



Final Report:

Regional Economic Benefits from CN's Acquisition of the EJ&E

Prepared for:
Chicago Metropolis 2020

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EXECUTIVE SUMMARY

The Regional Economic Benefits from CN's Acquisition of the EJ&E

Prepared by: Economic Development Research Group, Inc.

For: Chicago Metropolis 2020

November 25, 2008

The proposal for the Canadian National (CN) Railroad Company to purchase the Elgin Joliet and Eastern (EJ&E) Beltway, upgrade track and interchange connections and then route its existing trains along the beltway (effectively by-passing the heart of the Chicago rail-hub) extends the capacity for all rail users of the already congested rail terminal network by perhaps several years. CN would obtain a seamless connection for each of its five subdivisions, and two well placed rail yards. These two factors would contribute to operational efficiencies for CN through trains in terms of improved transit and yard time traversing Chicago. Other rail carriers in the network would benefit as well from reduced yard wait time and delays idling on congested track within the EJ&E arc.

This transaction when viewed from the perspective of *regional* and *national* economic benefit is associated with numerous *direct* travel time and freight cost (both transportation and logistics) implications as well as safety and emission outcomes. These direct changes have been identified by understanding how the performance of critical transportation infrastructure affects more than the vehicles and their contents on intersecting transportation modes or trip purposes (rail and highway intersections, passenger vs freight rail).

The value of the direct changes estimated for 2015 from this transaction are as follows:

Exhibit ES-1: \$ of Direct Annual net Benefit from CN Transaction

Consequence of CN Transaction	ANNUAL	
	Gross Benefit to all Traffic Involved	Benefit to Metro-area Based Users/Shippers
Rail – improved speeds and reduced wait times (existing traffic)	\$211,604,776	\$49,177,191
METRA – opportunity to expand service on NCS line	-\$8,268,808	-\$8,268,808
Passenger Car – reduced VMT and VHT from mode-shift to METRA	\$26,740,671	\$26,740,671
Truck – reduced VMT and VHT from mode-shift to rail	\$25,778,557	\$17,635,379
At-Grade Crossing effects (includes accident reduction)	\$3,378,808	\$3,405,491
<i>value of all direct benefits</i>	\$259,234,004	\$88,689,924
portion as Safety Benefits	\$6,642,646	\$6,642,646
portion as Emission Benefits	\$2,846,749	\$2,846,749
portion as Economic Benefits	\$249,744,609	\$79,200,529
Chicago Benefit as share of Gross		34.2%

These improvements belong to all affected traffic observed on the rail network. Since some of this traffic has its origin and destination outside the 8-county

Chicago metro area¹ the metro-area claim to the above direct values is \$88.6 million (34%) which includes the combined \$9.4 million of *social* benefits. The *at-grade* crossing delay impact (a net benefit) reflects a small reduction in annual accidents when crossings within and along the arc are considered. We assumed this would have reduced a *fatal* accident therefore it carries a large positive value. However the impact on delay time at these locations amounts to an increase of 107 hours per day worth \$782,000 per year to the vehicles involved.

Apart from the *net* safety and emission benefits, the majority of the remaining metro-area direct benefits come from freight logistics savings to metro-area shippers, rail freight cost savings shared with metro-area shippers, reduced truck transportation costs shared with metro-area shippers, and metro-area households saving by replacing an auto trip with a Metra trip. These benefit metro-area manufacturing industries and Wholesale Trade.

Apart from these valued direct effects from the operational changes on Chicago's rail (freight and passenger) and highway networks, two other direct economic effects will affect the Chicago metro economy from CN's proposed changes:

- An *annual* reduction of 114 Rail transportation jobs upon combining the CN and EJ&E workforces, and
- A three-year construction interval to phase in track and interchange improvements worth \$100 million.

The region's total economic impacts for 2015 are estimated as shown in ES-2 without including the initial three-year stimulus of related construction or the long term benefits from the \$60 million investment in mitigation offered by CN.

ES-2: Total Economic Impact - Chicago-metro 2015, CN Purchases EJ&E

		<i>million \$ (2007)</i>		
	Jobs	Business Output	Value-Added (GRP)	Labor Income
Total Impact _Transport Cost Savings	898	\$210.7	\$89.1	\$56.0
Total Impact _Rail Jobs lost	-249	-\$50.2	-\$28.9	-\$17.0
Combined	649	\$160.5	\$60.1	\$39.0

In addition are the annual safety and emission benefits that result, \$9.4 million.

The regional productivity impact is described by the +\$60 million of *gross regional product* (GRP) reported above. The National productivity benefit associated with the proposed improvement to a nationally-serving freight hub

¹ Comprised of Kane, Lake, Will, DuPage, Cook and McHenry counties in Illinois, and Lake and Porter counties in Indiana.

(through better utilization of an existing rail freight asset) is the Chicago-metro region's productivity gain *plus* approximately another \$207 million of GRP elsewhere in the U.S. Combined the U.S. economy will reap an added \$267 million of *gross domestic product* which in part will reward labor, capital and shareholders. Since the underlying mechanism of the rail freight improvement is through achieving efficiencies, households should see a reduced pressure on prices due to transportation system bottlenecks.

1

INTRODUCTION

1.1 Background and Objective

Canadian National (CN), a Class 1 railroad which operates part of its North American network and business through Chicago has filed an application with the Surface Transportation Board (STB) to acquire (and operate its trains on) a significant portion of the 198 mile Elgin Joliet and Eastern (EJ&E) Beltway railroad from U.S. Steel. Included in the proposed transaction is the transfer of ownership of two EJ&E classification yards (Kirk Yard in Gary, Indiana, and the East Joliet Yard in Joliet, Illinois) and initial investments estimated at \$100 million to improve connections where CN's existing lines intersect with the EJ&E and add double-track along specific segments. Subsequent investment (the amount not yet specified) by CN will be made predominantly to upgrade the configuration of Kirk Yard, with some modification to the East Joliet Yard. Currently CN has also committed \$60 million for unspecified mitigation.

The acquisition would allow CN to shift much of its current (through trip) traffic off its five lines where they enter the Chicago Terminal District (*within the arc*) and route them instead along the underused, circumferential EJ&E. Existing users of the EJ&E would remain under the terms of hauling or trackage agreements in place. The diverted CN train traffic alleviates congestion and delay in the core rail network (on tracks and in switching/classification yards) benefiting all freight rail carriers, and introduces more trains on the EJ&E.

It should be noted that CN might have simply established trackage rights with the EJ&E to route some of its traffic on the railroad. This would not have required an application to the STB. However, CN would not be able to achieve the operational efficiencies from better connections/interchanges of their existing lines with the EJ&E without making improvements, and that requires ownership. The transfer of assets between Class I and Class II (the EJ&E) railroads companies need not require STB approval *unless* certain traffic thresholds emerge concerning safety, or competition (two examples) as a result of the transfer.

The purpose of this evaluation is to measure the regional (8-county aggregate) economic impact from the transportation system changes associated with CN diverting its trains out of the core rail terminal network. This impact will be measured for a metro-area defined by the northeastern Illinois counties of Lake, McHenry, Cook, DuPage, Will and Kane, and Lake and Porter counties in Indiana. The analysis year is 2015. A statement of the National economic benefits that arise from this transaction is also included. It is based upon the productivity gains that flow from the portion of the transportation benefits that accrue to freight (rail and truck) customer destinations outside of the metro-area.

1.2 Analysis Process

The analysis process used by the consultant team involves four steps. They are:

- 1) **First, to translate the information regarding the railroad asset transfer into specific transportation user changes.** CN's application filing with the STB and the STB draft EIS) formed the starting basis for our analysis. For rail freight carriers, metro-area motor vehicular traffic, and for passenger (Metra) rail) assess the following:
 - time changes (and the value of that time) for any freight rail train on the Chicago network. This includes transit time, track idling time, and time spent in getting through a switching or classification yard.
 - At-grade crossing delay changes for motor vehicles along the arc and within the arc
 - Line capacity changes on Metra or AMTRAK operations
 - Safety changes in terms of accidents between a train and a motor vehicle
 - Changes in train and motor vehicle emissions
- 2) **Second, analyze the above user travel impacts** (as discussed in Chapter 3). The changes in vehicle-hours and vehicle-miles of travel are translated into changes in travel time, vehicle operating cost and accident rates. Ultimately, all of these metro-area changes involving either rail freight or motor vehicle traffic affect business travel, commuting trips and personal trips. Those effects are then translated into changes in the dollar value of total user (time and operating) costs.
- 3) **Third, economic impacts on the metro-area region are measured** (as discussed in Chapter 4). The calculations are made using the TREDIS model² for 8-county aggregate study area to identify how the user impacts allocate to the region's households, and the region's rail-using industries (as the business cost and productivity implications are differentially incurred). Those results are used to estimate the resulting changes (through an economic multiplier effect) in metro-area jobs and associated changes in levels of labor income and Gross Regional Product. The portion of initial transportation user impacts that do not belong to rail-customers, or motor vehicle traffic based in the metro-area are not

² Transportation Economic Development Impact System

overlooked. They are a significant part of the National productivity gain that results from achieving efficiencies within a (rail freight) terminal network that serves traffic from all over the country and elsewhere in North America.

- 4) **Finally, the policy implications of these findings are discussed.** This discussion will establish what the study's result can appropriately address as well as contribute to the public decision-making process.

2

TRANSPORTATION SYSTEM IMPACTS FROM THE CN ACQUISITION

The CN application focused on how its portion of all train traffic into the Chicago Terminal Network (approximately 7 percent) would be affected if CN could own, improve and use the EJ&E railroad for its through trains. Currently CN trains must enter and transit the Chicago network (“within the arc”) over the IHB and BRC railroads to connect onto their rail lines (CN has no seamless rail subdivision) and to reach any of their switching and consolidation/classification yards. This study seeks to address how all rail carrier traffic into/out of/through Chicago is affected when CN trains leave its own rail lines “within the arc”, route to peripheral yards (East Joliet, Kirk), dedicate Markham Yard as a purely Intermodal (I/M) Yard, and lessen congested conditions on the IHB and BRC railroads. From the perspective of the core rail freight network, such shifts would temporarily augment the infrastructure capacity which has been chronically congested, at or near capacity and not invulnerable to grid-lock. We also examine how the operational gains for CN might trigger a small mode-share diversion for a class of competitive freight away from truck. This would result in a small increase in car-load and I/M trains. It should be noted that CN did not assume a market share increase (from other rail carriers or from trucked freight). This analysis does not attempt to incorporate aspects of the *CREATE* program in the underlying rail future.

The functioning of the freight-rail traffic flows on this network has implications for motor vehicles when rail lines cross roads *at-grade*. We examine the region’s change in motor vehicle delay at the implicated crossings – that is delay reduced for the motor vehicle traffic “within the arc” compared to how delay increases for the motor vehicle traffic intersecting the EJ&E.

The presentation that follows reflects the conclusions of two detailed analyses required to develop this economic impact study. They were developed by Carl Martland, a rail-freight and Intermodal systems consultant, formerly with M.I.T. who served as a part of the consultant team. Complete versions are included as Appendices to this document.

The last aspect of the transportation system to be evaluated was Metra commuter rail service³. This analysis does not hypothesize on the *STAR Line* introduction as Metra had yet to begin negotiations with the EJ&E. However, there is a strong possibility that weekday (and weekend) commuter service on its North-Central Line would be possible when CN re-routes its trains off the Waukesha Subdivision and onto the EJ&E. Using some basic service assumptions supplied by SmartMobility Inc. we include this added passenger transit ridership (and reduced auto traffic) into our study.

2.1 Rail Carrier Operations Impact

In order to obtain estimates of the operating, service, and productivity changes that would result from CN's proposed acquisition and operation of the EJ&E, it was necessary to make numerous assumptions concerning the types of traffic that will be affected, the magnitude of the impacts, and the implications for cost and service. In September 2008, Chicago Metropolis 2020 hosted a series of meetings with railroad officials, public officials, and consultants familiar with operations within the Chicago Terminal region. Much of the insight and information garnered from those meetings are reflected in estimates derived in for this section.

In considering the impact of the proposed acquisition of the EJ&E on other train movements, this analysis goes beyond the draft EIS prepared by the Surface Transportation Board. The draft EIS did not consider the effect of the proposed merger on train movements on railroads other than the CN and the EJ&E. This was a major omission, because 15 to 20 trains per day must currently move via the IHB or the BRC between the Waukesha Subdivision and the other CN subdivisions or interchanges with CSX and NS.

The routing of all freight trains through the Chicago Terminal is coordinated by the CTCO, and the actual routing can vary with actual operating conditions. Train speeds are limited to 10 mph on some routes, and there are frequent, lengthy delays caused by conflicting train movements. The UP and BNSF mainlines into Chicago from the west are operating close to capacity, and operations through critical interlockings can be very difficult. Operations through the terminal are exacerbated by the fact that most of the terminals within the region are also operating close to capacity and periodically become jammed, at which times they are unable to receive any additional trains for hours at a time. CN reports delays of 8-12 hours to trains trying to move to or from the Waukesha Sub line when the BRC is jammed.

Trains have considerable difficulty moving within the Chicago Terminal. The

³ Other passenger rail service (AMTRAK) is not examined since CN has agreed to allow Amtrak to operate over its lines until an alternative routing is found. Therefore the proposed acquisition and change in operations will have no impact on Amtrak.

CTCO measures the time at which trains pass into or out of the region, roughly defined as the perimeter defined by the EJ&E. Many trains are simply trying to move across the region from one railroad to another without requiring any work other than a crew change within the terminal. The average time for these run-through trains to move the 60-80 miles through the terminal is 12 hours on a good day and averages about 16 hours.

Improvements in Performance for CN Traffic

Freight Car Utilization

Intermodal trains to or from Canada would no longer have to traverse the congested center portion of the Chicago Terminal, saving 14 hours per train. This estimate assumes that the average time to traverse the terminal will slowly increase, from the current average of 16 hours to 17 hours as of the completion of Phase III of the CN's upgrading of the EJ&E. The EIS estimated that the travel time from the Waukesha Subdivision to Kirk Yard would be somewhere between 2 and 4 hours; we assume that the intermodal trains would be able to cover the shorter distance between Markham Yard and the Waukesha Subdivision in 3 hours. Intermodal trains to or from the south and the east would not be affected, as they would still be using existing CN lines (the Elsdon and the Chicago Subdivisions) to access Markham Yard.

Through trains would also save approximately 14 hours per train in by-passing the center of the Chicago Terminal.

General freight trains would all be routed to or from Kirk Yard or E. Joliet Yard. All of this traffic would be moving around the EJ&E from one CN line to another, with savings on the order of 14 hours by by-passing the center of the Chicago Terminal. In addition, a portion of this traffic currently requires two classifications to move through the terminal. CN did not provide an estimate of the fraction that would save a classification, but indicated that most traffic currently requires only one classification. We have assumed that 20% of the traffic avoids a second classification, saving an average of 30 hours per car.

Local train service would be simplified in the new operating plan, as classification would be concentrated at two yards (E. Joliet and Kirk) and local trains would operate in from the EJ&E rather than out from one of the yards in the congested center of the Chicago Terminal. CN did not provide an estimate of the fraction that would save a classification, but indicated that most traffic currently requires two classifications. We assume that 80% of the traffic avoids a second classification, saving 30 hours per car.

Interchange service would also be simplified if the interchanges were moved as anticipated in the proposed operating plan. The traffic interchanged between BNSF/UP and the IC/GTW lines would be moved along the EJ&E rather than

going through the center of the Chicago Terminal, as would the traffic interchanged between the Waukesha Subdivision (i.e. Canada, Wisconsin, and Minnesota) and the IC/GTW lines. All of this traffic would save approximately 14 hours in train time and some (We assume a small portion, say 20%) would save work at one or more yards.

Exhibit 2.1.-1 summarizes the travel time impacts. The average savings per car is 16.4 hours, which is consistent with CN's estimated savings of 15-18 hours per car. The total car-hour savings are 80 thousand per day or 29 million per year. A typical value for car-hire is \$1/hour, so that these car-time savings amount to approximately **\$29 million per year**. Since cars involved in these moves may be owned by CN, other Class I railroads, other railroads, customers, or car supply companies, it is unclear who would actually receive this savings. Given the competitive nature of freight transportation, it is likely that improvements in utilization will ultimately be passed on to customer in the form of lower rates even if the customer does not own the cars.

Exhibit 2.1.-1 CN Service Improvements

	Daily Traffic Volume	Savings in Train Time	Savings in Yard Time	Total Time Saved	Hours Saved/Day
Intermodal					
• To or from Canada	720	14	0	14	10,080
• Other	1080	0	0	0	0
CN Run-Through Trains	300	14	0	14	4,200
Local, to CN lines					
• Bypass one yard (80%)	440	14	30	44	19,360
• Same number of yards (20%)	110	14	0	14	1,540
CN, through general freight (classified at E. Joliet or Kirk Yard)	1460				
• Bypass one yard (80%)	292	14	30	44	12,848
• Same number of yards (20%)	1168	14	14	14	16,352
Interchanged	800	14	6	20	16,000
Total	4910				80,380
Average per car or intermodal unit				16.4 hours	

Locomotive Utilization

A similar analysis can be done for locomotive utilization. If diverting trains away from the center of the terminal saves 14 hours per train, then there will also be 14 hours saved for every locomotive unit on the train. Thus, the locomotive savings can be estimated by assuming that 41.6 trains per day will each save 14 hours by by-passing the center of the terminal. If there are 3 locomotive units per train, the daily savings will be 1474 hours. This savings is 0.3 locomotive-hours per car, and the savings will initially accrue entirely to CN, as CN either owns or leases the locomotives used for its trains. If a locomotive costs \$2 million, then the annual carrying costs or lease rates will be on the order of \$200,000 per year, which would be \$25/hour assuming 90% serviceability. Taking \$25/hour as the marginal benefit from saving locomotive hours, the daily savings would be \$37 thousand and **\$13.5 million annually**.

Service Reliability

Customers whose shipments by-pass a yard will not only reap savings of nearly two days in average trip time, they will have more reliable service. For example, consider a hypothetical move between western Canada and Chicago that currently is scheduled to be handled at five yards, including two in Chicago. This move might initially experience typical levels of service for general merchandise traffic: an average trip time of 7-8 days, with the 95th percentile of the trip time distribution being 9-11 days. Accessing the proper CN subdivision via the EJ&E could save nearly two days: 14 hours by avoiding a congested route through the center of the terminal and another 30 hours by avoiding one of the yards in Chicago. The 95th percentile of the trip – a time that shippers might consider more relevant than the average trip time in planning their inventories – will probably be reduced by close to 3 days.

Equipment Utilization Benefits for Other Rail Carriers Using the Chicago Terminal

Removing traffic from any congested network will improve performance for the remaining traffic. Applying this basic principle of transportation systems analysis to the current situation will provide a lower bound upon the performance benefits that would result from the proposed diversion of freight trains to the EJ&E.

The Chicago Terminal is operating close to its capacity, and it is certainly congested. Discussions with railroad officials indicated that train delays are extensive, service reliability is poor, and the terminal risks gridlock in the event of a major storm. Rail-rail crossings, conflicts among freight and passenger trains, outmoded infrastructure, slow orders, and yard capacity problems all contribute to the terminal's difficulties. For trains that are just trying to pass through the terminal with nothing more than a crew change, the average time required is 16 hours, and 12 hours would be a very good time. Since the terminal is at most 80

miles across, even the best time indicates an average speed of only 6-7 miles per hour.

From all accounts, the rail operating environment in Chicago exhibits the symptoms of a highly congested network. Based upon discussion with operating officials familiar with the Chicago terminal, the average daily time for through trains to wend their way through the terminal varies from 12 to 20 hours; delays to individual trains can be far longer, especially when yards are plugged and unable to accept any more inbound trains. Without major investment, the overall freight traffic growth rate of 2-3% will lead to gridlock within a few years.

Even without any detailed analysis of the terminal, however, it is possible to provide an estimate of the potential impact of the changes on the operation of the terminal. The anecdotal evidence certainly supports the logical approach:

- The terminal is operating close to capacity, so that small increases in traffic will lead to longer average times and lower reliability for movements through the region.
- The same logic indicates that small decreases in traffic will lead to shorter average times and higher reliability for movements through the region.
- The terminal has many alternative routes available for moving between the dozens of major rail yards that are operated by the Class Is, the IHB, and the BRC. Any significant capacity added to any of these routes could lead to adjustments in the flows throughout the terminal.

The benefits per car or intermodal unit will be much less for other rail carriers than for the CN traffic. Since CN represents only 7% of the traffic through the terminal, the savings per car for other rail carriers traffic would be approximately 7.5% (i.e. $0.07/0.93$) of the savings per car for CN's traffic: 1.2 car-hours per car and 0.02 locomotive hours per car. Using the same logic as used for the CN analysis above, the value of these savings would be at least \$29 million for freight cars and intermodal equipment and \$13.5 million for locomotives. As with the CN traffic, the benefits related to shipments moving to or from Chicago would be expected to be about a quarter of the total. Exhibit 2.1.-2 summarizes the travel time impacts for *Other Rail Carriers* on the network.

Exhibit 2.1.-2 Service Improvements *Other* Rail traffic

	Daily Traffic Volume	Car Time Savings	Loco-hr Savings	Employee Hours Saved	Total	Avg. Per Unit
Total per day, other traffic	70,000	\$80,000	\$37,000	0	\$117,000	\$1.67
Total Annual Savings, <i>Other traffic</i>	-	\$29.2m	\$13.5m	-	\$42.7m	-

Labor Efficiency Savings

CN has identified labor efficiencies resulting from the joint operation. Their application and the EIS identified 114 positions that could be eliminated once the operations were completely integrated. The three major categories were as follows:

- 36 Maintenance of Way (because CN would use its more efficient MOW forces to upgrade and maintain the EJ&E)
- 36 Train and Engine Service (because CN and EJ&E local operations would be more efficient once they were combined)
- 28 Clerks (because CN would introduce its more efficient information systems)

According to AAR statistics (“Railroad Facts”), the average wage for MOW workers was \$57,000, the average wage for T&E service was \$66,000 and the average wage for professional and clerical workers was \$64,000. Employee benefits and payroll taxes amounted to 38% of wages for the industry as a whole in 2006. The average 2006 total of wages plus benefits for the positions that could be eliminated on the EJ&E were therefore approximately \$88,000 per employee. The total cost savings would be \$10 million per year.

Summarization of Rail Carriers’ Operating Impacts

This section has identified improvements in service that range from a half day reduction in trip time to as much as a 2-day reduction in travel time and a 3-day reduction in the 95th percentile of the trip time distribution (*reliability*). Such changes could have an impact on mode share in some markets. In a separate assessment (see Appendix II -“Estimating the Effects of The Proposed CN Purchase and Operation of the EJ&E on Railroad Mode Share”), estimated changes in logistics costs for typical classes of traffic and customers that would

result from the service changes identified above are addressed. How much, if any traffic would be diverted will depend upon the pricing policy that is adopted by CN and its connecting railroads. It is conceivable that prices could be increased so as to maintain market share; it is also conceivable that a competitive freight market would drive prices down to marginal cost, so that customers would enjoy lower prices as well as better service and therefore ship more by rail. More likely, the railroads would share the benefits with their customers, thereby having some increase in mode split while providing customers some reduction in price.

Annual *estimated* operating benefits will initially be distributed as follows:

- CN: \$39 million (43%)
 - Car utilization: \$14.5 million
 - Locomotive utilization: \$14 million
 - Employee efficiency: \$10 million
- CN Customers: \$14.5 million (14%)
 - Car utilization: \$14.5 million
 - Chicago customers: \$7 million
 - Other customers: \$7.5 million
- Other railroads: \$29 million (29%)
 - Car utilization: \$14.5 million
 - Locomotive utilization: \$14 million
- Customers of other railroads: \$14.5 million (14%)
 - Car utilization: \$14.5 million
 - Chicago customers: \$5 million
 - Other customers: \$9.5 million

The benefits outlined here may or may not remain with the parties who initially benefit. Historically, competition among railroads has kept downward pressure on rates, so that productivity improvements eventually get passed on to customers in the form of lower rates. If this happens in the future, then many of the benefits cited above would show up as lower rates for customers. In the last few years, higher fuel prices, congested highways, and capacity limits in the rail industry have helped the industry increase its average price levels for the first time in many years. If these conditions continue, then conceivably the railroads could capture some of the benefits assigned to customers, as customers perhaps would be willing to pay more for the improved service.

Freight Rail Shippers' Logistics Cost Impact

This impact is expected to arise whenever there is a change in the performance of a transportation system (single or multiple modes). Changes in logistics cost is incurred by the business who uses rail to send or receive product.

We quantify these benefits by first calculating car-time savings and tons/car from values contained in the memo contained in Appendix I. Total freight time savings

are then calculated as the product of car-time savings and average load per car. Daily freight time savings are annualized by a factor of 365. These calculations are summarized below in Exhibit 2.1.-3.

Exhibit 2.1.-3 Rail Freight time Savings by type of Traffic

Movement Type	Car Time Savings (car-hrs/day)	Freight Volume (tons/ day)	Freight Volume (cars/ day)	Average Car Load (tons/car)	Freight Time Svgs (ton-hrs/ yr)
CN-Intermodal	10,080	21,500	1,800	11.94	43,946,000
CN-Through	4,200	10,500	300	35.00	53,655,000
CN-Local	20,900	19,300	550	35.09	267,691,000
CN-General Freight	29,200	51,100	1,460	35.00	373,030,000
CN-Interchanged	16,000	28,000	800	35.00	204,400,000
Non-CN Movements	80,000	1,859,063	70,000	26.56	775,494,908
Totals	160,380	1,989,463	74,910	26.56	1,718,216,908

Source: Appendix I - Tables 3 and 8

Average per-hour time costs are estimated using the capital “lock-up” method⁴, where the value of freight is discounted by one hour. Using a discount rate of 5% and 5840 hours per year (assumes an average of 16 hours per day, reflecting businesses’ possible operating hours) yields:

- Local freight: \$442.94/ton; \$0.078 per hour
- Non-local freight: \$355.14/ton; \$0.062 per hour
- Average_all freight: \$356.86/ton; \$0.063 per hour

However, commodities exhibit a wide range of values (per ton) according to FAF 2007 data. To gain additional resolution on delay savings, we estimate for each commodity the cost per hour relative to the average for all freight from the FAF data for the Chicago-metro region (see Appendix III). Freight commodity mix is also estimated using the 2007 FAF database. “Chicago-metro” commodity mix is estimated from rail trips completely internal to the Chicago Region; the mix for “other” reflects combined incoming and outgoing trips.

Total costs (per commodity) are estimated by multiplying commodity-specific values of time by the estimated total annual time savings for that commodity (derived using the mix per load). Commodity-specific costs are translated into

⁴ The capital lock-up method, used by Highway Economic Requirement System⁴, estimates the opportunity cost of freight’s travel time as it’s value discounted by one hour. This reflects the fact that the expected economic use of goods is suspended during transit, and is only “unlocked” upon arrival at its destination, where it may be used in production (or for final consumption). Therefore, an arrival one hour early “unlocks” the economic value of the shipment, which then may, in principle, be invested at the prevailing interest rate. In practice, this method is conservative because it does not include added costs for spoilage or logistical disruptions for just-in-time manufacturing facilities.

industry-specific costs by mapping them through “make” and “use” tables, derived from IMPLAN’s national input/output accounts. These calculations also depend on the O/D patterns (i.e., import/export patterns), such that time savings for imported commodities benefit industries that use them, while time savings for exported commodities benefit industries that make them.

O/D patterns are taken from the information in Appendix I (pages 6 and 7):

Movement Type	Fraction Internal	Fraction Incoming	Fraction Outgoing	Fraction Through
CN-Intermodal	0.0%	33.4%	33.3%	33.3%
CN-Through	0.0%	0.0%	0.0%	100.0%
CN-Local	100.0%	0.0%	0.0%	0.0%
CN-General Freight	0.0%	0.0%	0.0%	100.0%
CN-Interchanged	0.0%	5.0%	5.0%	90.0%
Non-CN Movements	0.0%	19.4%	19.4%	61.3%

Direct freight logistics cost savings *annually* are summarized below in Exhibit 2.1.-4.

Exhibit 2.1.-4 Annual Freight Rail Logistics Cost Saved by Traffic

Movement Type	Total Freight Logistics Costs (\$)	Chicago Shippers Freight Logistics Costs (\$)
CN-Intermodal	2,722,271	907,878
CN-Through	3,323,704	0
CN-Local	27,483,709	27,483,709
CN-General Freight	23,107,653	0
CN-Interchanged	12,661,728	633,086
Non-CN Movements	48,038,676	9,295,484
Total	\$117,337,741	\$38,320,157

2.2 Motor Vehicle Delay Impact

The draft EIS by STB contained a partial accounting of at-grade crossing delay changes along the EJ&E, and “within the arc” on CN lines only. Our estimate builds from the draft EIS at-grade crossing delay impact and includes time delay impacts at crossings on the IHB and BRC rail segments currently used by CN trains. Exhibit 2.2.-1 presents the delay impacts. The data for the CN subdivisions and the EJ&E affected crossings are taken from Appendix E

Exhibit 2.2.-1 At-grade Crossing Delay Impacts (8-county area)

CN Subdivision	<i>Delay Impact</i>	
	Hours per day	Value per Year*
Waukesha	-487	-\$3,557,302
Freeport	-113	-\$827,540
Joliet	3	\$19,868
Chicago	0	\$0
Elsdon/Southbend	-673	-\$4,913,776
<i>sub_total CN</i>	<i>-1,271</i>	<i>-\$9,278,750</i>
EJ&E (Xings aggregated by County)		
Lake County IL	253	\$1,844,649
West Cook County	40	\$288,995
Dupage County	246	\$1,792,320
Will County	608	\$4,436,891
SE Cook County	358	\$2,614,556
Lake County IN	29	\$208,293
<i>sub_total EJ&E</i>	<i>1,532</i>	<i>\$11,185,705</i>
EJ&E_Waukesha to Markham Yard	1	\$5,720
EJ&E_to/from Kirk Yard	12	\$89,232
IHB & BRC Xings	-167	-\$1,220,000
Total for all Relevant Xings	107	\$781,907
<i>delay Impact as % of current six county daily delay¹</i>	<i>0.97%</i>	

*Consistent with the STB analysis, an hour of delay is valued at \$20.

¹2002 Motorist Delay Analysis by the Illinois Commerce Commission estimate of 10,982 hours of daily delay with at-grade crossings in the 6-county Chicago metro region.

in the STB draft EIS. Estimated delay impacts for IHB and BRC crossings were developed by the consultant team. Refer to Appendix 1 for the discussion.

Safety impacts are estimated based on information provided by the Draft EIS (Appendix C - Attachment C2) reports a decrease of 2.51 accidents on the current CN line through central Chicago, but an increase of 1.56 accidents on the EJ&E bypass line. Therefore, the estimated net impact is a decrease of 0.95 accidents. We assume that this is a fatality accident, which translates to a net safety savings of \$3,470,000. If it were not assumed that the accident would involve a fatality, the lower bound of one fewer accident involving a motor vehicle and a train would be \$211,000 (for a non-fatal personal injury incident).

2.3 Vehicle Emission Impacts

Emission impacts are considered for (a) train operations for all carriers, related to improved *in-transit* performance as well as changes in track idling time, for (b) motor vehicles as a result of the delay impacts associated with *at-grade* crossings, and (c) reduced passenger auto trips when additional service is added to Metra's North Central line (this component will be presented in Sec. 2.4). For (a) and (b) we use the 2015 impacts expressed as tons/year for six emission types produced by train operations (Appendix K of the draft EIS). The small increase in rail related emissions for 2015 reflects the fact that diverted CN trains running on the EJ&E arc must travel a longer path, despite the lower emissions both from CN incurring less idling time on congested track or yard approaches and from other rail carriers having better *in-transit* and reduced *idling* times. We monetize the changes (in Exhibit 2.3.-1) in tons/year using \$ valuations per ton derived from VTPI⁵.

Exhibit 2.3.-1 Rail Emission Impacts 2015 with the EJ&E Acquisition

Pollutant	Est. Change in Tons	Est. Value per Ton	Total Cost of Emissions
VOC	4.6	\$9,000	\$41,400
CO	19.1	\$500	\$9,550
NOx	95.1	\$11,000	\$1,046,100
SO2	0.07	\$12,000	\$840
PM10	3.05	\$7,500	\$22,875
PM2.5	2.96	\$7,500	\$22,200
Total Emission Impact Cost			\$1,142,965

Motor Vehicle Emission Impacts for 2015 are shown in Exhibit 2.3.-2. They are taken from Table 4.9-6 from the draft EIS and adjusted to take into account the *at-grade* crossing delay changes along the IHB and the BRC rail lines (consistent with Exhibit 2.2.-1 above). The \$ valuations per pollutant are taken from the same source cited above for cost of rail emission impacts.

⁵ *Transportation Cost Benefit Analysis*, Victoria Transport Policy Institute, 2006.

Exhibit 2.3.-2 Motor Vehicle Crossing Delay Emission Impacts 2015 with the EJ&E Acquisition

Pollutant	Est. Change in Tons	Est. Value per Ton	Total Cost of Emissions
VOC	1.1	\$9,000	\$9,900
CO	9.1	\$500	\$4,550
NOx	0.5	\$11,000	\$5,500
SO2	0.003	\$12,000	\$36
PM10	0.004	\$7,500	\$30
PM2.5	0.003	\$7,500	\$23
Total Emission Impact Cost			\$20,039

2.4 Passenger Transit Impact

If funding is secured, Metra could add 5 additional round-trip trains on its North Central service line between Vernon Hills (the northern most stop before crossing the EJ&E where CN would divert its trains) and downtown Chicago Union Station. There is the possibility of implementing weekend service, however we focus solely on the weekday implications. SmartMobility Inc. (Norwich, Vermont) has handled the Chicago metro-area travel demand modeling (TDM) network for numerous studies of transportation issues in Chicago. Most recently (2007) they participated in evaluating the travel user impacts of various funding scenarios for the RTA in Chicago and have contributed to the Regional Freight Mobility Plan⁶ for the Chicago metro-area. The same TDM analysis model is used for this passenger transit consideration.

The assumed daily ridership is 260 per round-trip or 1,300 total for the added daily service. This ridership is expected to come from existing passenger auto trips (no induced trip growth). The assumed passenger auto occupancy is 1.25. The daily passenger car diversion to the added Metra service is shown in Exhibit 2.4.-1 for 2015. The associated emission impacts, arising from fewer car trips and more commuter rail trains, are shown in Exhibit 2.4.-2.

⁶ 2004, on behalf of Chicago Metropolis 2020.

Exhibit 2.4.-1 Metro-area Auto Diversion with Expanded Metra Service, 2015

Chicago-Metro Road Network	Change over Base case	
	per Weekday	Annual
Passenger Auto Vehicle Hours of Travel	-5,370	-1,396,200
Passenger Auto Vehicle Miles of Travel	-48,000	-12,480,000

Exhibit 2.4.-2 Emission Impacts Passenger Auto diversion to Metra, 2015

Pollutant	Additional Annual Train-miles ¹	Gallons per Train-mile	Additional Annual Gallons	Estd. grams/gal from EIS	Additional Annual Tons	METRA Emissions Costs
VOC				6.59	0.86	\$7,734
CO				27.4	3.57	\$1,787
NOx	91,000	1.3	118,300	136.73	17.83	\$196,131
SO2				0.1	0.01	\$156
PM10				4.38	0.57	\$4,284
PM2.5				4.25	0.55	\$4,157
						\$214,248
						Auto Emission Cost
Passenger Auto		Annual Mileage Impact	-12,480,000	Emission Cost per Mile	\$0.05	-\$624,000

¹ Assumed length of service is 35 miles.

There will be safety (accident) impacts (Exhibit 2.4.-3) with fewer auto vehicle-miles-of-travel and increased train service. Passenger car accident rates are estimated from Bureau of Transportation Statistics (BTS) as follows:

- Fatality Accident: 0.93 per 100m VMT
- Personal Injury Accident: 85 per 100m VMT
- Property Damage Accident: 198 per 100m VMT

Commuter rail accident rates (also from BTS) are as follows:

- Fatality Accident: 4.9 per 100m VMT
- Pers. Injury Accident: 35 per 100m VMT
- Prop. Damage Accident: 0 per 100m VMT

Accidents for both modes are valued as follows (from USDOT, FHWA, adjusted to \$2007):

- Fatality Accident: \$3,660,000 per accident
- Personal Injury Accident: \$211,000 per accident
- Property Damage Accident: \$2,800 per accident

Exhibit 2.4.-3 Impacts on Safety from Auto diversion to Added Metra Service, 2015

	Impact on # of Incidents			Impact on Incident Cost
	Fatality	Personal Injury	Property Damage	
Passenger Auto	-0.12	-10.61	-24.71	-\$2,732,271
Additional Metra trains	0.004	0.032	0.000	\$23,040

The last aspect of the passenger transit service consideration is to account for changes in vehicle (auto or train) operating costs as annual VMT or train-miles change. For passenger auto we have assumed \$0.58 per mile of operating cost (this reflects a price per gallon of gasoline of \$4) and \$10.35 per hour of driver/passenger time⁷. We assume the additional Metra service would not have a capital cost requirement, however we expect additional operating costs. We apply an operating cost-to-train-mile elasticity⁸ to approximate how operating costs would increase from the 2008 Metra operating budget systemwide⁹, and assume these costs will be carried by commuters. Exhibit 2.4.-4 shows the impacts on operating costs.

Exhibit 2.4.-4 Auto and Commuter Train Operating Cost Impacts 2015

	Impacted Miles		Operating Cost Impact	Time saved on HWY	
	Annual	Operating Cost per mile		Annual Hours	Value of Time
Passenger Auto	-12,480,000	\$0.58	-\$7,238,400	1,396,200	\$ 14,450,670
	Annual Increase	Current	% increase train miles		
	Train miles	Train miles			
North Central Commuter Trains	91,000	7,783,305	1.2%		
elasticity of service-to-expenditure =		67%			
Current Metra Annual OP Budget =		\$553,000,000			
est. of additional Metra operating Cost =		\$4,310,337			

Concerning the future performance of existing Metra service, *i.e.* potential for delays to METRA trains that cross the EJ&E, it is assumed for this analysis that since METRA has first priority at all of these crossings, there should be minimal impacts resulting from the increase in CN traffic.

⁷ This reflects 50 percent of the 2007 average hourly wage for the Chicago metro-area. Source: Bureau of Labor Statistics.

⁸ A value of 0.667 was identified for the elasticity. Source: *Moving Beyond Congestion*, Joint study for Chicago *rta*, Metra, *cta* and *pace*, 2007.

⁹ \$553 million per year on 100 million passenger trips. Source: Metra Annual Report 2008

2.5 Truck-to-(CN) Rail Diversion Impact

A complete discussion of our estimate of the freight-rail mode share implications of the CN acquiring the EJ&E is contained in Appendix II. Excerpts of the logic and the findings are presented here. The basic question we attempt to address regarding rail mode share is - *to what extent will service improvements such as those predicted for CN result in diversions of freight from truck to rail?* These savings will potentially be most important for general freight that could move by truck, intermodal or rail depending upon the relative prices and services that are offered. For bulk traffic, such as coal or grain that is moving through Chicago requiring little or no yard work, the proposed service changes are less likely to affect mode share, as rail unit trains already have a very marked advantage over trucks. Competition among truck, intermodal, and rail for general merchandise traffic is assessed. The basic conclusion is that saving time by avoiding the congested center of the Chicago terminal region will provide a clear advantage to rail, both for general freight and for intermodal containers or trailers. Whether or not the service improvements and cost savings lead to changes in mode choice will depend upon CN's pricing strategy, as well as external factors such as the price of fuel.

CN's application to the STB identified a small amount of rail traffic that would be diverted to the CN/EJ&E route, because that route would become more direct than prior routes. CN did not expect to capture any traffic from highways as a result of the service and productivity improvements.

This assessment is based on a methodology developed at MIT and applied previously in various studies, including recent studies conducted for the International Railway Congress (UIC) and for the Coalition Against Bigger Trucks (CABT). The UIC methodology has been updated and adapted for examining rail mode share for a set of generic origins and destinations under various assumptions concerning changes in CN service once the EJ&E route is fully operational.

Two alternative scenarios were considered:

- Better Access: trip times were reduced by 14 hours for all rail and intermodal movements to reflect the time saved by moving on the EJ&E rather than through the center of the region
- By-Pass: trip times were reduced by 44 hours to reflect both the better access and the 30 hours saved by by-passing a yard. The buffer required for 95% reliability was reduced by 12 to 24 hours to reflect the better reliability resulting from eliminating one classification. The model automatically calculates the savings in car-hours and cars handled at terminals, and the unit costs for terminals were reduced another \$20 per

car to reflect the other expected efficiencies in operations. Note that the savings will apply to both the loaded and the empty movements associated with a shipment.

These two cases are consistent with, even though they do not align precisely with the estimated cost and service benefits estimated for Chicago (Appendix I memo).

Three options were explored concerning CN's possible pricing behavior as they reap operational savings: (a) maintain the ratio of price-to-variable cost – since variable costs are declining this means CN would lower rates to customers –the upper limit for rail mode share gain; (b) maintain market share (focus on the most profitable freight) while raising rates; and (c) customers and rail carrier share benefits, this is an intermediate stance between (a) and (b). The results for (c) are shown in Exhibit 2.5.-1. There appears to be an opportunity for attracting some traffic, especially in situations where a yard is by-passed. However, it is likely that CN would keep increasing prices so long as its traffic volumes held steady.

The information in the tables needs to be interpreted in the context of CN's traffic mix in Chicago (discussed in the Appendix I memo). To reiterate, 60% of CN's daily traffic will benefit from better access (a potential mode share gain of 4 percent) and 18% will benefit from by-passing a yard (a potential mode share gain of 20 percent, roughly 170 additional freight cars per day).

Exhibit 2.5.-1 Mode-split Results for Shared Rail Operational Benefits

Mode	Rate Factors (Base, Access By-Pass)	Base	Better Access	By-Pass
Rail	1.10, 1.15, 1.30	29.4%	30.6%	35.8%
Intermodal	1.10, 1.15, 1.13	10.1%	10.4%	10.5%
Truck	1.00	60.5%	59.0%	53.7%

Exhibit 2.5.-1 results provide reasonable estimate of the magnitude of traffic increases that might result from the estimated improvements in service. Applying the increases in mode share from this table to the traffic that would be impacted provides an estimate of the potential for traffic growth relative to the traffic volumes considered in the draft EIS:

- No change in service: no change in mode share (1080 intermodal units)
- Improvements in access: 4% increase in mode share
 - 720 intermodal units/day would increase by 21 units per day.
 - 2218 freight cars/day would increase by 90 cars per day.
- By-pass one yard: 22% increase in mode share for truck-competitive traffic
 - 892 freight cars/day would garner the service improvement, but a large portion of this traffic is low-value bulk traffic that is relatively non-competitive with truck. Assuming that two thirds of

the traffic is truck competitive, there would be an increase of about 130 cars per day.

The total daily increase would be 30 intermodal units and 220 general freight cars. This would be 1.1% increase in CN's intermodal traffic and a 6.8% increase in CN's other traffic within the region. The intermodal units would be equivalent to an additional train per week operating along the EJ&E between the Waukesha subdivision and Markham yard. The increase in general freight traffic would be equivalent to a bit more than two 100-car trains per day (15.6 trains per week), most of which would be operating along the EJ&E between Kirk Yard and intersections of the EJ&E with BNSF, UP, or the Waukesha subdivision of CN.

The added traffic would have two effects on highway traffic in the region. The additional trains would increase the crossing delays estimated for the EJ&E by approximately 5% (this has been captured in Exhibit 2.2-1 above). The estimated increase in intermodal traffic would have a modest impact on highways by diverting 30 trucks per day. The increase in rail carload traffic would be much greater, as each freight car carries the equivalent of 3-4 truckloads. The estimated increase of 220 general freight rail (loaded) cars per day represents a potential to alleviate congestion on the region's highways would therefore divert 650-800 trucks daily.

The added traffic would divert to rail because of the opportunity to reduce logistics costs for shippers. The magnitude of the benefit could be very large, for a customer that was already wavering between rail and truck, or it could be very small if the reductions in trip time and prices barely made rail more attractive than truck. The average savings for new customers will always be less than the reduction in logistics costs for shipping by rail (because the new customer previously used truck, presumably because the total logistics costs for using truck were less than the total logistics costs for using rail). The average savings can be estimated as half of the reduction in logistics costs for shipping by rail (using the so-called "rule of one half" devised by economists for estimating the benefits of price reductions to new customers.) The operating benefits for the new traffic would therefore be on the order of \$15 to \$45/car rather than \$30 to \$90 per car.

3

REGIONAL IMPACTS ON TRANSPORTATION USER

The presentation of changes in Chapter 2 emanate from a proposed change in freight rail infrastructure (the EJ&E). The discussion included interactions with the road/highway system, and passenger rail implications – *rail freight operational improvements, at-grade crossing delay for motor vehicles, passenger auto trips diverted to additional commuter rail, improved highway performance with fewer auto trips, vehicle (train and auto/truck) emission changes, safety implications, and potential to divert truck trips onto freight rail with improved highway performance with fewer truck trips*. This chapter will present these changes as those that accrue to metro-region based users (businesses and households) of rail freight, passenger rail, and the highway system. The balance of the direct changes that do not belong to a rider/trip with at least one trip-end in the 8-county area are direct impacts for the *rest of U.S.*

Besides allocating the direct impacts, we present any necessary assumptions for making this allocation and for expressing any of the direct changes in dollars values which were not already shown in Chapter 2. The *valuation* of the direct impacts is necessary for running the TREDIS (Transportation Economic Development Impact System) model and deriving economic impact results related to the CN's proposed acquisition of the EJ&E. Both are presented in Chapter 4.

Remaining Assumptions

Traffic Mix at crossings: *truck 8.9%, auto 91.1%* (*source: draft EIS – U.S. EPA MOBILE6.2 Emissions model, default national fleet-mix*)

Truck origin-destination (O-D) patterns: approximately 62% of the truck impacts will accrue to metro-based shippers (this is a trip-end weighted result that accounts for a truck trip with both end in the 8-county area, as well as those truck trips that have either an origin or a destination in the 8-county region).

Auto origin-destination patterns: given the aspects of the analysis that involve Auto traffic (mode-shift to commuter rail or crossing delay) 100% of the travel impact on Autos is expected to be metro-based households.

Auto trip purposes: *on-the-clock 13.7%, commute 54.7%, personal 22.8%*

Exhibit 3.1.-1 summarizes the dollar value of direct impacts that arise from the rail operational changes associated with CN acquiring the EJ&E, which include

estimates for some additional aspects (e.g. freight logistics costs, improved crossing performance along the IHB and BRC, additional Metra commuter service, and a freight mode-shift effect from truck to rail) not addressed in the CN application. These are allocated two ways: by two broad geographical designations (All the traffic vs Metro-based *road* user / shipper) and by recipient of the impact.

Exhibit 3.1-1 Allocation of Direct Transportation Impact (\$)

Impact Type	Gross Benefit to all Traffic Involved	Benefit to Metro-area Based Users/Shippers
Rail – improved speeds and reduced wait times (existing traffic)	\$211,604,776	\$49,177,191
Car time (rental) savings	\$58,400,000	\$12,000,000
Locomotive operating cost savings (to Corporate)	\$27,010,000	\$0
CN labor cost savings (to Corporate)	\$10,000,000	\$0
Freight logistics savings	\$117,337,741	\$38,320,156
Locomotive emissions (net increase)	-\$1,142,965	-\$1,142,965
Truck – reduced VMT and VHT from mode-shift to rail	\$25,778,557	\$17,635,379
Fuel/maintenance savings	\$16,992,000	\$10,620,000
Reduced driver wage costs	\$4,118,499	\$2,574,062
Freight logistics savings	\$604,643	\$377,902
Accident cost savings	\$463,415	\$463,415
Reduced emissions	\$3,600,000	\$3,600,000
METRA – opportunity to expand service on NCS line	-\$8,268,808	-\$8,268,808
Increase in passenger-time	-\$3,731,520	-\$3,731,520
Increase in transit costs	-\$4,300,000	-\$4,300,000
Increased safety costs	-\$23,040	-\$23,040
Increase in emissions	-\$214,248	-\$214,248
Passenger Car – reduced VMT and VHT from mode-shift to METRA	\$26,740,671	\$26,740,671
Fuel/maintenance savings	\$7,238,400	\$7,238,400
Passenger time savings	\$16,146,000	\$16,146,000
Accident cost savings	\$2,732,271	\$2,732,271
Reduced emissions	\$624,000	\$624,000
At-Grade Crossing effects	\$3,378,808	\$3,405,491
Passenger car delay	-\$718,572	-\$718,572
Truck delay	-\$71,154	-\$44,471
Safety savings at grade crossings	\$3,470,000	\$3,470,000
Emissions from idling	-\$20,039	-\$20,039
<i>Total (net) safety benefits</i>	\$6,642,646	\$6,642,646
<i>Total (net) environmental (emission) benefits</i>	\$2,846,749	\$2,846,749
<i>Total (net) Other benefits</i>	\$249,744,609	\$79,200,529

Working from the bottom of the exhibit up, the dollars of safety changes and emission changes reflect *net* benefit when considered across all impact types. The entire value of each of these benefits belongs to the metro-based region. The remaining *Other* benefits reflect the time and cost impacts. These are the majority of the valued changes stemming from the proposed acquisition of the EJ&E. Of the \$259 million of direct net savings associated with all users of the region's rail freight system (freight customers) and road system (autos and trucks), approximately \$88.6 million accrue to metro-based households and metro-based businesses that move freight by rail or by truck. That is 34 percent of the *gross benefit* is anchored in the 8-county region.

The assignment of \$88.6 million of metro-based direct net benefit is as follows:

for the rail freight improvement, metro-based businesses that are rail customers will absorb 100 percent of both the freight car savings and the freight logistics cost improvement. For the freight that shifts to more competitive rail, metro-based businesses that are freight customers will absorb 100 percent of averted truck operating cost, driver wages, and a freight logistics cost improvement. With passenger movements the following applies: for *commute* related trips (particularly in congested urban markets) industries (as employers) will absorb 50 percent of their workers time and operating costs (capitalized into wages as a means of guaranteeing access to qualified labor). Therefore improvements in either or both will be shared by the employer. The balance (yellow cells in Ex. 3.1.-2) of vehicle operating cost changes for the commute trip (car or train) borne by the household represents an inverse change in the households disposable income. For *personal* trips, any change to out-of-pocket vehicle operating expenses is an inverse change in the households disposable income. The time changes related to a passenger trips that can not be shared by an employer remain as a social utility impact (not economic).

Exhibit 3.1.-2 Direct Impact Implication for Metro-based Industry

Impact Type	Benefit to Metro-area Based Users/Shippers	Industry Involved	extent
Rail – improved speeds and reduced wait times (existing traffic)	\$49,177,191		
Car time (rental) savings	\$12,000,000	Y	100%
Locomotive operating cost savings (to Corporate)	\$0		
CN labor cost savings (to Corporate)	\$0		
Freight logistics savings	\$38,320,156	Y	100%
Lomotive emissions (net increase)	-\$1,142,965		
Truck – reduced VMT and VHT from mode-shift to rail	\$17,635,379		
Fuel/maintenance savings	\$10,620,000	Y	100%
Reduced driver wage costs	\$2,574,062	Y	100%
Freight logistics savings	\$377,902	Y	100%
Accident cost savings	\$463,415		
Reduced emissions	\$3,600,000		
METRA – opportunity to expand service on NCS line	-\$8,268,808		
Increase in passenger-time	-\$3,731,520	Y	50%
Increase in transit costs	-\$4,300,000	Y	50%
Increased safety costs	-\$23,040		
Increase in emissions	-\$214,248		
Passenger Car – reduced VMT and VHT from mode-shift to METRA	\$26,740,671		
Fuel/maintenance savings	\$7,238,400	Y	50%
Passenger time savings	\$16,146,000	Y	50%
Accident cost savings	\$2,732,271		
Reduced emissions	\$624,000		
At-Grade Crossing effects	\$3,405,491		
Passenger car delay	-\$718,572	Y	50%
Truck delay	-\$44,471	Y	100%
Safety savings at grade crossings	\$3,470,000		
Emissions from idling	-\$20,039		

Business sector involvement in absorbing cost/benefit impacts are allocated to specific industry sectors based on the profile of mode-specific traffic reliance each industry has. From this allocation we can introduce these dollars of time and cost impacts into a regional economic impact system to understand how these direct economic impacts work through the economy.

Exhibit 3.1.-3 Direct Transportation Impacts for Metro-based Industry

NAICS	Description	Total Direct \$ of Cost & Time Savings
111	Crop Production	\$140,089
112	Animal Production	\$238,279
113	Forestry & Logging	\$4,100
114	Fishing, Hunting & Trapping	\$11,419
115	Support for Agriculture & Forestry	\$8,486
211	Oil & Gas Extraction	\$15,940
212-213	Mining & Support Activities	\$995,416
221	Utilities	\$185,693
230	Construction	\$1,864,998
311	Food Products	\$6,662,195
312	Beverage & Tobacco Products	\$1,411,835
313	Textile Mills	\$374,434
314	Textile Product Mills	\$58,647
315	Apparel Manufacturing	\$49,427
316	Leather & Allied Products	\$39,428
321	Wood Products	\$163,697
322	Paper Manufacturing	\$501,426
323	Printing & Related Support Activities	\$78,824
324	Petroleum & Coal Products	\$841,398
325	Chemical Manufacturing	\$17,126,949
326	Plastics & Rubber Products	\$1,433,648
327	Nonmetallic Mineral Products	\$1,195,926
331	Primary Metal Manufacturing	\$730,736
332	Fabricated Metal Products	\$675,803
333	Machinery Manufacturing	\$1,141,329
334	Computer & Electronic Products	\$4,414,071
335	Electric Equipment, Appliances, etc.	\$3,294,022
336	Transportation Equipment	\$2,912,150
337	Furniture & Related Products	\$1,461,649
339	Miscellaneous Manufacturing	\$509,527
420	Wholesale Trade	\$5,166,204
441-454	Retail Trade	\$2,972,759
481-487	Transportation	\$1,134,679
491-493	Mail, package delivery & warehousing	\$174,929
511	Publishing Industries (except Internet)	\$107,058
512	Motion Picture & Sound Recording	\$28,002
513	Broadcasting	\$362,515
514	Internet & data process svcs	\$115,399
521-523	Monetary, Financial, & Credit Activity	\$1,889,454
524	Insurance Carriers & Related Activities	\$581,867
525	Funds, Trusts, & Other Financial Vehicles	\$28,163
531	Real Estate	\$481,616
532	Rental & Leasing Services	\$56,513
533	Lessors of Nonfinancial Intangible Assets	\$4,968

Exhibit 3.1.-3 –continued

NAICS	Description	Total Direct \$ of Cost & Time Savings
541-551	Professional Scientific, Technical, Services	\$2,469,993
561	Administrative & Support Services	\$1,019,829
562	Waste Management & Remediation	\$2,120,133
611	Educational Services	\$308,344
621-624	Health Care & Social Services	\$2,144,398
711-713	Amusement & Recreation	\$239,017
721-722	Accommodations, Eating & Drinking	\$803,403
811-812	Repair, Maintenance, & Personal Services	\$426,182
813	Religious, Civic, Professional, Organizations	\$236,736
920	Government & non NAICS	\$192,988

The presentation of resulting total economic impacts for the region in Chapter 4 is built upon the portion of the metro-region's \$88.6 million of time and cost savings that affects the bottom line of area shippers, area employers, area households. That amounts to roughly \$73 million (82 percent) eligible to circulate in the 8-county economy and create additional economic (multiplier) impacts.

4

ECONOMIC IMPACTS

The direct cost impacts related to freight logistics, rail freight services, driver/passenger time, and vehicle operations that were reported in Chapter 3 subsequently lead to additional impacts on the Chicago-metro economy. These impacts can be measured in terms of changes in jobs, income, value added (gross domestic product) and/or business sales in region. Such changes occur insofar as the proposed action leads to shifts in business operating cost, productivity, competitiveness and household living costs.

4.1 Types of Economic Impacts

Changes in the Chicago-metro economy occur through two basic mechanisms:

- (1) Business Costs – Changes in the cost of doing business in the metro-area occur through changes in the cost of rail freight services, for-hire truck services, operating own truck and car fleets, and paying the time costs of truck drivers and staff travel time. In addition, some businesses also bear a share of excess costs associated with commuting and parking. Together, all of these classes of business cost end up affecting productivity and profitability, and ultimately also the competitiveness of metro-based businesses. Of course, the value of this cost differs by industry, depending on the extent to which it depends on rail freight, trucking or “on-the-clock” employee travel.
- (2) Household Living Costs – Changes in the cost of living in the metro-area occur through changes in the annual expense that households pay for operating their cars, and paying for public transit. While households also bear impacts on time for personal travel that is a non-money impact that does not directly affect the flow of dollars in the economy.

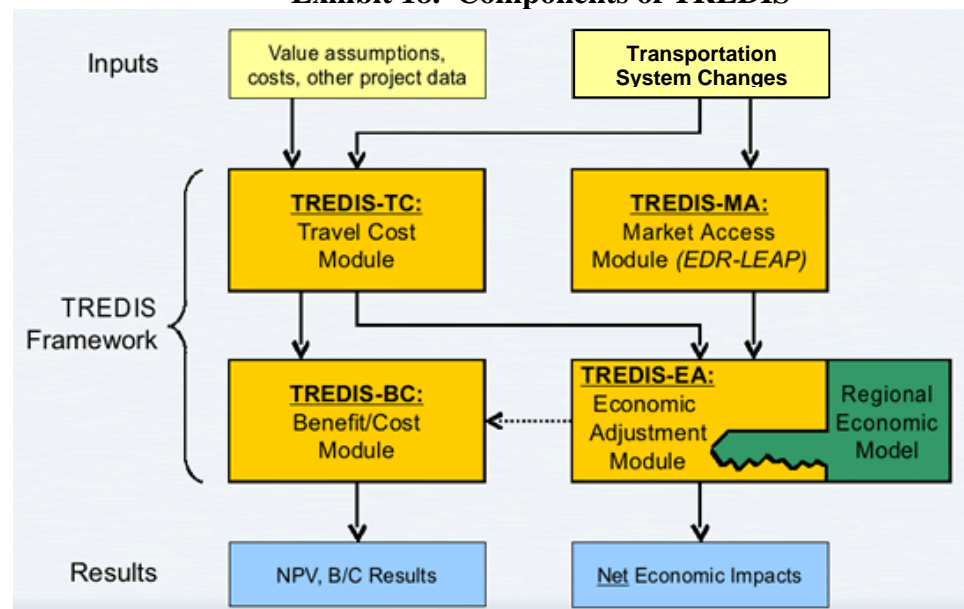
Apart from the TREDIS model, we also take into account two additional events that are explicit to the CN applications. First, CN will over the course of 3 years spend \$100 million for construction activities to install double-track and upgrade some interchange connections. Presumably all this would be completed before the 2015 horizon year which this study’s results address. Second, CN anticipates there are 114 redundant jobs when combining the EJ&E employment with the CN jobs in the region. Apparently, this stream-lining of labor utilization is possible even with the eventual 3-fold ramp up of cars handled at Kirk Yard (in Gary, IN).

The economic impacts stemming from these are carried out in an 8-county IMPLAN input-output model (the same approach used by the STB in the draft EIS – CH 4 and Appendix H).

4.2 Economic Analysis System

The Transportation Economic Development Impact System (TREDIS) is a framework for evaluating both user impacts and total regional economic impacts of transportation scenarios. It accounts for both short-term and long-term travel cost impacts, as well as effects of changes in market access and spending patterns. TREDIS utilizes an economic model of the Chicago-metro economy (8-counties), which combines an input-output model (known as IMPLAN) with a cost response forecasting and analysis system (known as the CRIO – the cost response input-output model), and a detailed accounting framework for calculating impacts on revenues and costs affecting various classes of shippers, carriers, households and government. The system also traces how different industries in the metro-area are affected by changes in costs of alternative rail, road and intermodal transportation options.¹⁰

Exhibit 18. Components of TREDIS



In practice, this analysis framework provides a way of tracking how travel time and expense changes will affect local cost of doing business in future years, as well as local cost of living for households. Changes in these factors end up shifting local spending patterns and cost-competitiveness, thus affecting business

¹⁰ Additional documentation of TREDIS is available at www.tredis.com

growth and investment, and ultimately jobs and income. The economic analysis system also recognizes that some of these changes are absorbed in the “local” *metro-area* economy, while others are passed on to customers outside of the region (the rest of U.S.).

4.3 Impacts on Chicago-metro Economy

The TREDIS economic analysis system was applied to depict the changes for 2015 emanating from a rail freight system improvement. The overall and sector-specific results reflect foremost the direct reliance of various types of Chicago-area businesses on rail freight (predominantly through improved freight logistics foremost with rail movements and some with truck) and their employees on highways. Even for those industries that do not ship freight by rail, or do not directly capitalize any part of their employee’s commute costs in competitive wage rates, there are forecasted economic impacts. In those cases, the impacts were the result of effects on other industries that sell them materials or buy their products (referred to as “forward” and “backward” economic links) and rely on rail shipments to do so. The embedded input-output linkages within the TREDIS system account for this latter interaction among Chicago-metro industries.

Exhibit 4.3.-1 shows four indicators of regional economic response by metro industries to the direct time and cost savings (approximately \$73 million per year). Compared to the 2015 economy without the proposed acquisition of the EJ&E, business sales increase by \$211 million (a regional multiplier response from the initial \$73 million of 2.89). This activity is supported by 898 additional jobs that will earn \$56 million of household labor compensation (an average compensation of more than \$62,000 per job created). The *value-added* contribution (the measure of local productivity contributed) on the \$211 million of increased activity for the region is \$89 million. This amount – also referred to as *gross regional product* –represents 42 percent for every dollar of sales impact created because of the rail system improvement. This relatively high *value-added to sales* response is a reflection of the types of industries that benefit from freight transportation improvements – namely manufacturing. Referring to Exhibit 3.1.-1 again shows which industries are the largest recipients of the direct transportation savings – among manufacturing it is *Chemicals, Computer & electronic products, Electrical equip. & Appliances, Food products, and Transportation equipment* firms, all with high value-added shares on a dollar of revenue. The non-manufacturing exception to be highlighted is *Wholesale Trade*. It is both a big beneficiary of the direct transportation cost improvements and 62 percent of every dollar of revenue generated is value-added. Higher value-added industries, reflecting greater productivity in their application of labor and capital, will pay their employees higher wages than lower value-added sectors in the economy.

**Exhibit 4.3.-1 Total ECONOMIC IMPACT RESULTS
from Transportation Time & Cost Improvements
8-COUNTY CHICAGO METRO AREA 2015**

NAICS	Industry	Business Output	Value Added	Jobs	Wages
111	Crop Production	0.193	0.115	3	0.051
112	Animal Production	0.307	0.020	6	0.049
113	Forestry & Logging	0.028	0.004	0	0.002
114	Fishing, Hunting & Trapping	0.001	0.000	0	0.000
115	Support for Agriculture & Forestry	0.001	0.001	0	0.001
211	Oil & Gas Extraction	2.503	1.592	1	0.634
212-213	Mining & Support Activities	0.003	0.002	0	0.001
221	Utilities	1.894	1.216	2	0.364
230	Construction	1.695	0.855	11	0.743
311	Food Products	16.107	4.340	41	2.466
312	Beverage & Tobacco Products	2.533	0.616	3	0.267
313	Textile Mills	0.791	0.211	3	0.177
314	Textile Product Mills	0.133	0.040	1	0.030
315	Apparel Manufacturing	0.119	0.042	1	0.031
316	Leather & Allied Products	0.095	0.032	0	0.028
321	Wood Products	0.455	0.166	3	0.115
322	Paper Manufacturing	0.924	0.278	3	0.210
323	Printing & Related Support Activities	0.257	0.182	2	0.137
324	Petroleum & Coal Products	6.474	0.753	1	0.367
325	Chemical Manufacturing	54.471	14.940	57	7.093
326	Plastics & Rubber Products	4.672	1.915	17	1.106
327	Nonmetallic Mineral Products	0.011	0.005	0	0.003
331	Primary Metal Manufacturing	1.721	0.459	2	0.237
332	Fabricated Metal Products	1.439	0.615	6	0.398
333	Machinery Manufacturing	2.810	0.953	10	0.733
334	Computer & Electronic Products	14.169	3.242	38	3.137
335	Electric Equipment, Appliances, etc.	8.435	3.568	27	2.121
336	Transportation Equipment	6.906	1.516	14	1.286
337	Furniture & Related Products	2.778	1.511	15	0.902
339	Miscellaneous Manufacturing	1.275	0.681	5	0.521
420	Wholesale Trade	11.699	7.890	52	4.432
441-454	Retail Trade	6.577	4.375	92	2.721
481-487	Transportation	3.889	1.955	24	1.512
491-493	Mail, package delivery & warehousing	1.325	0.989	18	0.844
511	Publishing Industries (except Internet)	0.667	0.354	2	0.203
512	Motion Picture & Sound Recording	0.344	0.156	2	0.082
513	Broadcasting	1.647	0.823	4	0.359
514	Internet & data process svcs	0.286	0.148	1	0.107
521-523	Monetary, Financial, & Credit Activity	4.249	2.710	19	1.695
524	Insurance Carriers & Related Activities	1.616	0.926	7	0.548
525	Funds, Trusts, & Other Financial Vehicles	0.302	0.061	1	0.061
531	Real Estate	3.288	2.307	14	0.547
532	Rental & Leasing Services	0.465	0.225	3	0.128
533	Lessors of Nonfinancial Intangible Assets	1.428	0.621	0	0.064
541-551	Professional Scientific, Technical, Services	14.665	8.987	84	7.713
561	Administrative & Support Services	2.928	1.908	51	1.572
562	Waste Management & Remediation	0.337	0.191	2	0.114
611	Educational Services	1.027	0.652	15	0.601
621-624	Health Care & Social Services	7.155	4.353	81	3.809
711-713	Amusement & Recreation	0.920	0.557	16	0.405
721-722	Accommodations, Eating & Drinking	4.249	2.280	67	1.526
811-812	Repair, Maintenance, & Personal Services	1.805	0.935	19	0.588
813	Religious, Civic, Professional, Organizations	0.719	0.438	10	0.498
920	Government & non NAICs	5.884	5.352	41	2.694
Total		\$210.669	\$89.061	898	\$56.032

There is a very small portion of the above economic impact result that reflects metro-based households *out-of-pocket* savings on vehicle operations in switching from an auto to a public transit trip. That savings is disposable income that contributes to consumer spending. Businesses that directly fulfill consumer purchases reflect industries very different than those industries which directly benefit from rail freight improvements.

The total economic impacts associated with reducing the combined CN and EJ&E workforce by 114 jobs is shown in Exhibit 4.3.-2.

Exhibit 4.3.-2 Annual Total Economic Impacts¹ from Reduced Jobs in Rail Transportation

		<i>million \$ (2007)</i>		
	Jobs	Business Output	Value-Added	Labor Income
Direct	-114	-\$28.8	-\$16.8	-\$9.6
Total	-249	-\$50.2	-\$28.9	-\$17.0
<i>multiplier</i>	2.18	1.74	1.72	1.77

¹Using the IMPLAN model of the 8-county Chicago region.

Combining the total economic impact from transportation time and cost savings and the *rationalized* employment in the *Rail Transportation* sector, leads to the results in Exhibit 4.3.-3.

Exhibit 4.3.-3 Combined Annual Total Economic Impacts from the Proposed Acquisition of the EJ&E

		<i>million \$ (2007)</i>		
	Jobs	Business Output	Value-Added	Labor Income
Total Impact _Transport Cost Savings	898	\$210.7	\$89.1	\$56.0
Total Impact _Rail Jobs lost	-249	-\$50.2	-\$28.9	-\$17.0
Combined	649	\$160.5	\$60.1	\$39.0

Last, we present (Exhibit 4.3.-4) the temporary economic impacts that come from \$100 million of construction activity to improve rail tracks and connections/interchanges. These impacts are expected to occur over three years (completed by 2012) and obviously precede our 2015 evaluation.

Exhibit 4.3.-4 Three-Year Total Economic Impacts¹ from CN 's Track Construction Investment

		<i>million \$ (2007)</i>		
	Jobs	Business Output	Value-Added	Labor Income
Direct	733	\$102.6	\$58.3	\$48.2
Total	1282	\$193.6	\$106.6	\$76.5
<i>multiplier</i>	1.75	1.89	1.83	1.59

¹Using an IMPLAN model of the 8-county Chicago region.

At this point in time CN does not know what level of investment will be required to upgrade Kirk Yard to realize the car handling efficiencies is planning on. This phase of investment will also bring about temporary economic gains – both directly and with a *multiplier* response comparable to that exhibited for the above construction impacts.

Social Benefits in the form of (i) *net* emission reductions when accounting for how this rail service improvement interacts with commuter rail service opportunities on the North Central Line and truck freight mode share; and (ii) the value of safety improvements both need to be considered as well. Those are worth \$2.8 million and \$6.6 million annually.

5

POLICY IMPLICATIONS

This study uses the changes CN has outlined in its application to the STB for approval regarding the purchase the EJ&E. It incorporates some additional information that the STB-SEA developed while producing the draft EIS. It also incorporates two additional key elements which this study team felt were important to require further examination (truck mode-share shift) or an initial consideration (additional commuter rail service opportunities on the freed up capacity on CN's Waukesha line). What are the implications from this economic impact assessment of the changes that would emanate from the transfer, improvement and use of the EJ&E by CN?

First, the emphasis of this study has been *regional* economic considerations, for an aggregated economy comprised of eight Chicago-area counties. It is not meant to address specific counties or neighborhoods. It's objective was to consider the *net* direct transportation system changes –*within the arc* and *along the arc*- that would be set in motion if CN purchases the EJ&E, how the value (\$) of the changes allocate to households and businesses within the metro-area, and the propensity for those dollar impacts to flow in the regional economy and stimulate more economic activity. Not all changes are *economic* catalysts, but that does not reduce the importance of identifying and considering them – such as with *emission* and *safety* impacts. These are valuable social benefits.

For the horizon year presented, 2015, the annual economic impact is \$160 million additional business output (sales) containing \$60 million of value-added. This requires 649 additional jobs generating \$39 million of labor income to metro-area households. This is after considering impacts from the elimination of 114 *Rail Transportation* jobs. The combined value of *emission* and *safety* benefits is \$9.4 million annually.

There are likely additional changes that could be set in motion post-transaction that were beyond the scope of this analysis. It remains to be seen what role CN's railyards *within the arc* will play if both East Joliet and Kirk yards take on the significance thus far described. Markham Yard will become a dedicated I/M yard and CN will likely retain other yard capacity for serving local traffic. However, if yards were retired and the land transferred and developed into other uses, we know this has potential for attractive economic impact generation in a city reliant on in-fill development opportunities for future growth. We have explored this redevelopment opportunity related to railyards for the Chicago DOT (and the DPD) back in 2003.¹¹ Also, there may be development opportunities

¹¹ Rail Freight Futures, Reebies Associates, EDR Group, Martland, & Menaker Associates (2003), Chicago DOT.

within specific industrial corridors that previously did not see ample rail freight service. CDOT is currently studying this question. Finally the vicinity surrounding Kirk Yard could be the site for attracted business development which would support or be reliant upon the envisioned increase in car handling activities.

Second, there are National implications from the proposed type of transportation system changes that would materialize. Chicago is a rail-hub serving North America. The performance of its terminal affects shippers and customers all over the country and it affects how exports and imports are land-bridged from East and West Coast ports in the U.S. and Canada. From our book-keeping of the *gross value* of the direct benefits (Ch. 3) there is \$259 million of annual benefit to all the affected traffic. This traffic presents shipments belonging to shippers (businesses) throughout the U.S. The Chicago-metro area claim on these direct time and cost benefits is \$88.6 million (34 percent). The remaining direct benefit accrues to the *rest of U.S.* and some portion to Canadian shippers.

Without having run a multi-regional economic system of the U.S. economy we can extrapolate what the National economic impact might be. *Given* that these rail freight transportation improvements represent efficiencies that boost productivity growth (instead of an industry decision to reduce rail freight rates which lowers cost to freight customers) we can expect growth to extend beyond the Chicago-metro and be shared in the rest of the national economy. We focus on the *value-added* (GRP) impacts since this is a measure of the productivity gain response from the proposed transaction. The *rest of Nation* could receive additional GRP worth \$207 million for 2015 based upon its portion of the direct cost and time benefits and the value-added response (for the metro-area modeling) to a dollar of direct time and cost benefits that can be circulated in the economy.

Nationwide then for 2015 the impact on *gross domestic product* is \$207 million in the *rest of U.S.* plus the \$60.1 million additional in the Chicago-metro region – a total of \$267.1 million of extra GDP. The inference we can make from this more than one-quarter billion of annual GDP nationwide is additional jobs will be supported providing household labor income and U.S. business sales expand over the *no-transaction* future.

What is implicit to both the regional and National economic benefits is that consumers ultimately benefit. Productivity gains in the rail freight transport sector can be shared in part with freight customers, those firms can then share cost savings or freight logistic efficiencies with households vis a vis some reduction in prices. In a climate of heightened productivity, instigated by freight transportation system efficiency gains –a key determinate in the price of the goods we pay- consumer prices would benefit.

APPENDIX I - RAIL FREIGHT OPERATIONAL EFFICIENCIES

APPENDIX II — RAILROAD MODE SHIFT IMPACTS

Appendix I and Appendix II can be found on the Chicago Metropolis 2020 website at:
<http://www.chicagometropolis2020.org>

Appendix III – Chicago Region FAF Data

SCTG Code	SCTG Commodity Description	Commodity Mix (%)			Commodity Value of Time - Relative to Average	
		Local Rail	Other Rail	Truck	Rail	Truck
01	Live animals/fish	0	0	0.5	0	1.323
02	Cereal grains	0	10.5	6.6	0.03	0.060
03	Other ag prods.	0	1.1	1.7	0.003	0.444
04	Animal feed	0	0.9	0.4	0.654	0.329
05	Meat/seafood	0.3	0	0.5	4.764	2.469
06	Milled grain prods.	0	1.4	1.1	2.652	1.123
07	Other foodstuffs	17.4	6.2	4	1.045	0.831
08	Alcoholic beverages	12.6	1.3	0.7	0.342	1.001
09	Tobacco prods.	0	0	0	0	29.415
10	Building stone	0	0	0.8	0	0.076
11	Natural sands	0	0.1	3.1	0	0.008
12	Gravel	0	2.1	15.7	0	0.004
13	Nonmetallic minerals	0	0.8	2.3	0.027	0.021
14	Metallic ores	0	0.1	0.2	0.003	1.570
15	Coal	0	14.2	0.1	0	0.031
16	Crude petroleum	0	0	0	0	0.107
17	Gasoline	0	0.3	4.4	0	0.352
18	Fuel oils	0	0	1.4	0	0.255
19	Coal-n.e.c.	11.7	2.4	2.5	0.455	0.180
20	Basic chemicals	27.7	5.2	0.6	0.2	1.468
21	Pharmaceuticals	0	0	0.2	0	22.199
22	Fertilizers	0	14.9	1.5	0.598	0.197
23	Chemical prods.	0.5	0.8	2.5	1.331	2.166
24	Plastics/rubber	19.8	3.4	1.4	2.906	2.446
25	Logs	0	0.1	0.4	0	0.101
26	Wood prods.	0.4	2.1	1.5	0.017	0.511
27	Newsprint/paper	0	1.9	1.2	0.022	0.805
28	Paper articles	0	0.7	0.8	2.773	1.408
29	Printed prods.	0	0	0.7	6.088	2.587
30	Textiles/leather	0	0	0.2	0.321	5.005
31	Nonmetal min. prods.	6.6	1	8.6	0.574	0.121
32	Base metals	0	2.7	4.5	0.259	0.582
33	Articles-base metal	0	0.4	3.2	1.475	1.429
34	Machinery	0	0.2	4.5	11.231	6.018
35	Electronics	2	0	0.6	14.793	9.511
36	Motorized vehicles	0	0.7	1.2	14.271	5.127
37	Transport equip.	0	4.8	0.9	1.865	4.156
38	Precision instruments	0	0	0.1	5.939	14.387
39	Furniture	1.1	0	0.3	5.483	2.651
40	Misc. mfg. prods.	0	0	0.9	11.236	2.932
41	Waste/scrap	0	18.8	6.7	1.032	0.217
42	Unknown	0	0	7.8	0	0.861
43	Mixed freight	0	1	3.6	21.116	2.693