

# Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan

February 20, 2008

Submitted to  
St. Louis and Lake Counties Regional Railroad Authority

Proposal for  
Minneapolis-Duluth/Superior  
Restoration of Intercity Passenger Rail Service  
Comprehensive Feasibility Study and Business Plan



Submitted by



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## Work Plan

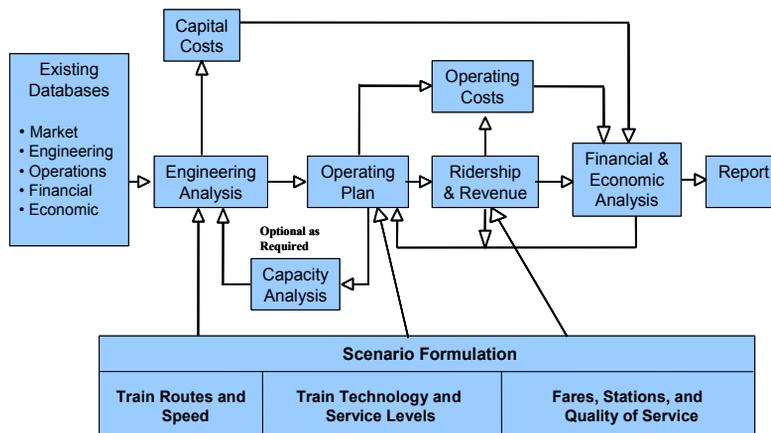
Tasks	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
<b>Study Databank</b>						
Task 1: Study Design	█					
Task 2: Data Assembly	█	█				
Market Database	█	█				
Engineering Database	█	█				
Technology Database	█	█				
<b>Service Scenarios</b>						
Task 3: Services Scenarios for the Corridor		█	█			
Base Level Service Concept		█	█			
Improved Service Concepts		█	█			
<b>Interactive Analysis</b>						
Task 4: Interactive Analysis		█	█	█		
Demand Analysis		█	█	█		
Rail Service Analysis		█	█	█		
<b>System Forecasts &amp; Outputs</b>						
Task 5: Ridership & Revenue Forecasts			█	█	█	
Task 6: Operating & Capital Costs			█	█	█	
Task 7: Financial & Economic Feasibility Analyses				█	█	
Financial Analysis				█	█	
User & Non-User Benefits				█	█	
<b>Institutional &amp; Financing Plan</b>						
Task 8: Financing & Funding Arrangements				█	█	█
Task 9: Institutional Framework				█	█	█
Task 10: Allocation of Costs & Revenues				█	█	█
<b>Business Plan</b>						
Task 11: Implementation Plan					█	█
Task 12: Business Plan Documentation					█	█
<b>Steering Committee Meetings</b>						
	●	●	●	●	●	●

## FRA Criteria for Intercity Rail Projects\*

- Positive Operating Ratio
- Positive Cost Benefit Ratio

\*High Speed Ground Transportation for America. USDOT FRA 1997

## Business Planning Process – Interactive Analysis



## Evaluation Scenarios

79-mph, 110-mph, and 125-mph

	79/1	79/2	79/4	110/4	110/8	125/4	125/8
Speed (mph)	79	79	79	110	110	125	125
Frequency (train/day)	1	2	4	4	8	4	8
Full Fare (\$/mile)	0.22	0.22	0.22	0.35	0.35	0.35	0.35
Running Time (minutes)	170	170	170	120	120	110	110

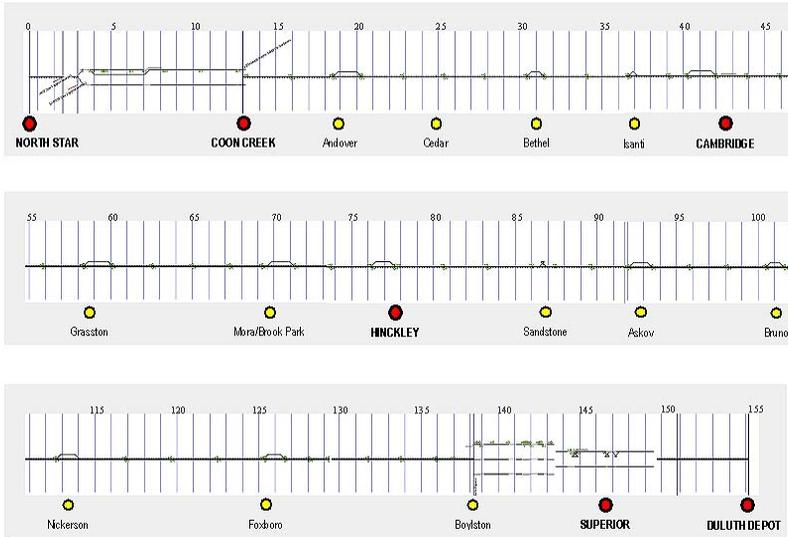
Scenarios overlap with 4 round trip frequencies to facilitate an “Apples to Apples” comparison. Assumed fare levels, however, are higher in the 110-mph and 125-mph scenarios.

## Incremental Rail Equipment Options

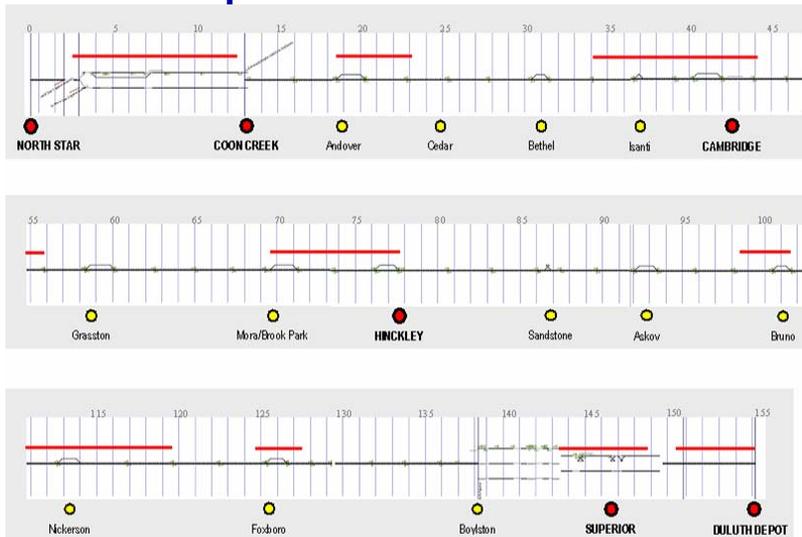
▶ 79-mph	Loco-Hauled Coaches		Colorado DMU		Desiro USA		
	▶ 110-125 mph	Talgo T21		ICE TD / ACE 3		Jet Train	
		“Integrated Trainsets” Tilting and Non-Tilting Variants					



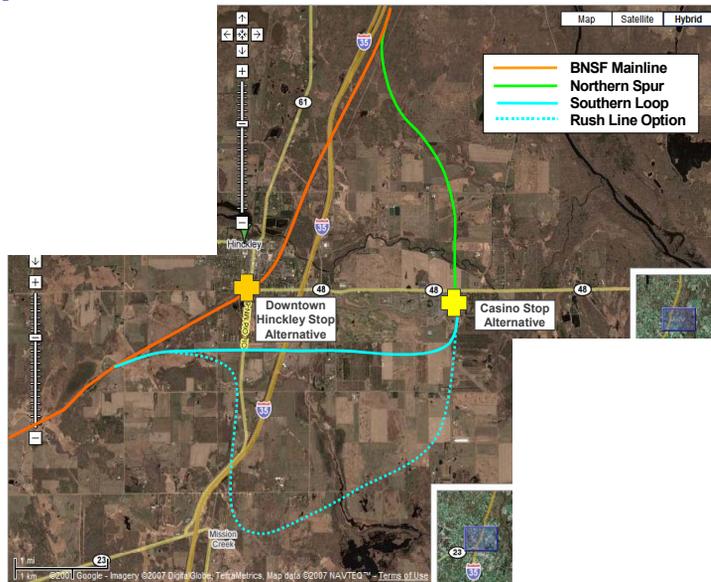
## Base Infrastructure and Sidings



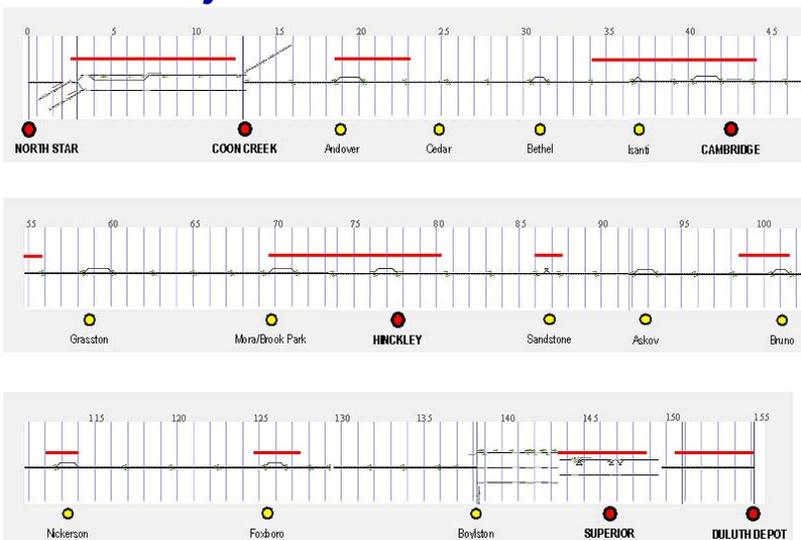
## Infrastructure Improvements 110-mph 8 Round Trips



# Loop Connection



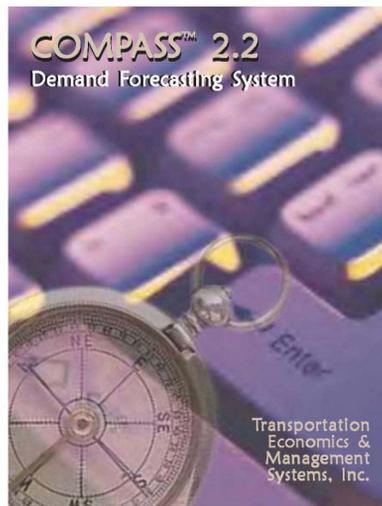
# Infrastructure Improvements 110-mph with Casino Adjustments



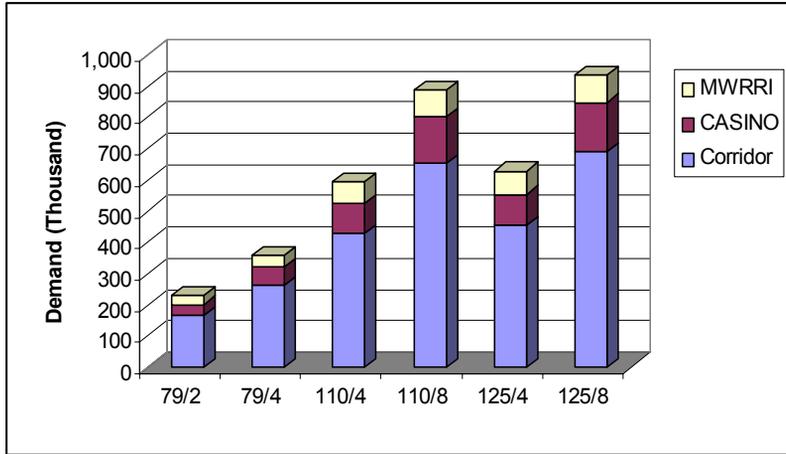
## Capital Costs Summary (in \$2006 millions)

Scenario	79/2	79/4	110/8	110-Cas	125/8
Track	\$22.2	\$22.2	\$36.0	\$35.4	\$40.8
Capacity Upgrades	\$30.5	\$80.5	\$108.4	\$145.1	\$114.2
Platforms + Fencing	\$1.6	\$1.6	\$5.7	\$5.7	\$7.1
Crossings + Signals	\$1.2	\$47.6	\$116.5	\$113.2	\$322.9
Contingency	\$3.9	\$18.2	\$32.0	\$30.6	\$60.8
Equipment	\$16.0	\$32.0	\$64.0	\$64.0	\$64.0
<b>TOTAL</b>	<b>\$75.4</b>	<b>\$202.1</b>	<b>\$362.6</b>	<b>\$394.0</b>	<b>\$609.8</b>

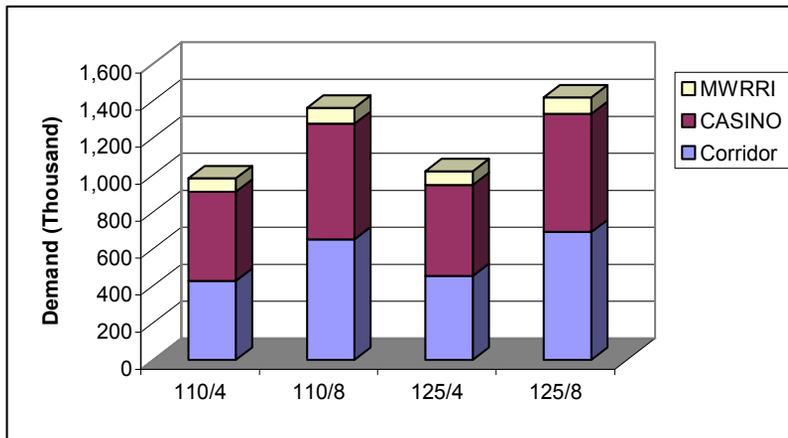
## Demand Forecasting and Operations Analysis



## Ridership Estimates – 2010 Shuttle Bus Connection



## Preliminary Ridership Estimates – 2010 Direct Rail to Casino



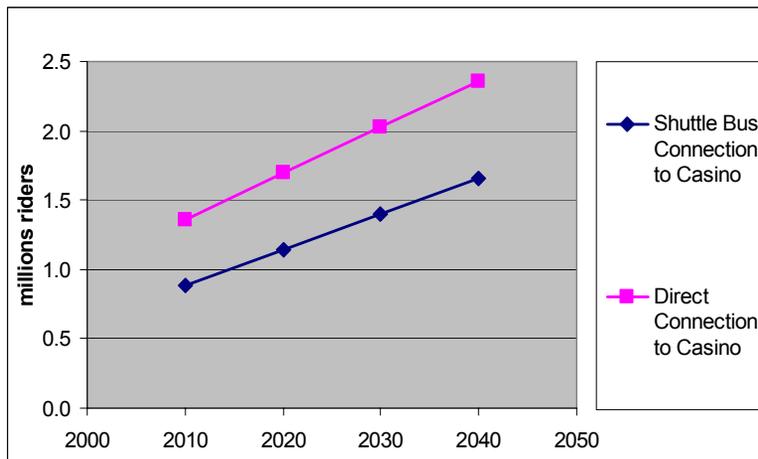
## Ridership and Revenue – 2010 Shuttle Bus Connection

	79/2	79/4	110/4	110/8	125/4	125/8
Ridership	0.229	0.360	0.595	0.889	0.628	0.937
Pass-Miles	23.1	37.3	60.8	93.6	65.2	100.1
Revenue	\$4.2	\$6.9	\$17.1	\$27.1	\$18.5	\$29.0

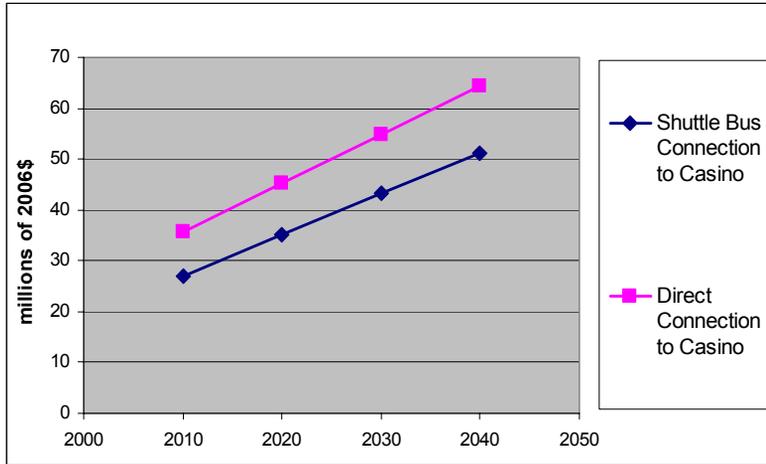
## Direct Rail to Casino

	110/4	110/8	125/4	125/8
Ridership	0.982	1.363	1.021	1.419
Pass-Miles	88.4	127.5	93.5	134.8
Revenue	\$24.3	\$35.8	\$25.8	\$38.0

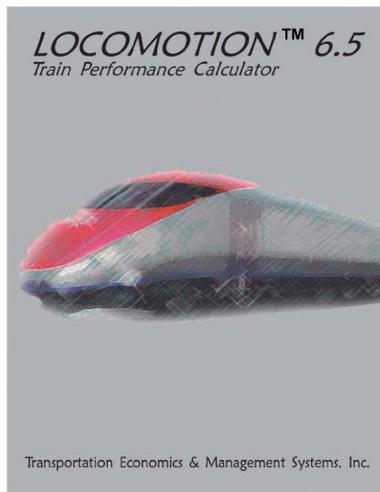
## 2010-2040 Ridership Forecast - 110-mph/8 Train Option



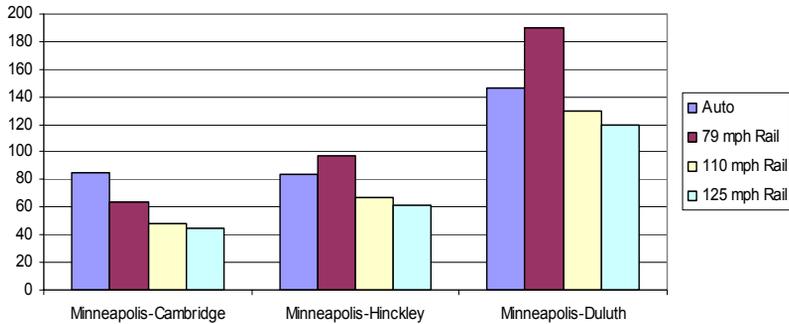
## 2010-2040 Revenue Forecast - 110-mph/8 Train Option



## Operating Analysis

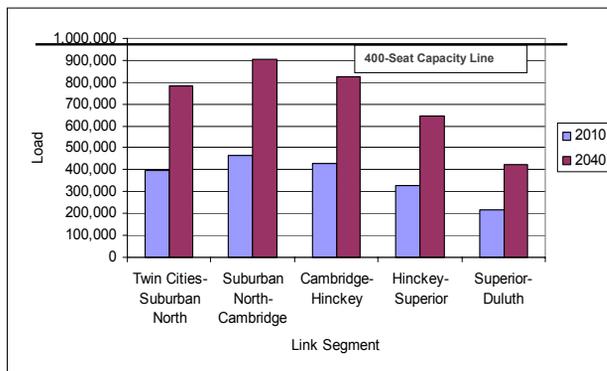


## Preliminary Operating Analysis Travel Time Comparison



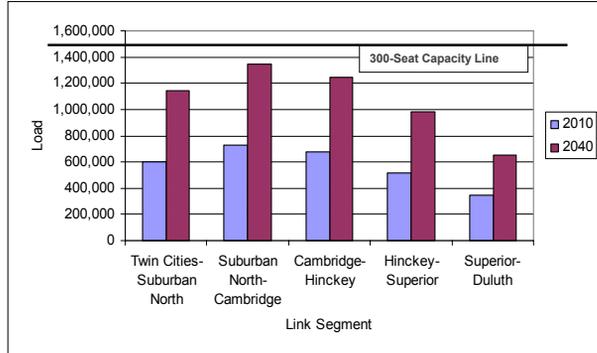
**110-mph service is needed for auto-competitive travel times to either Hinckley or Duluth. The 79-mph option is time-competitive to Cambridge only because of the lack of a direct interstate highway connection there.**

## Preliminary Operating Analysis Segment Loading Chart, 110/4 Scenario with Shuttle Bus connection to Casino



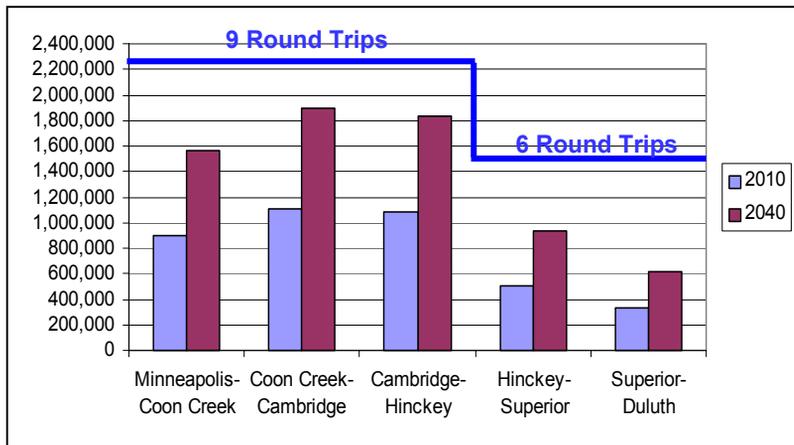
**110-mph 4 Train Service would require rather large trains to accommodate forecasted demand. However with only a shuttle bus connection, the ridership drop-off at Hinckley is not so great that any trains need to turn back there.**

## Preliminary Operating Analysis Segment Loading Chart, 110/8 Scenario with Shuttle Bus connection to Casino



**110-mph 8 Train Service has substantially higher demand than the 4 train scenario. Because of the added train frequencies, it can use smaller trains. With only a shuttle bus connection to the casino, the ridership drop-off at Hinckey is not so great that any trains need to turn back there.**

## Segment Loading Chart, 110/6+9 Scenario with Casino Direct Rail



## Resulting Schedule for Sandstone

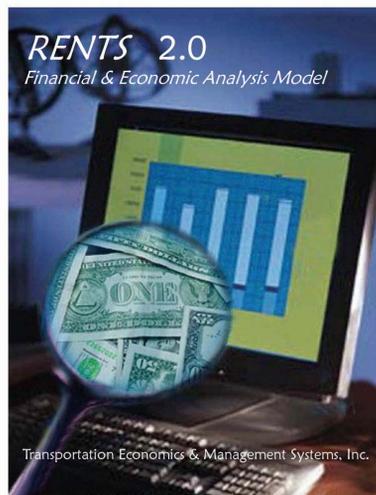
- The three trains that turn back at Hinckley would continue north to Sandstone
- One train would lay over in Sandstone which would be the first AM commuter run to Minneapolis. This train would also serve “all night” Casino patrons.
- The first morning train from Minneapolis to Duluth and an evening train from Duluth to Minneapolis would add a stop in Sandstone
- Two evening Casino shuttles would also stop in Sandstone.

<i>Southbound</i>				
<b>Duluth</b>	<i>Casino Shuttle</i>	<i>Casino Shuttle</i>	7:00 PM	<i>Casino Shuttle</i>
<b>Sandstone</b>	5:50 AM	4:50 PM	7:50 PM	11:50 PM
<b>Minneapolis</b>	7:00 AM	6:00 PM	9:00 PM	1 AM

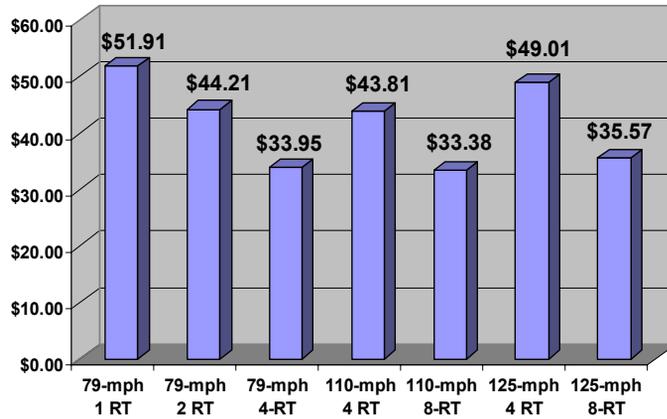
<i>Northbound</i>				
<b>Minneapolis</b>	6:30 AM	3:30 PM	5:50 PM	10:30 PM
<b>Sandstone</b>	7:40 AM	4:40 PM	7:00 PM	11:40 PM
<b>Duluth</b>	8:30 AM	<i>Casino Shuttle</i>	<i>Casino Shuttle</i>	<i>Casino Shuttle</i>

Note: Train schedules are preliminary, and are provided for discussion purposes only.

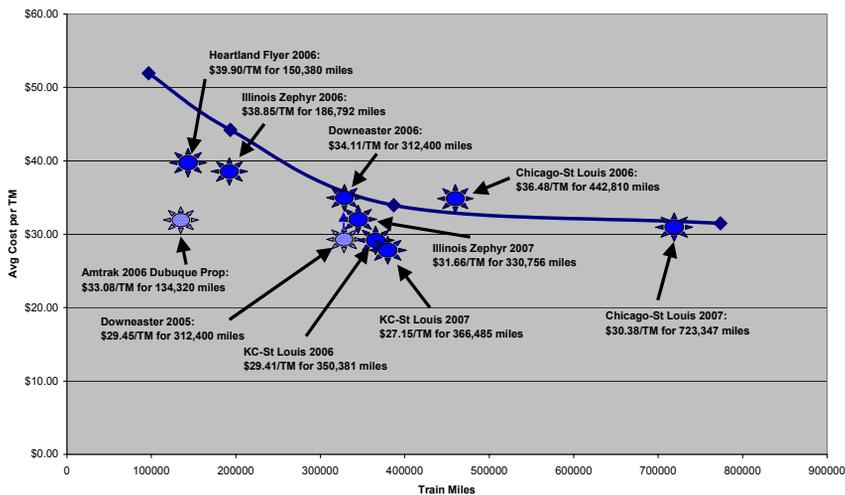
## Financial and Economic Results



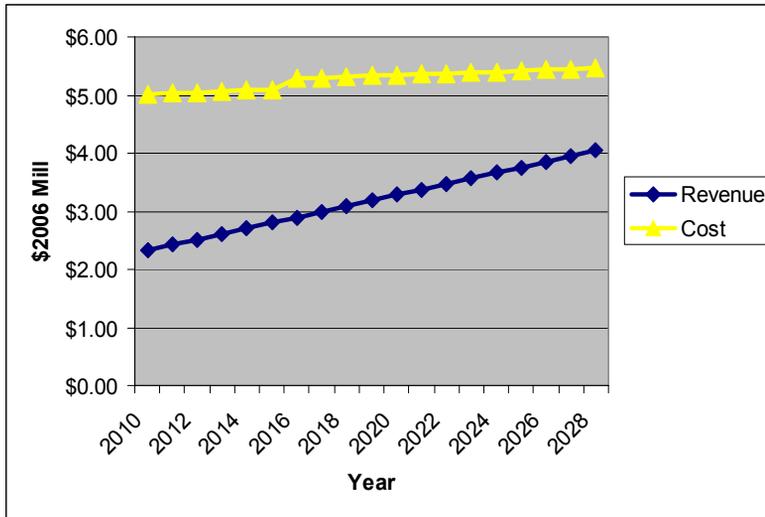
## Projected Average 2010 Costs per Train Mile for Minneapolis-Duluth Options



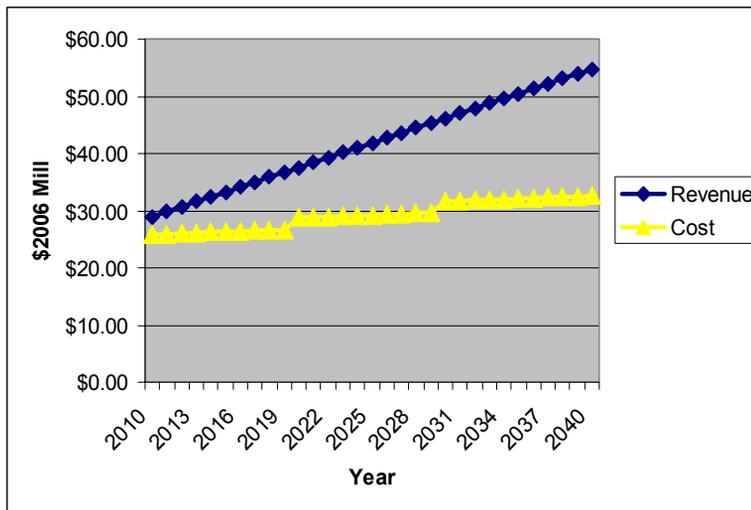
## Benchmark Costing Comparison



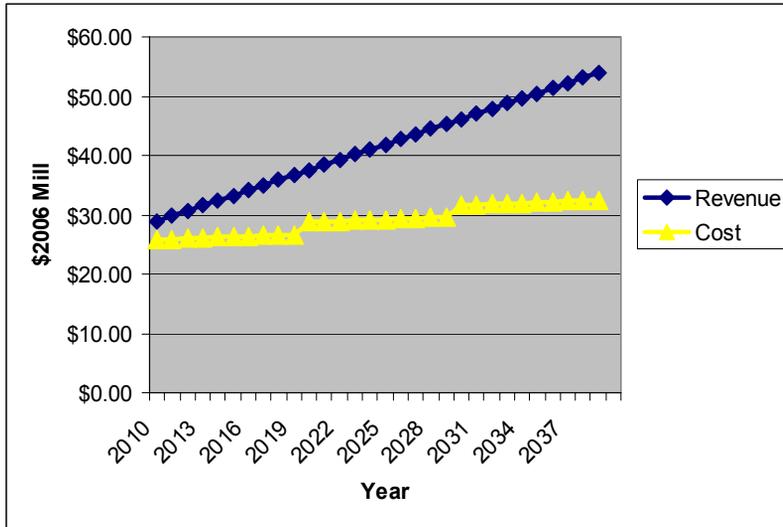
## Operating Ratio Forecasts – P42- 1 Train @ 79-mph



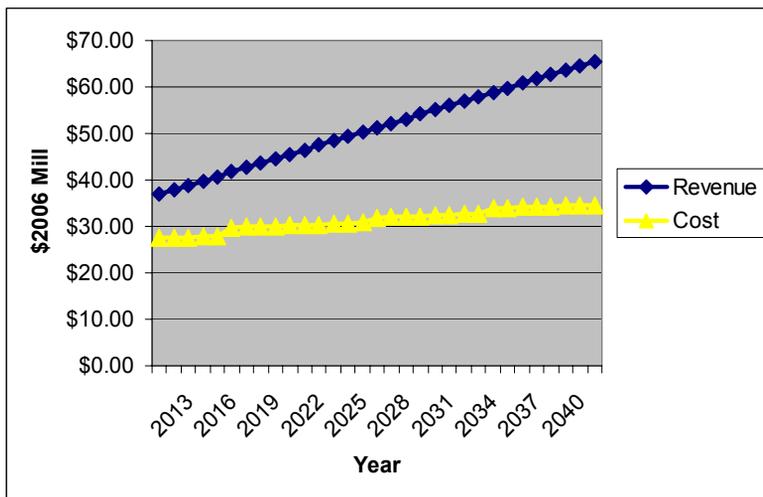
## Operating Ratio Forecasts – 8 Trains @ 110-mph



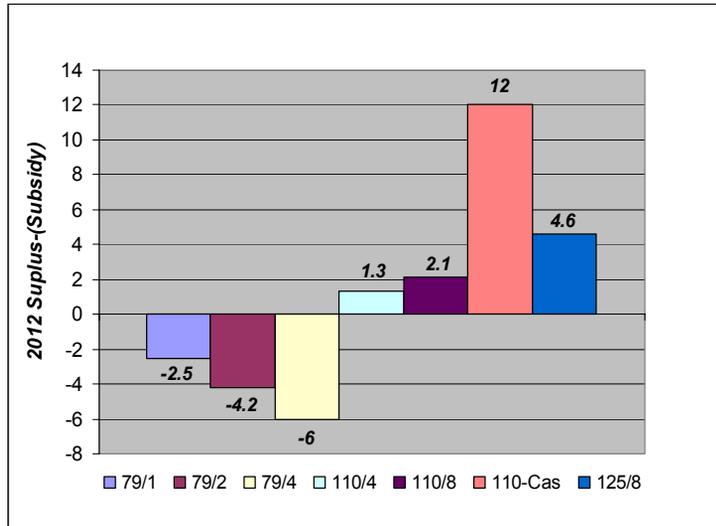
## Operating Ratio Forecasts – 8 Trains @ 125-mph



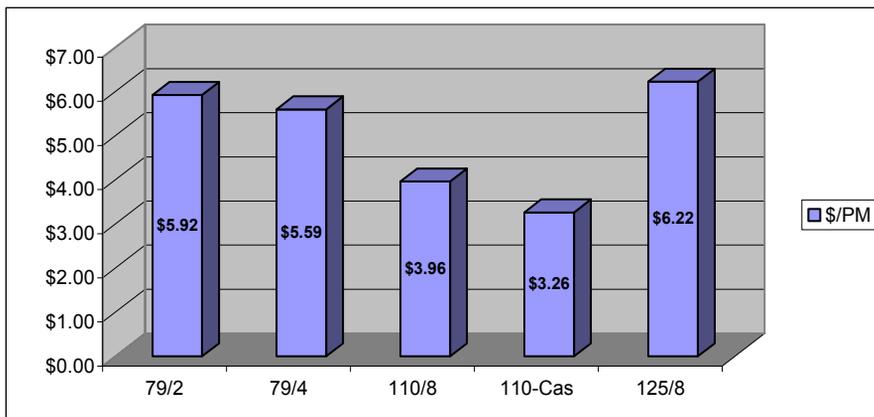
## Operating Ratio Forecasts – Casino Direct Rail with 6+9 Trains @ 110-mph



## Operating Ratio Forecasts for Each Option

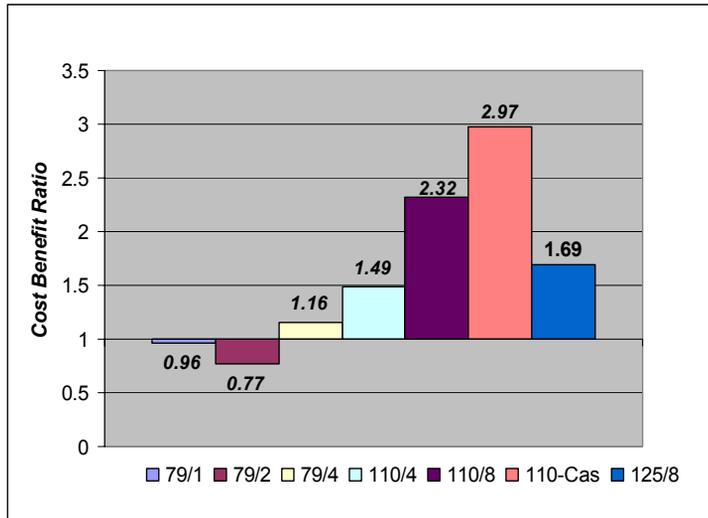


## Capital Efficiency per Passenger Mile



Scenario	79/2	79/4	110/8	110-Cas	125/8
Capital (\$ Mill)	\$75.4	\$202.1	\$362.6	\$394.0	\$609.8
Pass-Miles (Mill)	12.73	36.13	91.57	120.83	98.02

## Calculated Benefit Cost Ratios



## Benefit Cost Detail for 110-mph Options (Net Present Value, in millions 2006\$)

OPTION	8-Train Base	Casino Direct
Revenue	\$673.4	\$829.5
Consumer Surplus	\$782.2	\$1,134.2
Other Mode + Resource	\$545.4	\$806.2
<b>Total Benefit</b>	<b>\$2,001.0</b>	<b>\$2,770.0</b>
Capital Cost	\$353.1	\$383.7
Operating Cost	\$488.3	\$525.6
Track Capital Maintenance	\$21.9	\$24.1
<b>Total Cost</b>	<b>\$863.3</b>	<b>\$933.5</b>
<b>Cost/Benefit Ratio</b>	<b>2.32</b>	<b>2.97</b>
<b>Net Benefit-Cost</b>	<b>\$1,137.8</b>	<b>\$1,836.5</b>

## Minneapolis-Duluth/Superior Corridor Economic Benefits by Station (110-mph/8 Train Option)

Station Name		Employment (# jobs)	Income (Millions 2006\$)	Development Potential (Millions 2006\$)
Minneapolis		5,700-7,400	\$220-290	\$670-900
Suburban North		1,400-2,000	\$100-150	\$250-390
Cambridge		700-1,100	\$40-60	\$120-170
Hinckley	Shuttle Bus Connection to Casino	300-400	\$15-20	\$55-80
	Direct Connection to Casino	800-1,300	\$40-60	\$135-205
Superior		700-900	\$25-30	\$70-90
Duluth		1,400-1,900	\$50-70	\$140-190

## Conclusion

- **79-mph passenger rail service is not financially self-sustaining, and does not meet FRA criteria, and would need to be subsidized.**
- **Financially self-sustaining service is only achievable above 110-mph.**
- **125-mph service produces a lower cost benefit ratio than 110-mph due to the increase in capital costs.**

## Conclusion

- **A Casino direct link significantly enhances the overall financial and economic performance of 110-mph service, dramatically reducing project risk.**
- **The proposed system double tracks 50 percent of the route and greatly increases total railroad capacity for passenger and freight trains.**

## Conclusion

- **The development of the 110-mph system will greatly enhance railroad and highway safety by creating a “Sealed Corridor” by fencing and gating the route and providing automatic train stop capability.**
- **The development of the 110-mph system will generate a significant economic impact creating jobs, income, and joint development potential at stations.**

**Thank You**