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Short-Haul Intermodal Service: Can Rail Compete with Truck?

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Conventional Thinking About Rail Intermodal

- Rail cannot compete for shorter hauls and make any money because:
 - ◆ Rail intermodal depends on short-haul truck delivery (“dray”) at each end of the rail haul
 - ◆ Drayage is costly, typically \$100 or more for each dray
 - ◆ Terminal costs for moving containers from and to rail cars add additional costs
 - ◆ Intermodal terminals are costly to build
- The only way to have anything left to cover the rail haul is to move trailers/containers 750 miles or more

Where Has Intermodal Been Successful in the Past?

- ◆ 80% of the eastbound perishables from California move by rail (mostly intermodal)
- ◆ Railroads have been successful in attracting “landbridge” and “mini-bridge” traffic; more than three quarters of containers from Seattle/Tacoma move east by rail
- ◆ Rail has achieved significant market penetration in other high-volume, long distance lanes

By Contrast, the Short Haul Experience Has Not Been Good

- ◆ Illinois Central “Slingshot” service (Chicago-St. Louis) was abandoned due to lack of demand
- ◆ Burlington Northern “Expeditors” (short haul, short trains between major markets) was discontinued after only a few years
- ◆ Conrail “demarketed” shorter-haul services (New York -- Buffalo) due to lack of volume and profitability

Experience Would Seem to Support the Conventional Wisdom

But...

- Railroads have “maxed out” their market share in long-haul markets
- To further grow intermodal, the railroads must find ways to compete for shorter hauls
- New technologies and new management strategies will be required

What is Being Done Today?

- ◆ Norfolk Southern has successfully penetrated some short-haul markets by NS:
 - ◆ Atlanta - Miami (600 miles)
 - ◆ Atlanta - Savannah (300 miles)
 - ◆ Atlanta - Charleston (350 miles)
- ◆ CP's "Expressway" service between Montreal and Toronto (350 miles) has been successful enough that truckers are asking for additional daily trains
- ◆ BNSF is selectively re-entering short-haul markets where volume exists to support daily service

So Railroads Can Compete, But Can They Make Money?

- ◆ NS partners with low-cost carrier Florida East Coast in the Atlanta -- Miami market
- ◆ CP provides only terminal-to-terminal service on Expressway. Shippers are on their own to arrange drayage to and from rail terminals
- ◆ Burlington Northern & Santa Fe looks for trainload volumes
- ◆ Bottom line: the long-haul intermodal market is mature. Intermodal growth will have to come in short-haul markets

A Paradigm Shift

- ◆ Railroads are realizing that:
 - Traditional intermodal markets are “mature” (they’ve got all the business they can get)
 - As understanding of costs improves, railroads see that money can be made in shorter-haul markets
 - Investments in both line-haul capacity and terminals will be needed
 - For import/export cargoes, on-dock rail is important to hold down drayage costs
- ◆ The railroads need money to make the necessary capital improvements to chase short-haul intermodal

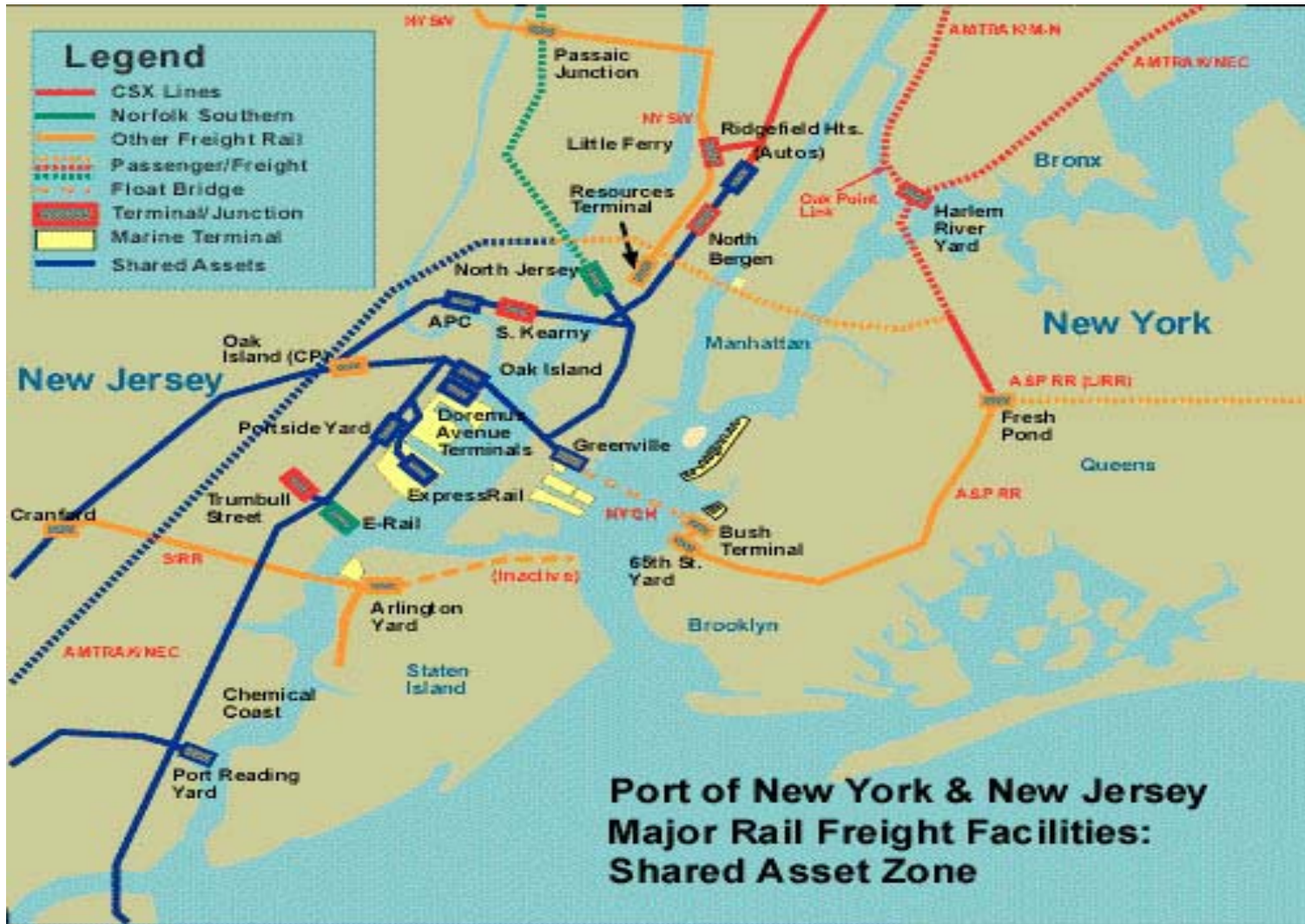
The Port Intermodal Distribution Network (PIDN) Study

- ◆ A couple of years ago, the Port Authority of New York and New Jersey undertook an analysis of ways to reduce the truck share of inland movements from the port (trucks move 87% of traffic to/from the port)
- ◆ Rail, barge, and truck costs were compared for inland movement
- ◆ ZETA-TECH, as a subcontractor to Moffat & Nichol Engineers, developed the rail costs for this analysis

The PIDN Analysis

- ◆ Ten “centroids” of truck demand were identified by M&N, with volumes of traffic to/from the Port of New York
- ◆ In each case, costs were developed for two alternate rail routings where feasible, one via CSXT and one via NS (in two cases, no competitive routings were available)
- ◆ Rail movement costs were calculated per “twenty-foot equivalent unit” (TEU)

Rail Access to Port Newark/Elizabeth



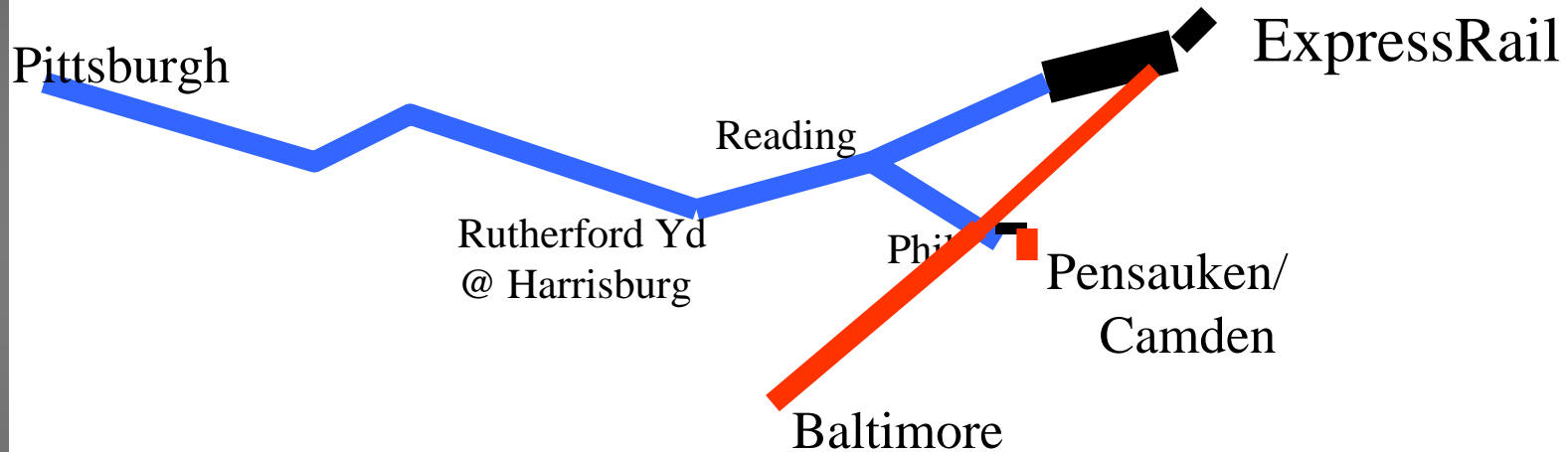
Rail Markets Analyzed

- ◆ ExpressRail to Philadelphia, Harrisburg, Pittsburgh
- ◆ ExpressRail to upstate New York points and New England, via both CSX and NS:
 - ◆ Albany
 - ◆ Syracuse
 - ◆ Rochester
 - ◆ Buffalo
 - ◆ Springfield/Worcester/Framingham, MA
- ◆ Rail service to East Hartford and Camden, NJ was found problematic due to lack of double-stack clearances

Expressrail to Phila., Harrisburg, Pittsburgh

Philadelphia, Rutherford, Camden
& Pittsburgh PIDN Network

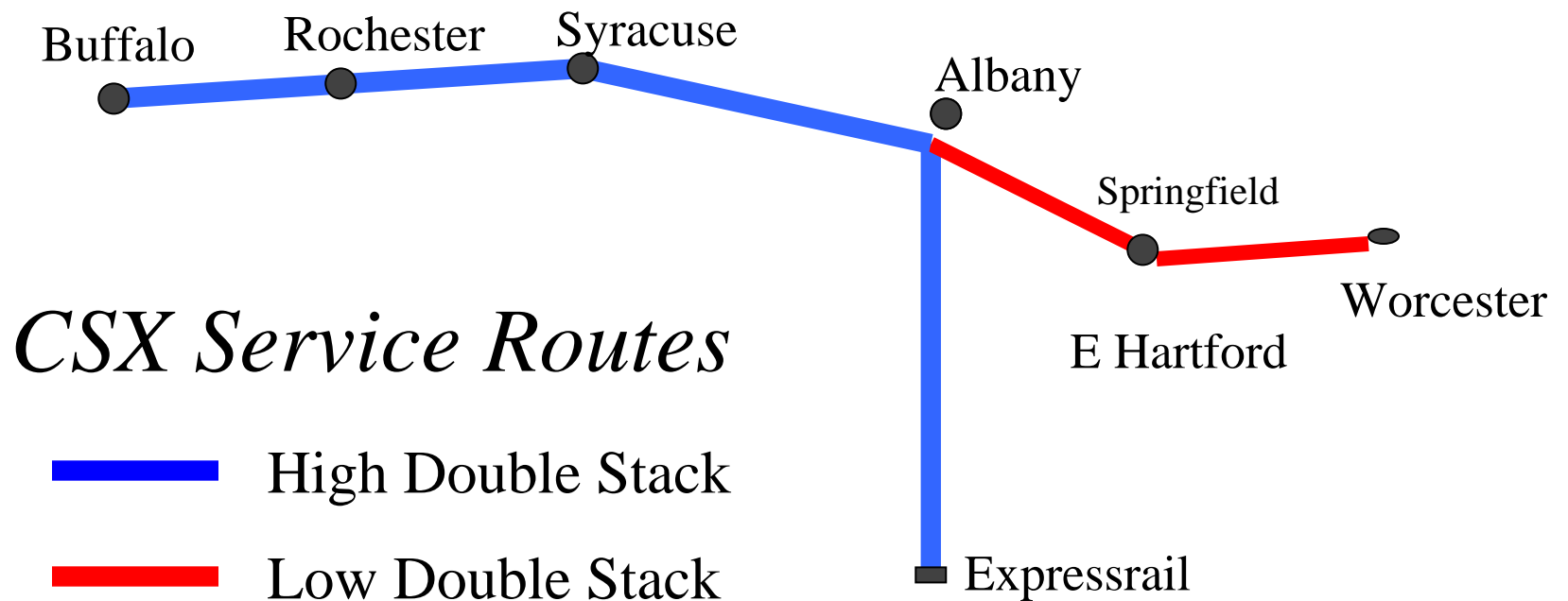
Not to exact scale



NS Service Routes

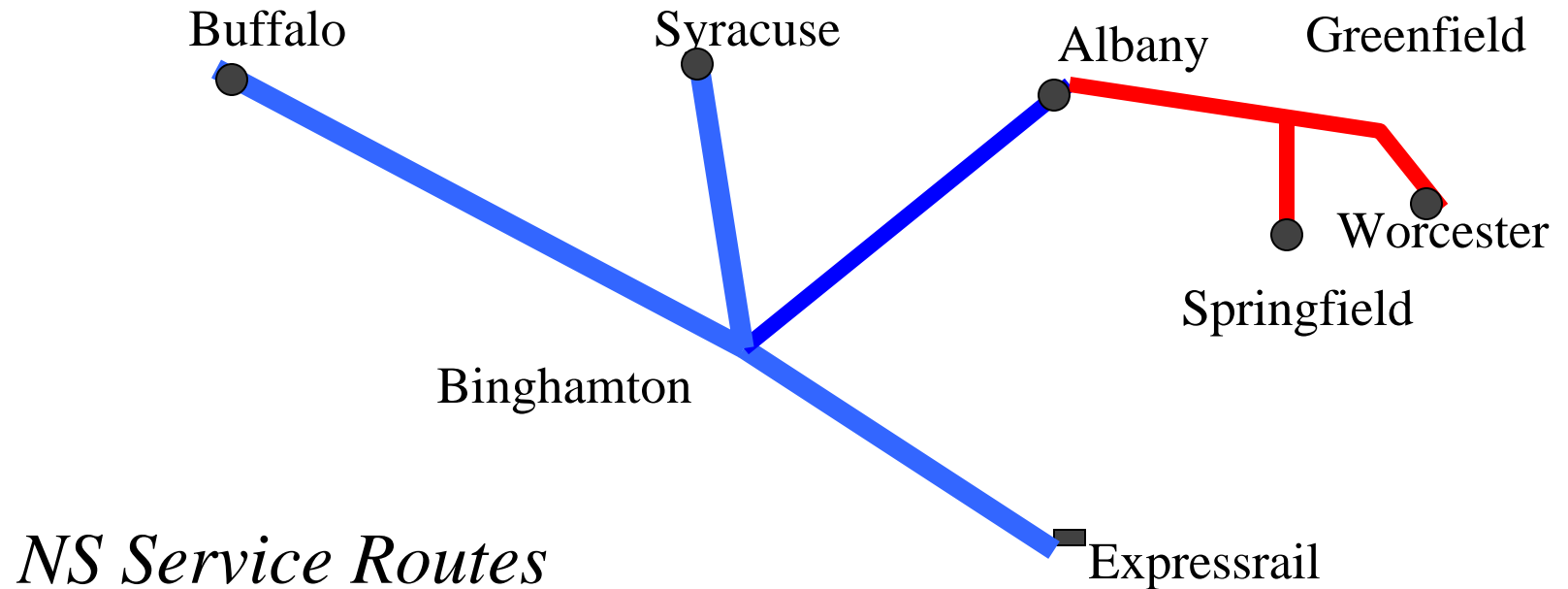
- Hi Dbl Stk
- Lower Clearance
- Shared Asset Section

New York State and New England (CSX)



Not to exact scale

New York State and New England (NS)



 High Double Stack

 Low Double Stack

Not to exact scale

Important Factors Affecting Rail Costs

- ◆ Clearances. Use of double-stack rail equipment greatly reduces cost per TEU
- ◆ Terminal costs. On-dock rail is essential.
- ◆ Reasonable travel times. Routes with excessive circuitry cannot not be competitive
- ◆ On-dock rail. This eliminates the drayage cost at the port (port costs were not included, since they applied equally to truck, coastwise barge, and rail)
- ◆ Reasonable equipment utilization
- ◆ Balanced flows (train capacity was sized to accommodate the heaviest direction of movement, meaning empty platforms were moved on the return)

Stack Train Technology in Brief

- ◆ In the 1980s, railroads developed freight car designs that could carry two ocean containers stacked on top of one another
- ◆ These cars produced reductions of up to 40% in movement cost, due to lighter weight and other design features
- ◆ Double-stack cars require 22 feet of overhead clearance
- ◆ The rail industry and some state governments have spent substantial sums “clearing” rail routes for stack train operation

The Old Way -- TOFC



The First Double Stack Car: 1977



Modern IBC Stack Car



Resor@ZETATECH.com.

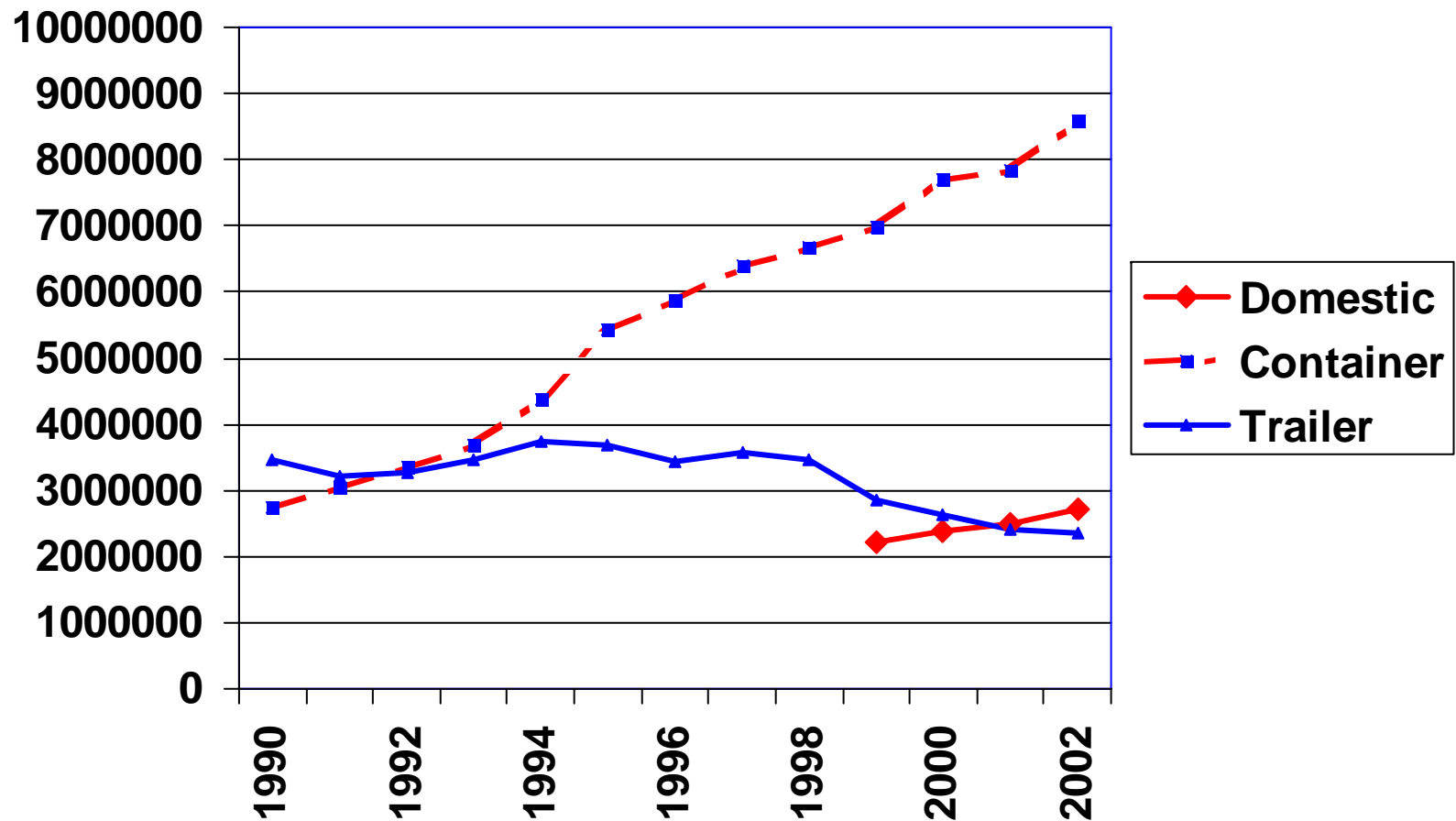
ExpressRail Stack Train Terminal



Stack Train, Alameda Corridor



U.S. Intermodal Traffic 1990 -- 2003



Cost Comparison: Rail vs. Truck

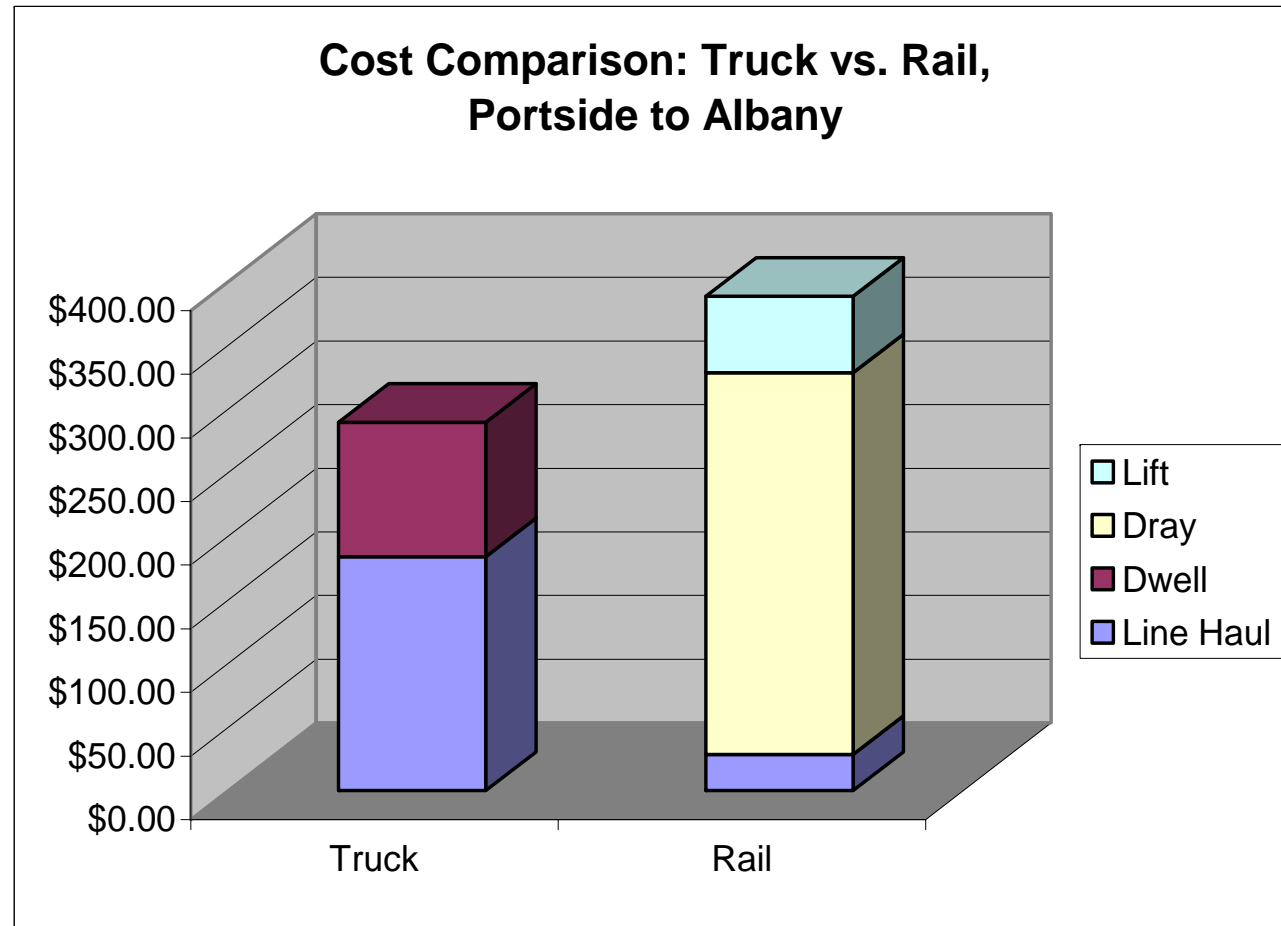
- ◆ Costs included for rail:
 - Cost per lift, origin and destination
 - Cost of car and locomotive ownership and maintenance
 - ◆ Ownership per hour, including running time and dwell
 - ◆ Maintenance per mile
 - Cost of crews (one crew per 7 hours of transit time, based on existing crew change points)
 - Cost of fuel (based on computer simulation of stack train operations)
 - Cost of track maintenance and replacement (per thousand gross ton miles, based on Conrail's historic cost)
- ◆ Truck costs include over-the-road cost per mile plus cost of dwell at customer and marine terminal
- ◆ Running time estimated @ 20 mph average for rail, 45 mph average for truck

One-Way Truck and Rail Cost per TEU

Destination	Rail Cost*	Truck Cost
Albany	\$294.13	\$211.25
Buffalo	\$322.58	\$383.98
Pittsburgh	\$321.70	\$348.75
Hagerstown	\$301.25	\$274.70
Framingham	\$339.87	\$239.47
East Hartford, CT	\$328.11	\$158.40

*Includes lift on and off, dray at destination only

Terminal and Dray Overwhelm the Line Haul Advantage of Rail



What's Missing from these Numbers?

- ◆ Profit. These are costs, not prices.
- ◆ Service reliability. Rail is generally less reliable than truck.
- ◆ Transit time differences. Costs do not reflect the time value of lading to the shipper
- ◆ The cost of capacity. The railroads are busy, and will require capital investment to handle large volumes of new traffic
- ◆ A backhaul. Costs are for a one-way move
- ◆ Note, though, that rail can be competitive in some lanes

So What Can be Done to Take Trucks off the Highways?

- ◆ Reduce terminal construction and operating costs
 - ◆ On-dock rail
 - ◆ New strategies such as “mini-terminals”
 - ◆ New technologies (Expressway)
 - ◆ Public investment
- ◆ Reduce dray costs
 - ◆ Better scheduling of drays to increase productivity
 - ◆ Central management of drayage
- ◆ Improve highway access to rail terminals

Concluding Thoughts

- ◆ Railroads can be competitive in many markets where they do not now participate. Short-haul intermodal is one.
- ◆ Highways are becoming increasingly congested, with no real relief in sight.
- ◆ Railroads are capital-constrained; they cannot fund all the investments needed to maintain their existing fixed plant.
- ◆ Public participation will be needed. The costs presented here suggest that, if terminal and dray costs can be minimized (by on-dock rail and/or public investment), rail can compete