electronic tolling
- Travel and traffic management
- WIM – weigh in motion
- Emergency management
- HAZMAT
- Redundancy features



Modal Productivity Comparisons



16,000 TEUs
Post Panamax

Percent change in
operating volume \approx 300%

4,000 TEUs
(1980)



580,000 Cu. Ft.
(2010)

Percentage change in
operating volume \approx 200%

200,000 Cu. Ft.
(1980)



4,055 Cu. Ft.
(2010)

Percentage change in
operating volume \approx 14%
Weight capacity \approx 9%

3,500 Cu. Ft.
(1980)



Truck Design Options



5-axle Tractor- Semitrailer



6-axle Tractor-Semitrailer



Rocky Mountain Double



Triple Trailer Combination



HPVs and technology

- HPV to maximize benefits:
 - Improved equipment utilization
 - Reduced equipment costs
 - Haul more freight with fewer trucks
 - Reduce VMT
 - Greater revenue per truck
- HPV Questions/Issues
 - How many companies would use HPVs?
 - State/facility based regulatory inconsistencies

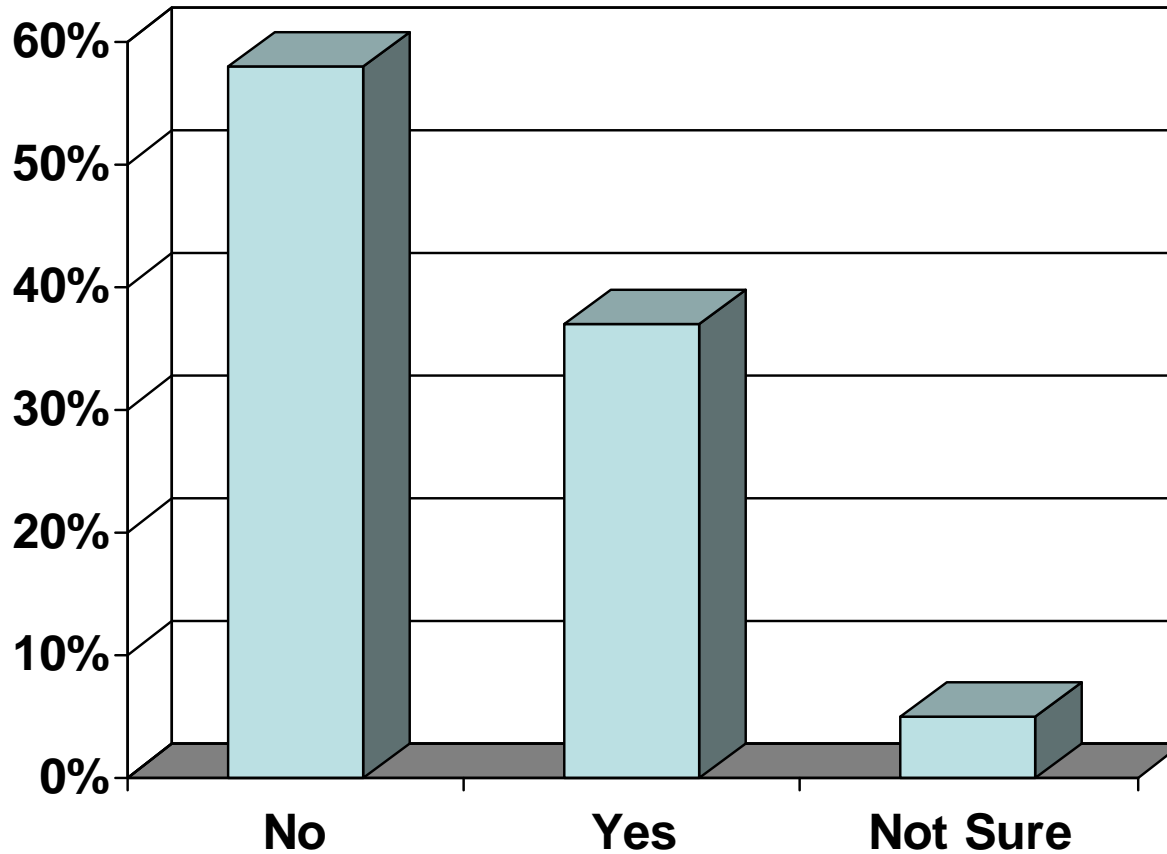


Hypothetical freight scenario

- **Five-axle semitrailer conversion to HPV**
 - Increased vehicle weight and cubic feet of available trailer space.
- **Of 1,000 truck trips, a 40% conversion to HPV would:**
 - Reduce number to trips to 832
 - Reduce total VMT by 18%
 - Decrease fuel consumption by 13%
 - Reduce emissions (CO₂, NO_x, PM) by 13%



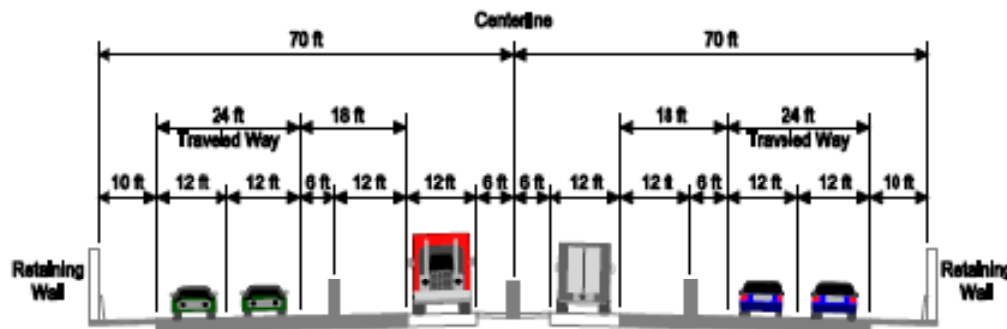
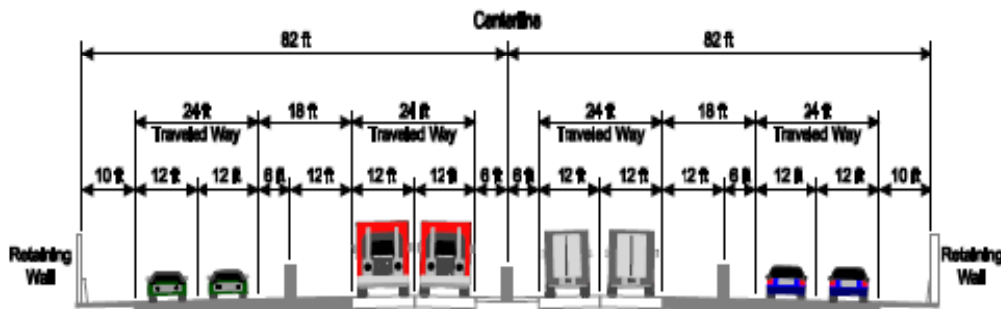
Would carriers need to be provided incentives to use dedicated truck lanes?





Phase 2 - Outside the Box: Congestion

- Exclusive Truck Lanes (ETL) + High Productivity Vehicles (HPV)
- Truck Platoon Concepts
- Intelligent Vehicle Initiatives





Environmental Red Flag Assessment

- No fatal flaws identified that cannot be avoided or mitigated for the project
- Noise
 - Trucks on inside versus outside lanes
- Air quality and carbon emissions/footprint
 - Reducing or increasing carbon footprint of corridor
 - Consolidation of trucks through LCVs/HPVs
 - Reduced congestion
- Environmental Justice and Secondary & Cumulative
 - Impact of funding mechanisms: tolls, increased taxes
 - May attract more traffic to corridor – rail, I-80/I-40
 - Increased freight and other economic development as positive cumulative impact



Modal Connectivity

Truck - Rail

Comparable Miles on I-70

- CSX - 415
- NS - 330
- UP - 270

Combined, 715 of the 790 total corridors miles



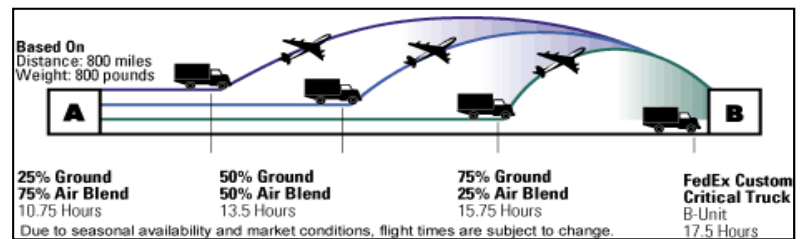
Future System Impacts on I-70

- NS - Heartland Corridor
Norfolk VA – Columbus OH
- CSX - National Gateway Corridor
Baltimore MD – Central Ohio



Modal Connectivity

Truck – Air Cargo

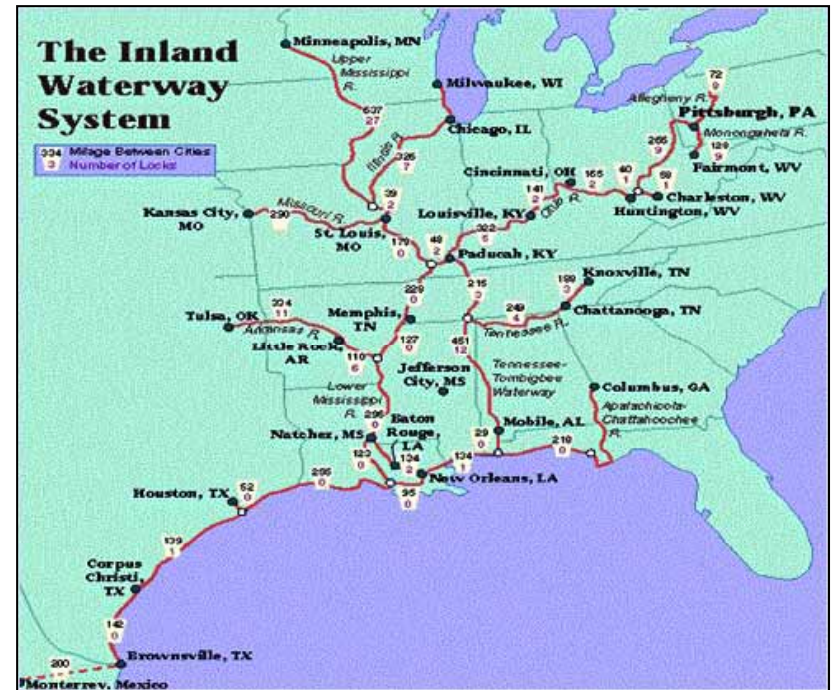




Modal Connectivity

Missouri DOT "I-70 Marine Highway Corridor
MoDOT I-55 Marine Highway Corridor

Truck – Water Cargo

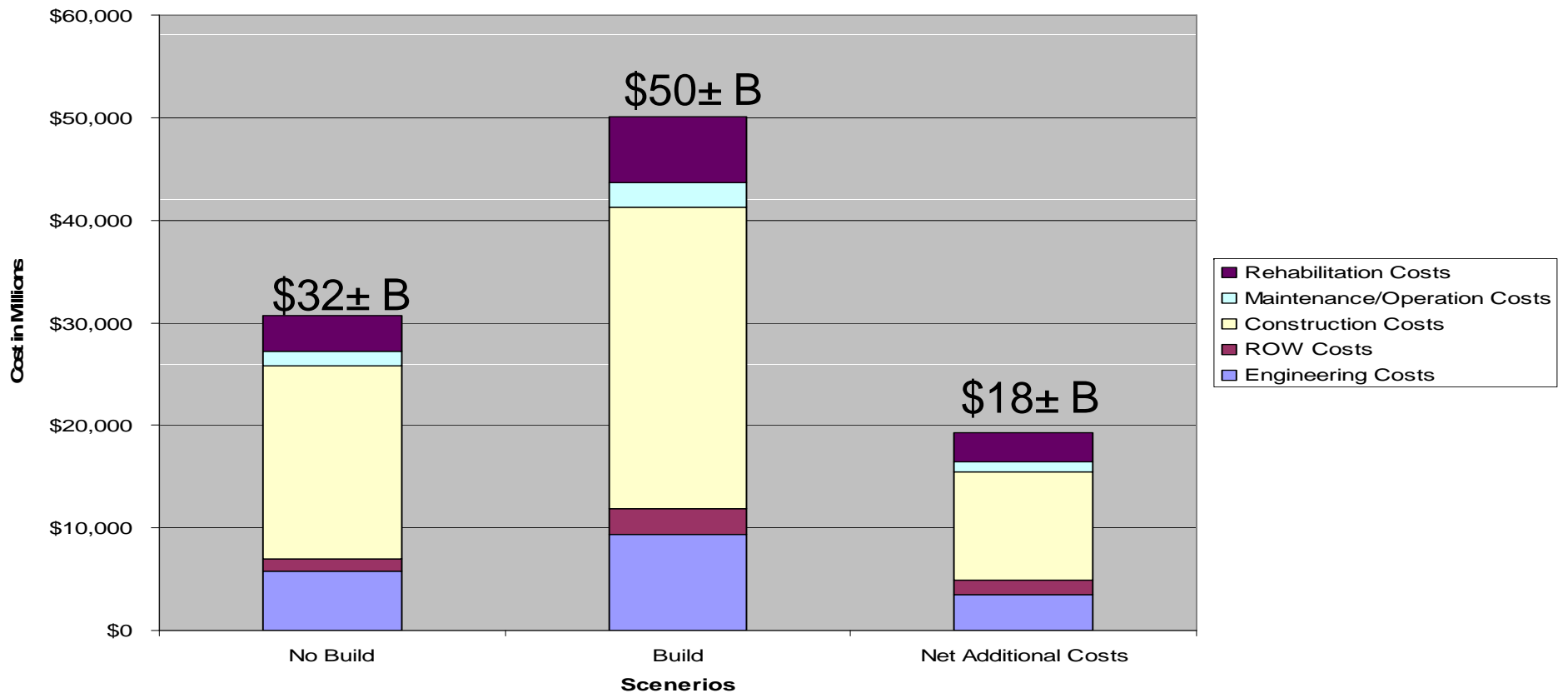




GPL & DTL 40 Year Costs

- \$17 to \$19 billion net differential over 40 years
- Savings in GPL rehabilitation and maintenance

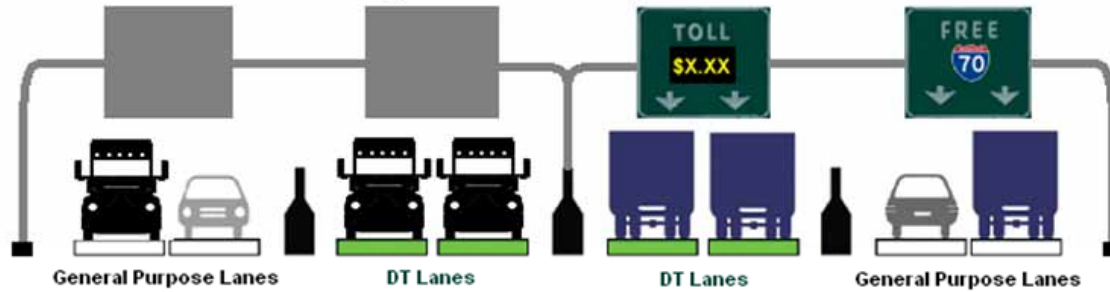
Intital Build (5 years)





Toll Options

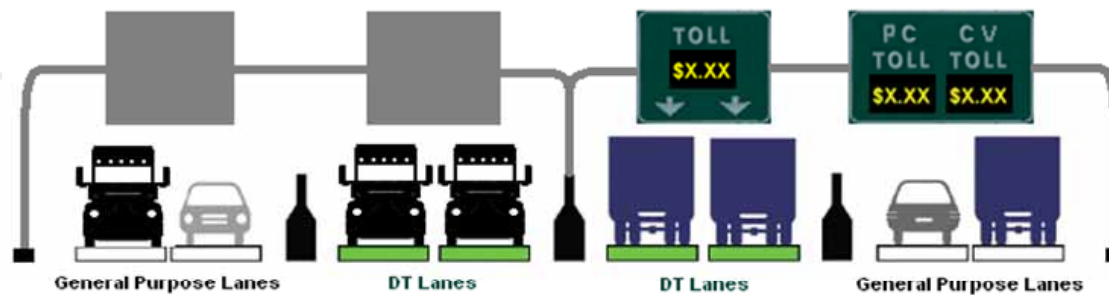
Toll Option 1: Toll only CV in DTL



Toll Option 2: Toll Only CV in DTL and GPL



Toll Option 3: Toll All CV in DTL and GPL and PC in GPL





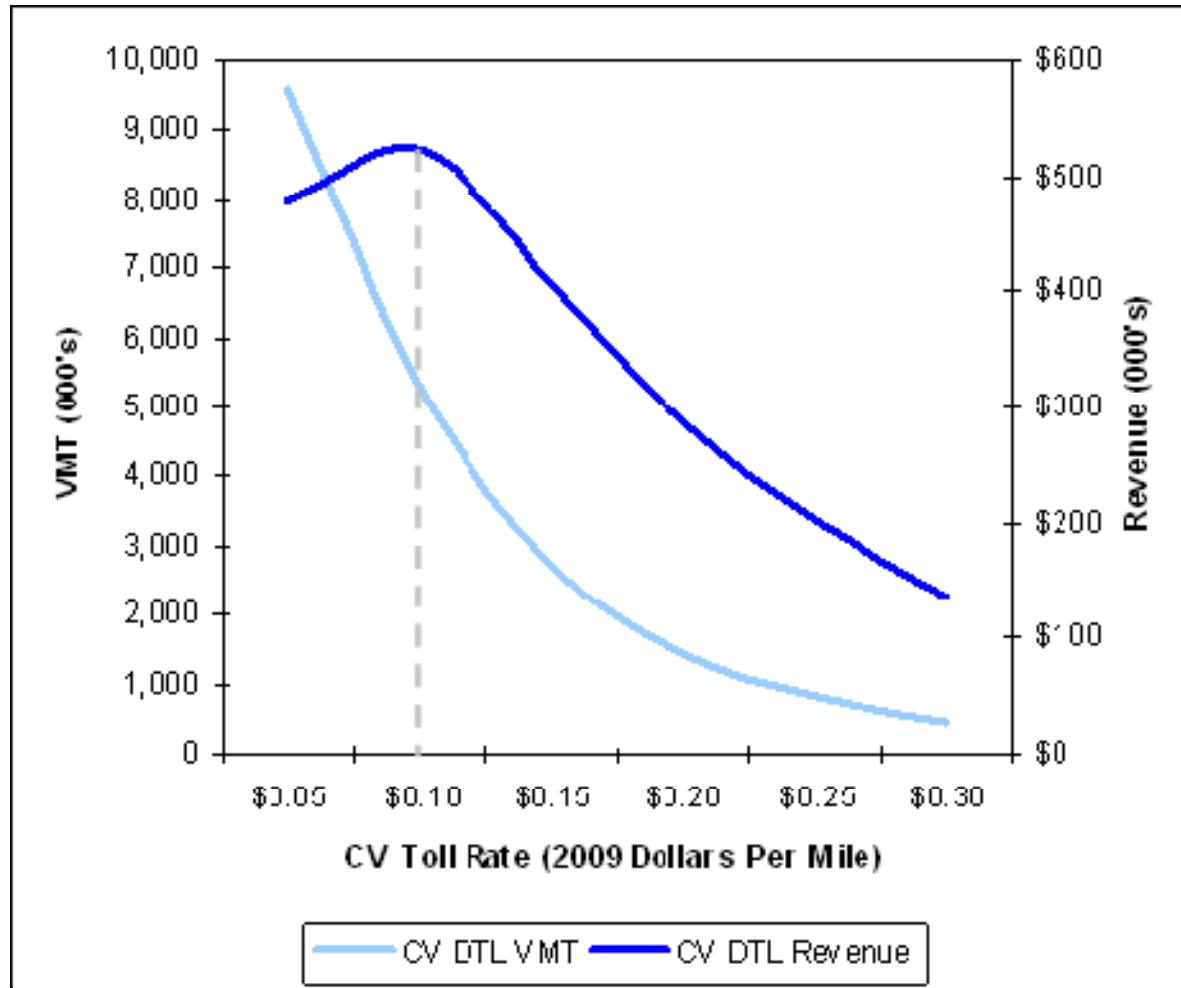
Traffic and Revenue Estimation Methodology

- Develop skeletal model for national and regional CV estimation
- Perform traffic assignments
- Test toll rates, \$0.05 to \$0.30 per mile in 5 cent increments
- Review traffic counts to estimate PC and local CV
- Estimate toll transactions and revenues



Sample Toll Sensitivity

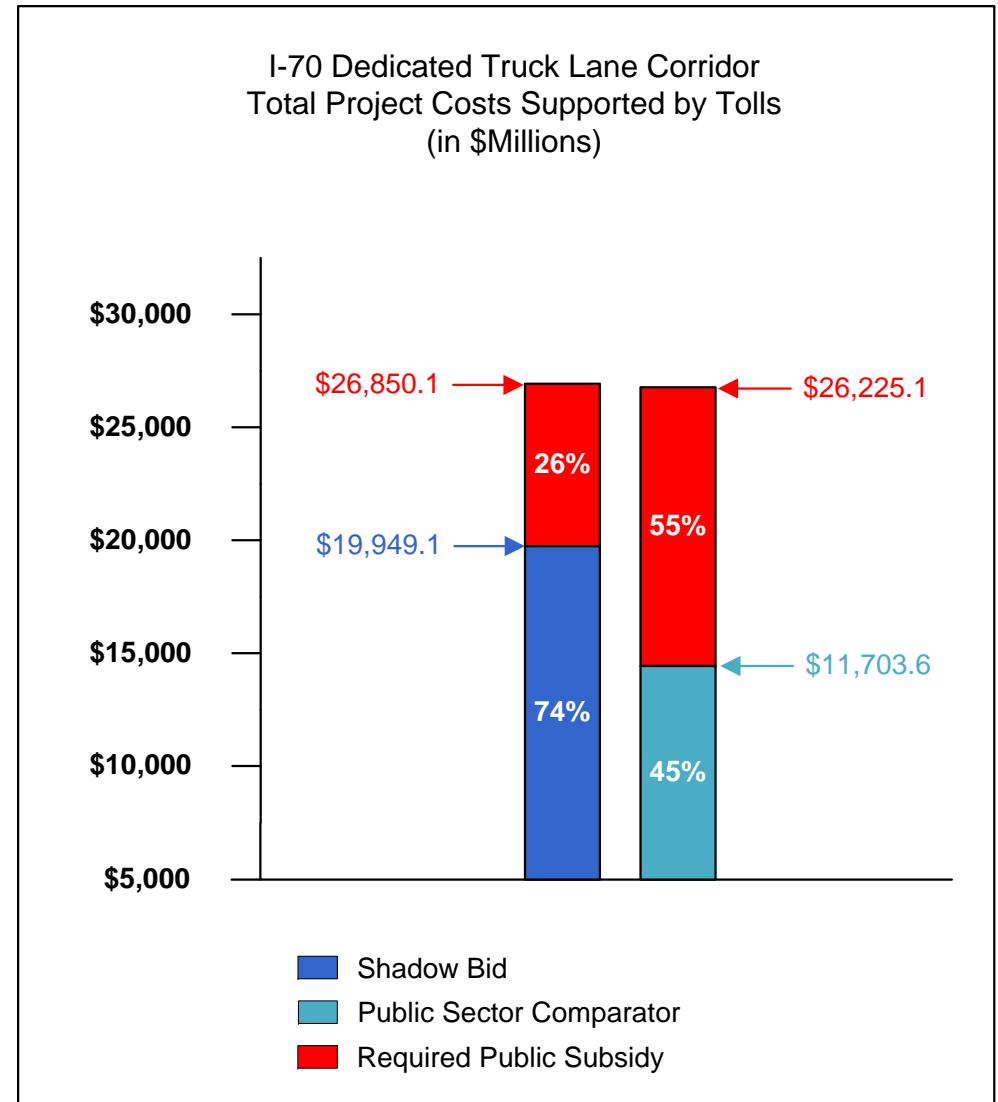
- Scenario 2, Toll Option 1, optimal toll rate \$0.10/mile





Financing Capacity Analysis Conclusions

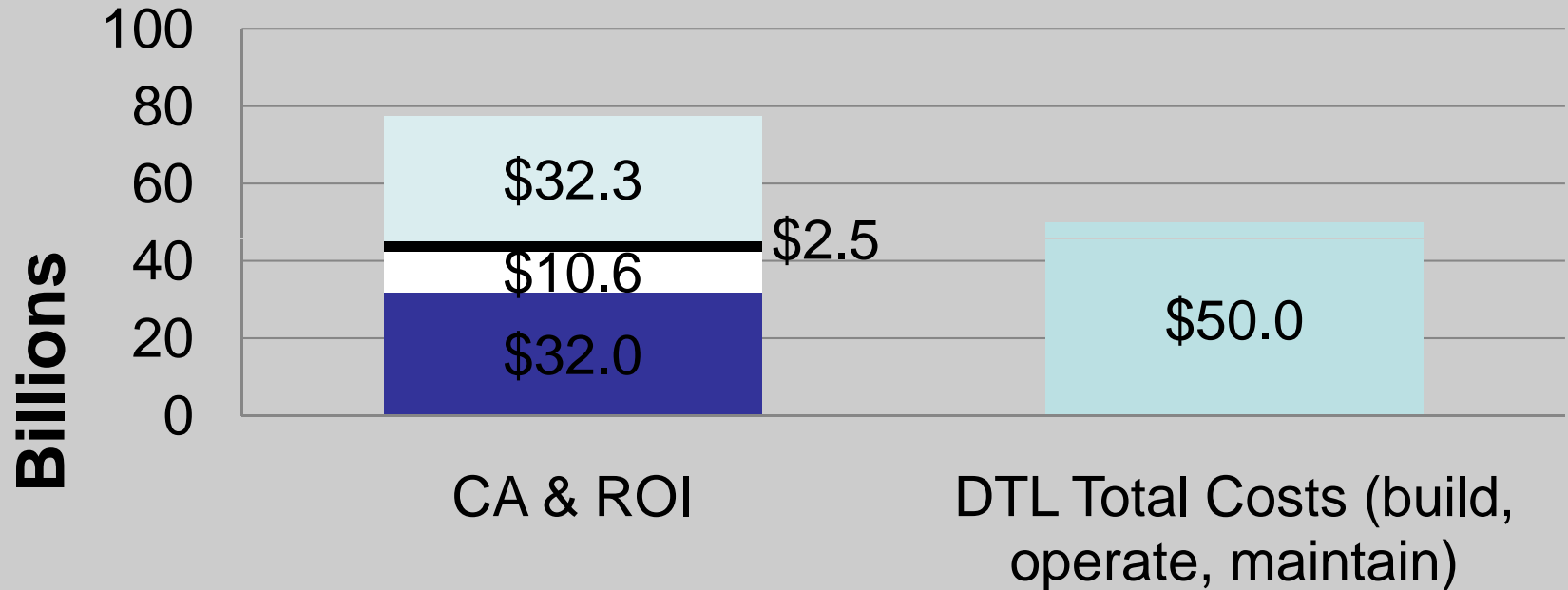
- Tolls Support:
 - 74% of Project Costs (P3 Model)
 - 45% of Project Costs (Public Model)





Is there a business Case for DTL?

40 Year Cost Avoidance & Return on Investment (2015 - 2055) in 2010 Dollars



- Build Costs & Operations
- CA (as is costs w/o DTLs)
- Optional Toll Revenues
- Safety Cost Reduction (\$2.5 - \$3.3 Billion)
- Increased Economic Output (Benefits 2011-2030)



Finishing Phase 1 – Starting Phase 2

- Meetings with DOT leadership
- MPO/key stakeholder meetings or webinar – July 16
- Freight/shipping industry/ motor carrier follow-up
- Scope Phase 2 – July 20
 - Outstanding questions
 - Refine numbers
 - Framework to make business case a reality



I-70 Website

www.i70dtl.org

- Summaries of tech appendices posted
- Phase 1 final report
- Online meeting

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