



# Metropolitan Chicago's Freight Cluster: **A Drill-Down Report on Infrastructure, Innovation, and Workforce**

Full Report, June 2012

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# Introduction

Metropolitan Chicago is one of the world's great economic centers. While the region enjoys a diverse mix of industries, it also realizes significant gains through its economic specializations. These "industry clusters" create high-quality jobs, spur innovation, and generate growth among numerous interconnected industries.

[GO TO 2040](#)—metropolitan Chicago's first comprehensive regional plan in more than 100 years—calls for strategically organizing the region around its existing and emerging clusters of specialization to better compete in the national and international marketplace. The plan directs the Chicago Metropolitan Agency for Planning (CMAP), with the support of its partners, to perform "drill-down" analyses into specific industry clusters, including freight, advanced manufacturing, and biotech/biomed.

The first in a series of cluster studies by CMAP, this drill-down report analyzes freight — one of the Chicago region's strongest specializations — to identify the major issues affecting this cluster's competitive advantage in the 21<sup>st</sup> Century. The scope of the report is the seven northeastern Illinois counties of CMAP's planning area: Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will. Unless otherwise noted, data supporting the analysis are for those seven counties.

This **Introduction** includes the history of freight in the region and the freight cluster's current standing, as well as its importance in the global supply chain.

**The Cluster Approach to Regional Economic Development** describes why cluster analysis is emerging as a preferred framework in economic development. It includes a statistical overview of the regional freight cluster, followed by an economic analysis of cluster industries. It concludes with a gap analysis describing why the cluster is under-specialized in a few key industries.

The chapter **International and National Developments in Freight** looks at both international and domestic trends in freight and how those developments will affect metropolitan Chicago's freight cluster. The chapter pays particular attention to how competitor regions like Memphis or Kansas City are devoting significant resources to capitalize on the same emerging trends.

In addition to external developments, the cluster faces a series of challenges within the region. GO TO 2040 calls attention to three areas with the most potential to affect the future economic vitality and global competitiveness of the freight cluster: infrastructure, innovation, and workforce. The chapter **Challenges and Opportunities: Infrastructure, Innovation, and**



**Workforce** looks at these three themes, highlighting challenges as well as opportunities moving forward to bolster regional strengths in freight.

Through a series of case studies, the chapter **Cluster Support Strategies** surveys major existing strategies that support freight in the region. Even with significant support strategies in place there are crucial gaps that threaten to stifle or even prevent growth in the cluster. The chapter **Moving Forward: Strategies to Strengthen the Cluster** includes a set of regional strategies to better align resources and investments with the needs of the freight cluster.

## Metropolitan Chicago's Freight Cluster

The efficient movement of goods drives economic growth and improves quality of life, yet freight's impact on everyday activities often goes unnoticed. Today, one can find bananas in the supermarket year round or express deliver a late birthday card overnight to a cousin in New York or Texas, but behind these seemingly simple conveniences resides a complex network of firms, infrastructure, and transactions. Nearly all the goods that improve and sustain the welfare of residents and businesses arrive to the region via the freight system. Large volumes of goods flow both in and out of metropolitan Chicago, linking industries and consumers to state, national, and global markets. On average, 52 million tons of goods worth over \$45 billion move across the U.S. transportation system *each day*.<sup>1</sup> As the country continues to grow, so too will the demand for freight transport, which will nearly double in the next 20 years.<sup>2</sup> Freight supports a significant number of jobs, encompassing 4 percent of the region's private sector employment and \$13 billion in personal income.<sup>3</sup> However, freight's economic impact is not limited to the transportation sector. The prosperity of many other sectors of the economy, including manufacturing, wholesale trade, and retail trade, mirrors the health of the freight cluster. One recent estimate suggests that over a quarter of all jobs in the state are in industries directly tied to freight.<sup>4</sup>

*Demand for freight will nearly double in the next 20 years.*

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<sup>1</sup> Federal Highway Administration Office of Freight Management and Operations, "Freight Facts and Figures 2011," U.S. Department of Transportation, (Statistics are for year 2007) 2011, p. 9.

<sup>2</sup> Chicago Metropolitan 2020, "The Metropolitan Freight Plan: Delivering the Goods." December 2004, p.3.

<sup>3</sup> Chicago Metropolitan Agency for Planning, "GO TO 2040 Comprehensive Regional Plan," (Statistics are for year 2008) 2010, p. 307.

<sup>4</sup> Metropolitan Strategies, "Developing Sound Freight Policies to Build the Illinois Economy." May 2011.



## Metropolitan Chicago: Nation's Distribution Hub

An unmatched combination of freight transportation modes and infrastructure confirms metropolitan Chicago's status as the nation's freight hub. Estimates suggest that between a quarter and a third of all freight tonnage in the U.S. originates, terminates or passes through the region.<sup>5</sup> As the nation's rail crossroads, it is the only region served by six of the seven Class I railroads. An estimated 500 freight trains move 37,500 rail cars through the region each day, accounting for approximately 50 percent of total rail freight movement in the nation.<sup>6</sup>

Figure 1. Regional freight movements by mode



Metropolitan Chicago is a hub for trucking as well—seven interstate highways converge in the region, more than any other area in the U.S., and trucks make up one out of every six vehicles on Illinois' urban interstates.<sup>7</sup> The dual hub airport of O'Hare is the nation's second busiest international air cargo gateway by value, representing 12 percent of the value of all U.S. international air cargo.<sup>8</sup>

*Between a quarter and a third of all freight tonnage in the U.S. originates, terminates or passes through the Chicago region.*

Though Midway International Airport moves cargo at a much smaller rate, Chicago/Rockford International Airport is the second-largest UPS air parcel sorting facility and ranks 19<sup>th</sup> nationally for air cargo loads by weight.<sup>9</sup> Finally, an extensive waterway system positions the Chicago region as the only point where the Mississippi River waterway joins the Great Lake and Saint Lawrence Seaway system.

<sup>5</sup>For the 14 County Chicago Metropolitan Statistical Area (MSA). The Chicago MSA comprises nine Illinois Counties (Cook, DeKalb, DuPage, Grundy, Kane, Kendall, Lake, McHenry, Will), four in Indiana (Jasper, Lake, Newton, Porter) and one in Wisconsin (Kenosha). Organisation for Economic Co-operation and Development (OECD), "Territorial Review of the Chicago Tri-State Metropolitan Area, United States" 2012, p. 207; DiJohn, Joseph, "Chicago's CREATE Rail Program: A Successful Public-Private Partnership." Metropolitan Transportation Support Initiative, Urban Transportation Center, University of Illinois at Chicago. Submitted to the Canadian Transportation Research Forum, May 30 to June 2, 2010.

<sup>6</sup>OECD, 2012, p. 55. Data for the Chicago MSA.

<sup>7</sup>CMAP, GO TO 2040, 2010; Metropolis Freight Plan, 2004, p. 4.

<sup>8</sup>"America's Freight Transportation Gateways: Connecting Our Nation to Places and Markets Abroad," Bureau of Transportation Studies, Research and Innovative Technology Administration, 2009.

<sup>9</sup>Ibid.



## History of Freight in the Region

Metropolitan Chicago's status as the nation's foremost freight hub is rooted in its history. Since its settlement, businesses have exploited the region's geographic position as the shortest distance by land between the Northwest and the Northeast, as well as the nexus between the nation's agricultural heartland and eastern markets. As the nation developed, metropolitan Chicago became the conduit through which raw materials from the western frontier flowed east to factories in the industrializing north, and manufactured goods returned to frontier markets in the west. As the city industrialized and grew, it also became a major exporter of goods.

The region's transportation infrastructure expanded to support metropolitan Chicago's budding status as a transcontinental hub. Construction of the Illinois and Michigan Canal began in 1829 and the first rail line reached Chicago in 1836. For the next 75 years, the railroads reigned supreme as the preferred way to transfer heavy goods over long distances, and over time they converged around Chicago. In the 20<sup>th</sup> Century, air and trucking also emerged as important freight modes. Construction of Chicago Municipal Airport, later to become Midway, began in 1927, while O'Hare was opened in 1955. The creation of the interstate highway system in the 1950s connected vast areas of the country to commerce by freight trucking, which today moves the most freight by both tonnage and value.<sup>10</sup>

Metropolitan Chicago's past as the conduit of raw materials for an industrializing nation has helped bolster its current position as the nation's freight hub as massive investments in the built environment have entrenched freight operation in the region. Yet the conditions that fueled the early growth of the region no longer dominate in today's global marketplace. Supporting metropolitan Chicago's sustained vitality in the freight cluster requires an understanding of the new forces that affect freight movement.

## Metropolitan Chicago in the Global Supply Chain

Innovation, technological adoption, and increased trade have revolutionized freight movement and produced a global supply chain. Today, supply chains are longer and more fragmented, incorporating global networks of sourcing, manufacturing, and consumption. Most notably, the increased utilization of standard containers over the last 50 years has awarded increased flexibility to production systems and spurred the rise of intermodal shipments, where freight is transported seamlessly using multiple modes of transportation. The rise of intermodal freight reduced transportation and handling costs and many industries have expanded operations to a global production network. With worldwide sourcing and production, trade between nations

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<sup>10</sup>Chicago Historical Society, *The Electronic Encyclopedia of Chicago: Economic Geography*, 2005. See <http://encyclopedia.chicagohistory.org/pages/409.html>.



more than quintupled in real value between 1980 and 2009, and economies across the globe have become increasingly interdependent.<sup>11</sup>

“Lean supply chains,” in which inventory levels are kept low while the larger share of stock remains in constant circulation until reaching the final destination, have also been formative in shaping modern freight movement. A lean supply chain that is global in scale adds another layer of complexity to freight movement and relates to a third trend in today’s freight landscape: the rise of third-party logistics (3PL) providers who specialize in moving goods. According to a recent report, more than 75 percent of domestic Fortune 500 companies now use a 3PL,<sup>12</sup> highlighting the ascendancy of the industry.

These developments mean that though freight is now shipped longer distances, it is increasingly being funneled through strategic locations that perform important functions in the supply chain. The Chicago metropolitan region has been able to adjust to these contemporary changes in supply chain patterns to emerge as a transshipment center for intermodal shipments. The region is the largest intermodal container handler in the Western Hemisphere, as nearly half of all intermodal freight movements in the nation originate, terminate or pass through the region.<sup>13</sup> Furthermore, firms in the regional cluster have responded to new market dynamics by providing functions integral to today’s supply chain operations including drayage, logistical support, and transshipment and distribution. While the region’s freight industry arose originally to connect raw materials in the west to burgeoning industrial markets in the east, the region has adjusted to shifting contemporary trade patterns. This response bolsters the region’s status as a nucleus of freight activity.

### Intermodal Transportation

Intermodal transportation is the movement of freight in a uniform container that can be easily transferred across ships, rail, and trucking.



Photo from the Sanitation Districts of Los Angeles County  
<http://tinyurl.com/73kqn96>

<sup>11</sup> Federal Highway Administration Office of Freight Management and Operations, “Freight Facts and Figures 2011,” p. 8.

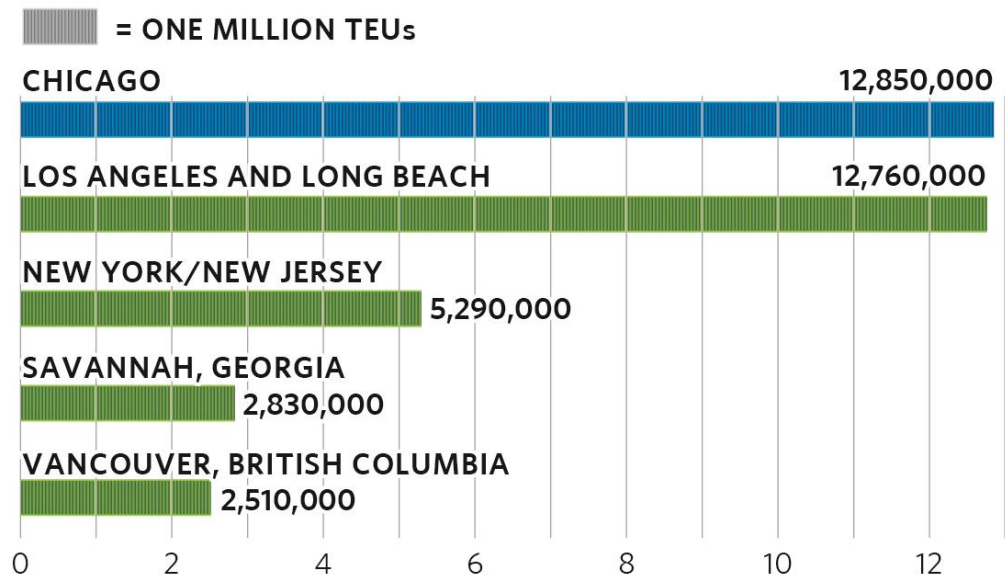
<sup>12</sup> O’Shea, Will, “Coming to Terms With Today’s Supply Chain Challenges.” *Area Development Online*. February 7, 2012. See <http://www.areadevelopment.com/>.

<sup>13</sup> OECD 2012, p. 206, for Chicago MSA.





Figure 2. 2010 top western hemisphere ports by 20-foot equivalent units (TEU) container traffic, in millions



Source: CMAP Regional Freight System Snapshot for Chicago region, World Shipping Council for other regions, 2012.



# The Cluster Approach to Regional Economic Development

## Why Clusters?

The industry cluster framework has emerged as a preferred economic development methodology because of its enhanced ability to describe a region's economy, recognize the relationships between firms, and identify strategies for sustainable economic growth. GO TO 2040, the region's comprehensive plan, identifies clusters as a key driver of economic growth and innovation. Following a key recommendation of GO TO 2040, this report "drills down" into the regional freight cluster in order to identify opportunities and challenges while exploring strategies that will return economic benefits to the region.

An industry cluster is a group of interdependent firms and related institutions that draw a productive advantage from their geographic concentration and connections. Firms in a cluster share common resources and technologies, rely on a similar labor pool and institutions, and are linked through strong relationships and transactions in addition to co-location.

Freight and logistics firms in particular benefit from participating in a cluster. First, the concentration of major freight hubs balances demand between inbound and outbound flows, making it easier for carriers to fill backhauls as well as consolidate shipments to move conveyance at close to capacity. In addition to realizing these economies of scale and density, clusters support freight activity by increasing the frequency of departures and arrivals. Finally, firms within a freight cluster utilize shared assets such as logistic parks and can be more flexible when responding to changing customer demand.<sup>14</sup>

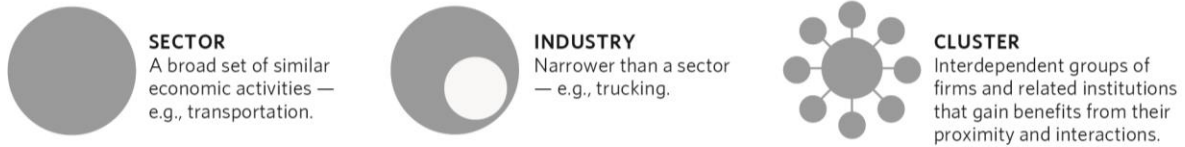
"Clusters" are different than traditional industry sectors in that they comprise multiple types of businesses that are related through transactions and networks, as well as similar economic activities. In contrast, a "sector" is a broad set of economic activities, and an "industry" focuses on a specific product or service within a sector.

The following graphic visually represents the different activities of sectors, industries, and clusters, and also shows components of the metropolitan Chicago freight cluster. Firms in a cluster can be divided into core industries that drive economic activity; supply industries that provide the core with value-added inputs; support industries that offer maintenance and infrastructure; and customers who purchase goods or services from the core.

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<sup>14</sup> Yossi Sheffi, "Logistics-Intensive Clusters: Global Competitiveness and Regional Growth," Regional Science Association Annual Conference, Denver, CO, November 11, 2010.

**Figure 3. What is a cluster?**



**FREIGHT CLUSTER COMPONENTS**

- **SUPPORT INDUSTRIES**
- **CUSTOMER INDUSTRIES**
- **CORE INDUSTRIES**
- **SUPPLY INPUT/INDUSTRY**



Source: CMAP analysis, 2012.  
Note: Circle size represents relative size of cluster component by employment.

# CMAP's Cluster Framework and Composition

This cluster drill-down report organizes industries within the freight cluster into four categories based on their primary activities:

- **Core industries** drive economic activity in the cluster and include industries moving freight by rail, truck, air, or water.
- **Direct supply and input industries** provide the core industries with production or other value-added inputs for goods and services such as warehousing, consulting, leasing, and packaging.
- **Indirect support industries** provide services or infrastructure germane to the core industry and direct suppliers including port operations, infrastructure, and support industries.
- **Customers** purchase goods or services from the core industries, utilizing the inputs of direct suppliers and support and infrastructure from indirect suppliers. Customers of the core industries include freight transportation arrangement, couriers, and wholesale agents.

CMAP reviewed the approximately 1,200 six-digit NAICS codes<sup>15</sup> and selected the industries that are concentrated in the region and/or have high employment and serve critical functions for freight movement. CMAP's freight cluster consists of 42 interconnected industries<sup>16</sup> whose collaboration and concentration enable freight to move through the region. While freight carriers like trucking companies or railroads are the most visible industries in the cluster, other industries such as logistical support, input manufacturing, or port operations are also vital for the effective functioning of the cluster.

*In the past decade, employment in the freight cluster has increased by 7 percent, while employment in the overall regional economy has increased by less than 1 percent.*

## Cluster Statistics

*Location quotients* (LQ), which compare the distribution of employment by a regional industry to the national average, provide one way to measure the concentration of industries within the cluster. A location quotient of one means the industry has the same distribution of employment regionally as it does nationally; a location quotient below one signifies a below-average

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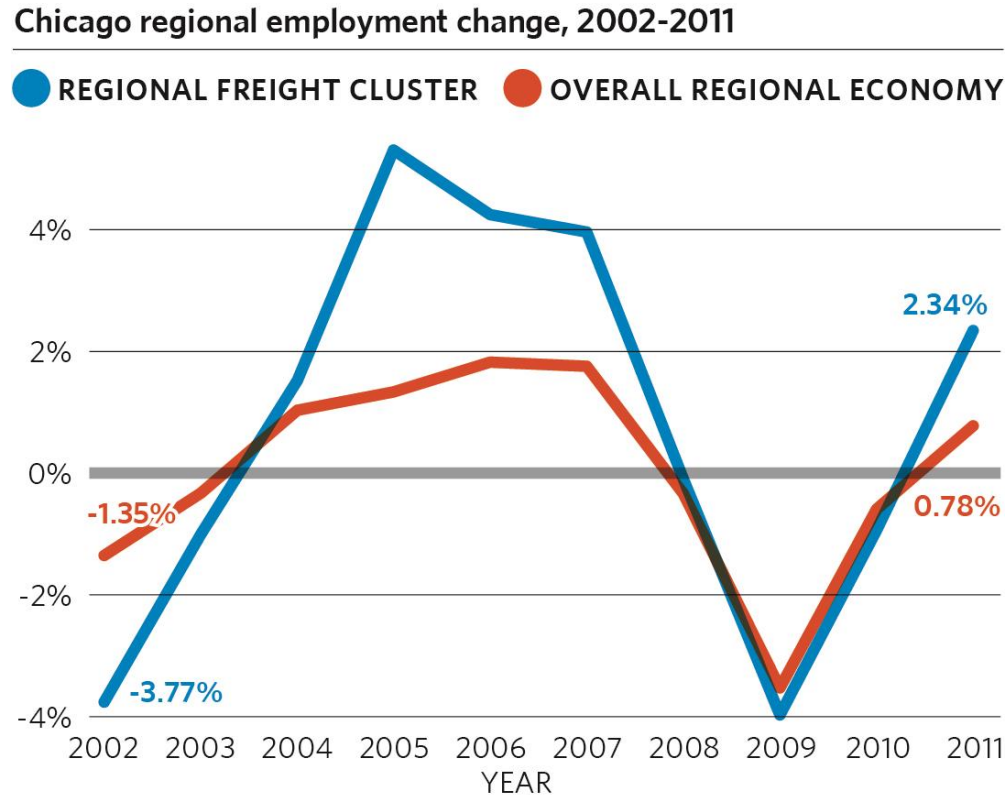
<sup>15</sup> The North America Industry Classification system (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.

<sup>16</sup> One important point is that this analysis does not include the activities of the United States Postal Service (USPS). The primary justification behind this exclusion is that the USPS, as a semi-independent agency of the Executive Branch, is subject to its own special regulations and rules that do not affect private firms in freight. Regional employment in the postal service is substantial (around 22,000 in 2011). The appendix lists all cluster industries by NAICS code.



proportion of employment for a regional industry, while a location quotient above one indicates an above-average proportion. Two-thirds of the 42 industries within metropolitan Chicago’s freight cluster have a location quotient greater than one based on 2011 data, showing that freight is a specialization of the region. The overall location quotient for the cluster was 1.21 in 2011, growing from 1.14 in 2001.<sup>17</sup>

**Figure 4. Chicago regional employment change, 2002-11**



Source: CMAP analysis of EMSI data, 2012.

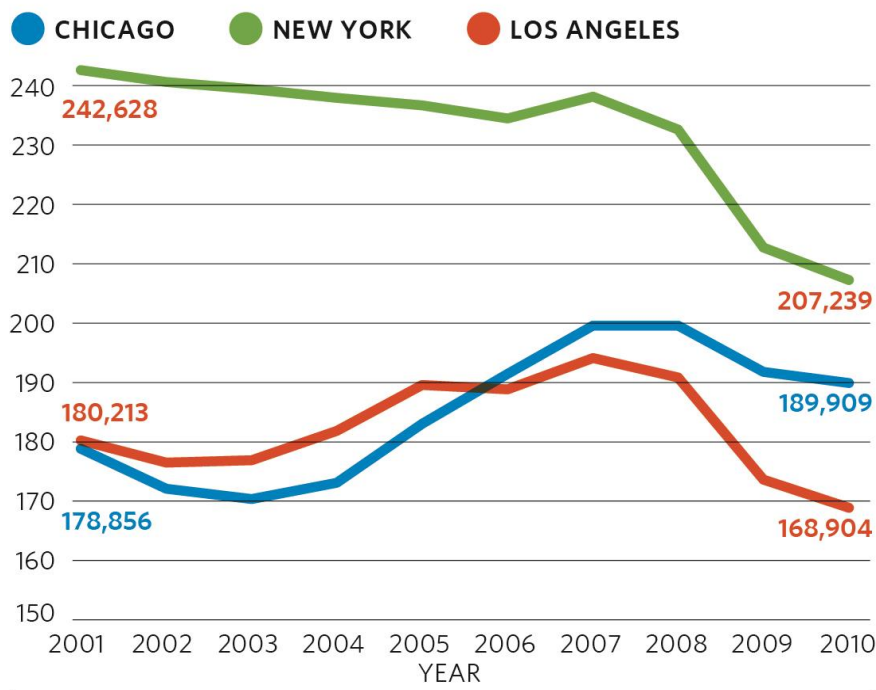
The industries that make up the freight cluster account for a significant portion of total economic activity in the region. In 2011 regional employment in the cluster was 204,350, or about 4 percent of total employment. Over the past decade, the cluster has grown more (7 percent) than the overall regional economy (less than 1 percent). Several fast growing industries within the freight cluster are largely responsible for this higher than average growth including wholesale agents, long-distance trucking, and freight transportation arrangement.

<sup>17</sup> Cluster statistics for this report, unless otherwise noted, derive from CMAP analysis of Economic Modeling Specialists, Inc. (EMSI) data. EMSI’s numbers are based on Bureau of Labor Statics (BLS) counts and have been integrated with roughly 90 other sources to improve accuracy and allow for more precise analyses.



In comparison to the largest freight clusters in the U.S., the Chicago region’s growth this past decade stands out. In the past ten years, New York’s (-15 percent) and Los Angeles’ (-6 percent) freight clusters both shrank. Other smaller regions witnessed a growth in freight between 2000 and 2010. Memphis’ freight cluster grew by 12 percent in that time while Houston’s grew by an estimated 22 percent. However, in terms of absolute numbers both these clusters are still dwarfed by the Chicago region, which has two to three times the total employment of the smaller clusters.<sup>18</sup>

**Figure 5. Largest freight clusters in U.S., by number of employed, in thousands**



Note: Estimates exclude rail.  
 Source: QCEW and EMSI data. Data for Chicago region is for seven-county CMAP area.  
 Data for New York and Los Angeles are for Metropolitan Statistical Areas (MSA).

While jobs in the freight cluster are located across the seven-county region, they concentrate along key corridors in close proximity to airports, intermodal facilities, and container yards.

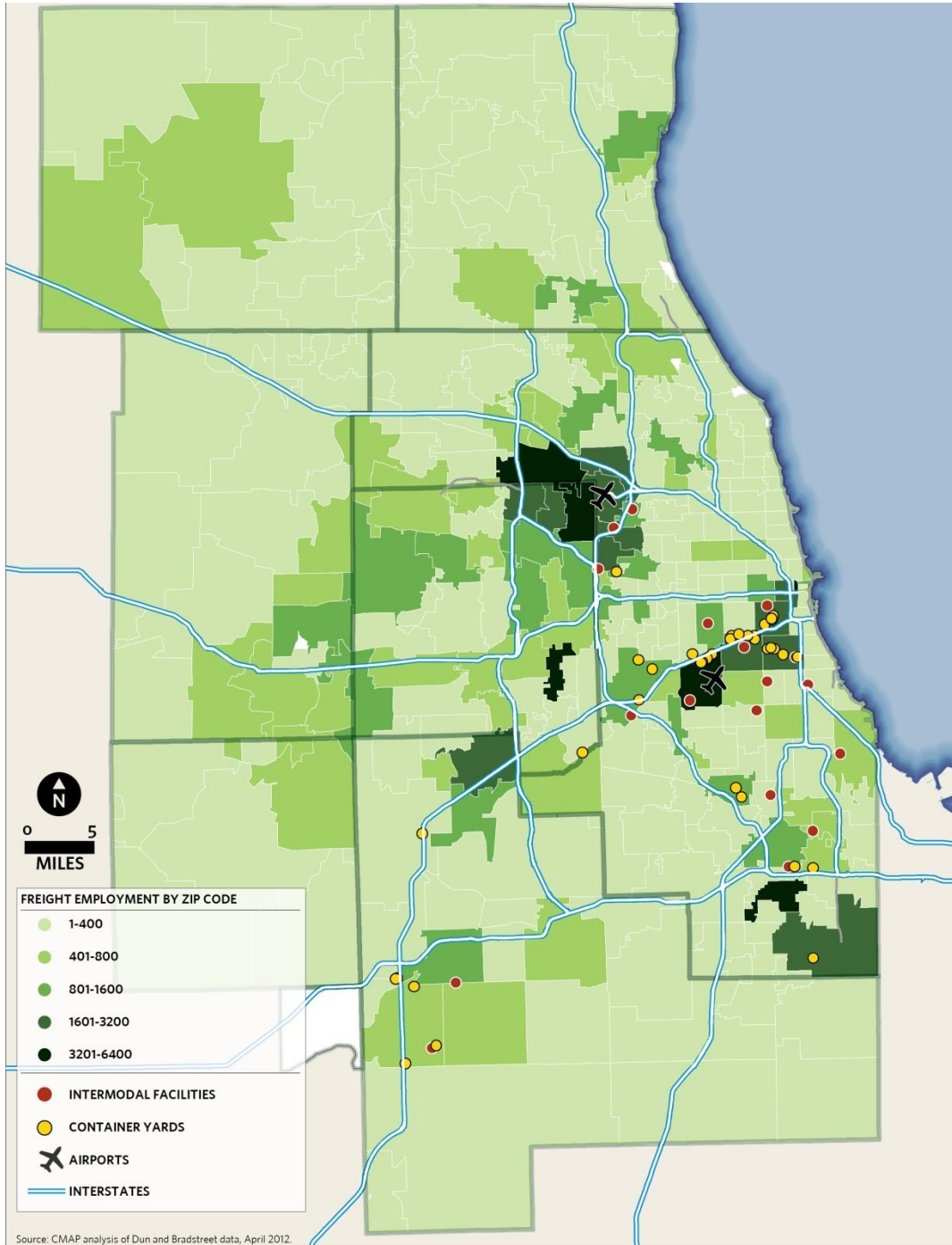
<sup>18</sup> Data for the Chicago region are for the seven-county CMAP area. The remaining regions use the Metropolitan Statistical Area (MSA). Freight cluster for all regions is defined to include the 42 NAICS codes used in this study. Data for rail (NAICS 482) were not disclosed for all MSAs and were excluded from analysis. Additionally, for the Atlanta MSA data were not disclosed for NAICS 481212 (nonscheduled air freight), NAICS 483113 (coastal and great lakes freight), and NAICS 483221 (inland water freight) while for Memphis data were not disclosed for NAICS 333924 (transportation machinery manufacturing), NAICS 481212 (nonscheduled air freight), NAICS 483111 (deep sea freight), and NAICS 561910 (packaging and labeling services). Estimates of employment and cluster growth are based on Quarterly Census of Employment and Wages (QCEW) as well as Economic Modeling Specialist, Inc. (EMSI) data.





Major employment centers include the southside of Chicago, O'Hare Airport and northeastern DuPage County, southern Cook County, and an emerging concentration in southwest Will County.

**Figure 6. Major employment centers of the freight cluster**



## Shift-Share Analysis

Shift-share analysis is a popular method that compares regional employment growth in an industry to national employment trends to help reveal strengths and weaknesses in the regional economy. Shift-share estimates how much employment change in the region is likely due to changes in the national economy and how much change is due to industry specific trends. Combining both measures gives an expected employment change for if the region completely mirrored these larger trends. Shift-share analysis then compares this expected change with the actual employment change in the industry. Where the actual change is higher than the expected change, the region has a competitive advantage. For example, the industry “Support Activities for Rail” has been growing nationally the past ten years, so shift-share analysis predicted an increase of 241 jobs in this industry in the region. However, the Chicago region actually added 426 jobs in this industry. The difference between the actual change (426 jobs) and the expected change (241 jobs) is termed the “competitive effect,” and is used to show regional competitive advantage.

The table below shows the five industries in the cluster that have the largest competitive effect and is followed by the industries with the lowest regional competitive effect. The following section explores some of the reasons behind these diverging growth trajectories of cluster industries.

**Table 1. Shift-share analysis for regional freight cluster, 2001-11**

Most competitive industries	Expected Job Change	Actual Job Change	Competitive Effect
Wholesale Trade Agents and Brokers	8,868	17,821	8,953
General Freight Trucking, Long-Distance Truckload	107	6,276	6,169
Freight Transportation Arrangement	251	1,898	1,647
Other Warehousing and Storage	363	1,739	1,375
General Freight Trucking, Long-Distance, Less Than Truckload	133	1,309	1,177
Least competitive industries	Expected Job Change	Actual Job Change	Competitive Effect
General Warehousing and Storage	8,829	(1,212)	(10,042)
Scheduled Freight Air Transportation	184	(2,636)	(1,829)
Specialized Freight (except Used Goods) Trucking, Local	285	(1,208)	(1,493)
Rail transportation	(490)	(1,306)	(817)
Packaging and Labeling Services	145	(659)	(804)
Source: CMAP Analysis of EMSI data, 2012			



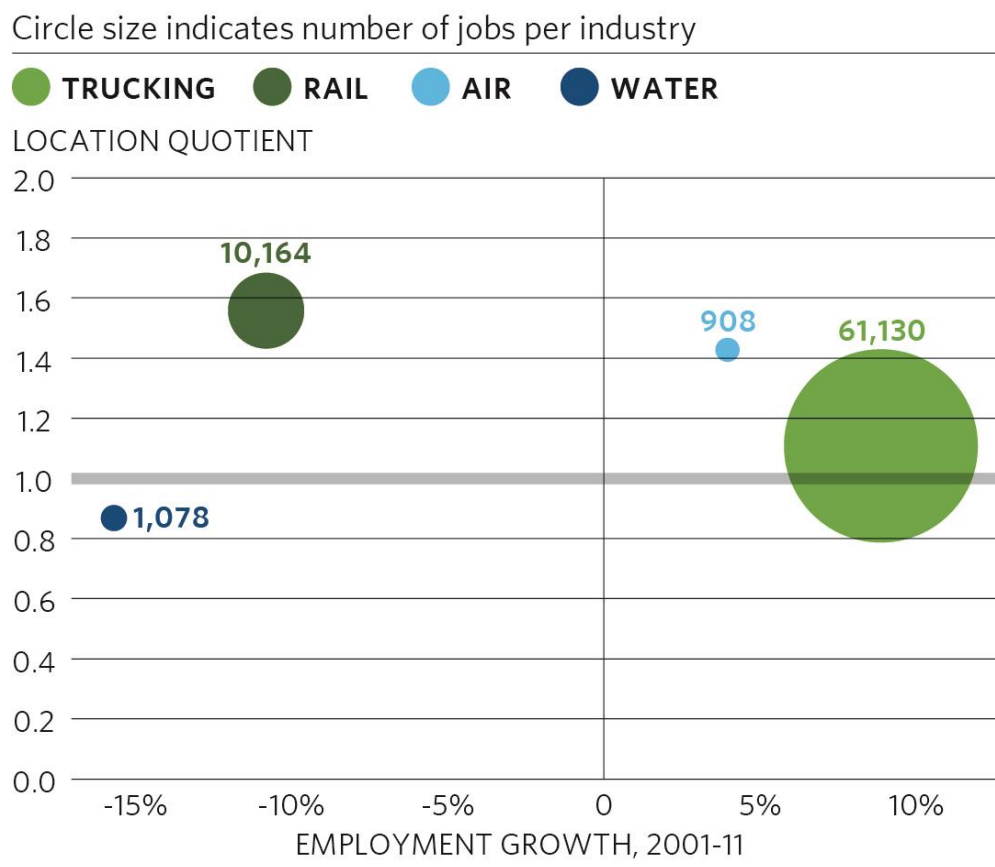


# Description of Cluster Industry Activities

## Core Freight Industries

Metropolitan Chicago’s freight cluster is divided into core, supply, support, and customer segments. Industries within the core of the Chicago region’s freight cluster are primarily engaged in the direct movement of goods and can be classified by the modes of air, rail, water, and trucking.<sup>19</sup> Firms in the core of metropolitan Chicago’s freight cluster had an employment of 73,279 in 2011, representing a third of total cluster employment. These 2011 employment numbers are slightly higher than the 72,000 employed ten years ago.

Figure 7. Freight cluster core industries



Source: CMAP analysis of EMSI data, 2012.

Analyzing the industries within the core across three separate metrics—current employment, employment growth, and location quotient—helps illustrate the region’s comparative advantages as well as areas where the cluster is underperforming. Figure 7 shows the growth

<sup>19</sup> The appendix lists all cluster industries by NAICS code.

and specialization of the core freight industries in the region. The horizontal axis measures employment change from 2001 to 2011 and the vertical axis shows the 2011 location quotient. The size of each industry's circle represents current employment.

**Table 2. Value of regional freight by weight**

	Air	Rail	Truck	Water
Volume (tons)	847,000	631,175,000	736,158,000	72,976,000
Value (\$ Millions)	8,165	917,524	2,820,214	15,387
\$/ton	9,640	1,450	3,830	211
Source: CMAP analysis of Transearch database for Chicago Bureau of Economic Analysis area, for year 2007				

As the table above illustrates, trucking and rail are much larger than water and air modes in terms of the volume and value of freight moving through the region. A significant portion of both trucking and rail is through traffic since the region serves as a midway point for many continental moves. Trucking and water are also both noted for the percentage of local moves, or those that never leave the region. Air, in contrast, is almost entirely inbound and outbound moves for faraway markets.

### **Rail**

Metropolitan Chicago is the nation's rail freight center: the region handles 50 percent of all rail freight movement in the entire U.S.<sup>20</sup> For intermodal moves the region's concentration is just as striking as the Chicago region moves close to half of all intermodal units in the U.S.<sup>21</sup> Because of this concentration, rail freight in the Chicago region has a relatively larger proportion of total volume and value than in other major American transportation hubs. Rail establishments principally transport lower-value goods over a longer distance. Currently, estimates suggest that goods need to move a minimum of 500 to 600 miles for rail to be price competitive with trucking; with rising petroleum prices this number will likely decrease and rail will become a more attractive option.<sup>22</sup>

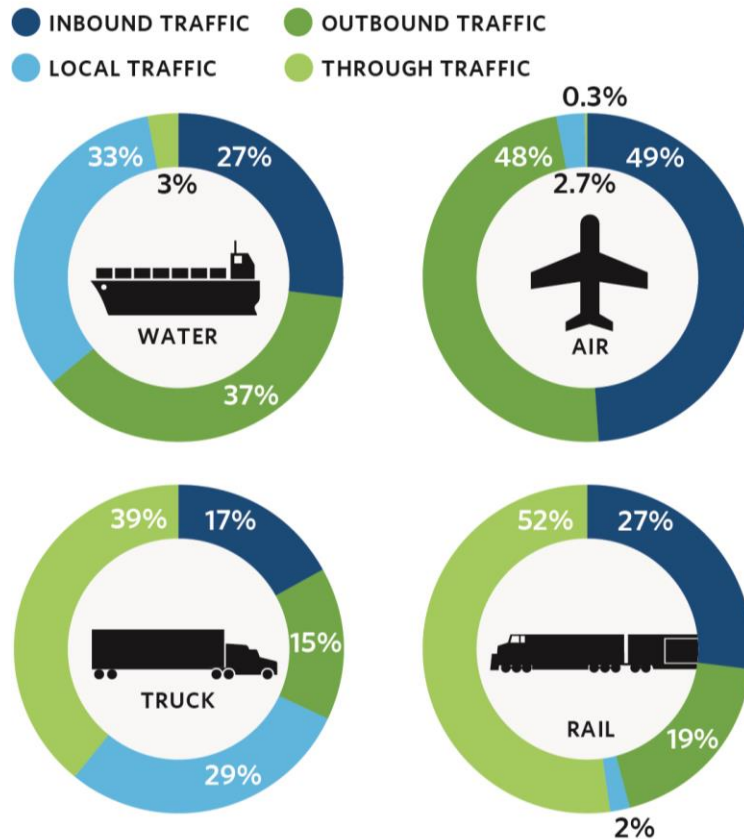
<sup>20</sup> OECD 2012, p. 206, for Chicago MSA.

<sup>21</sup> OECD 2012, p. 206-07, for Chicago MSA.

<sup>22</sup> National Center for Freight and Infrastructure Research and Education, "Logistics for the Public Sector Training Course." See <http://www.wistrans.org/cfire/education/professional-development/logistics-public-sector/>.



Figure 8. Percent of regional freight volume by trip type



Source: Transearch database for year 2007. Estimates are for CMAP seven-county area.

In 2007 rail moved \$918 billion in value in the Chicago region, representing almost 30 percent of total freight value in the region. By weight, rail’s share was even higher: the estimated 600 million tons of freight moved by rail in the region in 2007 was 40 percent of total freight by weight.<sup>23</sup> For both intermodal and bulk commodity rail freight, the Chicago region serves as an intercontinental distribution center linking eastern and western railroads. This through traffic, at close to 300 million tons, made up half of regional rail freight volume in 2007 and is predicted to maintain the largest share of regional rail movement in the years to come.<sup>24</sup> In addition to serving as the transshipment point for intercontinental freight movement, rail establishments in the region also bring in considerable goods—180 billion

*The Chicago region handles 50 percent of all rail freight movement in the entire U.S.*

<sup>23</sup> “Regional Freight System Planning,” CMAP estimates based on IHS Global Insight’s Transearch database for the Chicago Bureau of Economic Analysis area (BEA). Available at <http://www.cmap.illinois.gov/freight-snapshot>.

<sup>24</sup> CMAP estimates based on Transearch database for Chicago BEA.



tons in 2007—for local consumption. Finally, rail freight helps connect companies in the greater Midwest to larger markets, and the region maintains an exporting core that sent out over 130 million tons of freight by rail in 2007.<sup>25</sup>

Rail freight moving on the metropolitan Chicago system is funneled to one of nearly 80 rail terminals in the region that handle, sort and distribute a large percentage of the nation’s bulk carloads and intermodal containers. These terminals are a significant asset to the regional economy because they utilize metropolitan Chicago-based supply companies such as 3PLs and equipment leasing firms as well as employ people to make the transfers.

The region’s rail terminals are concentrated in the Southside of the City of Chicago and the nearby southern suburbs of Cook County (see map on following page: Regional freight facilities). Increasingly, Class I railroads are moving freight towards new large intermodal facilities in the south and west suburbs where space is more available for warehousing, repackaging and logistics. For example, two of the newest intermodal rail hubs—BNSF’s Logistics Park and UP’s Joliet Intermodal Terminal—are both located in southwestern Will County.

Rail has significant employment in the region, with 10,164 jobs in 2011. Rail is highly capital intensive due to the infrastructure and operating demands of the mode. In fact, rail spends the highest percentage of revenue on capital expenditure of any U.S. industry.<sup>26</sup> As such, the mode is highly concentrated and has become more consolidated in the past 20 years. Six long-haul Class I railroads—Union Pacific, BNSF, Canadian National, Canadian Pacific, CSX, and Norfolk Southern—dominate rail traffic in the region. Short-haul lines such as the Indiana Harbor Beltway or the Iowa Interstate Railroad also are active in the region.

### New Freight Investments: CenterPoint Intermodal Centers

Taken together, the neighboring intermodal centers in Elwood and Joliet represent the largest master-planned inland port in North America. Located in Will County almost 40 miles from Chicago, these two recently opened facilities illustrate the trend of concentrating new freight investment in the south and west of the region.

CenterPoint Intermodal Center-Elwood is a 2,500-acre site anchored by BNSF’s Logistics Park terminal. Only open since 2002, the terminal is the busiest in the region in annual lifts, with about 850,000 in 2010. A large component of the additional 12 million square feet of the center is leased to 3PLs like DSC and Maersk Logistics, producers such as Georgia Pacific and Potlach, and a massive distribution center for Walmart.

CenterPoint Joliet is the more recent freight investment in the area, opening in 2010. It is home to UP’s 785 acre Joliet Intermodal Terminal as well as 20 million square feet of industrial space.

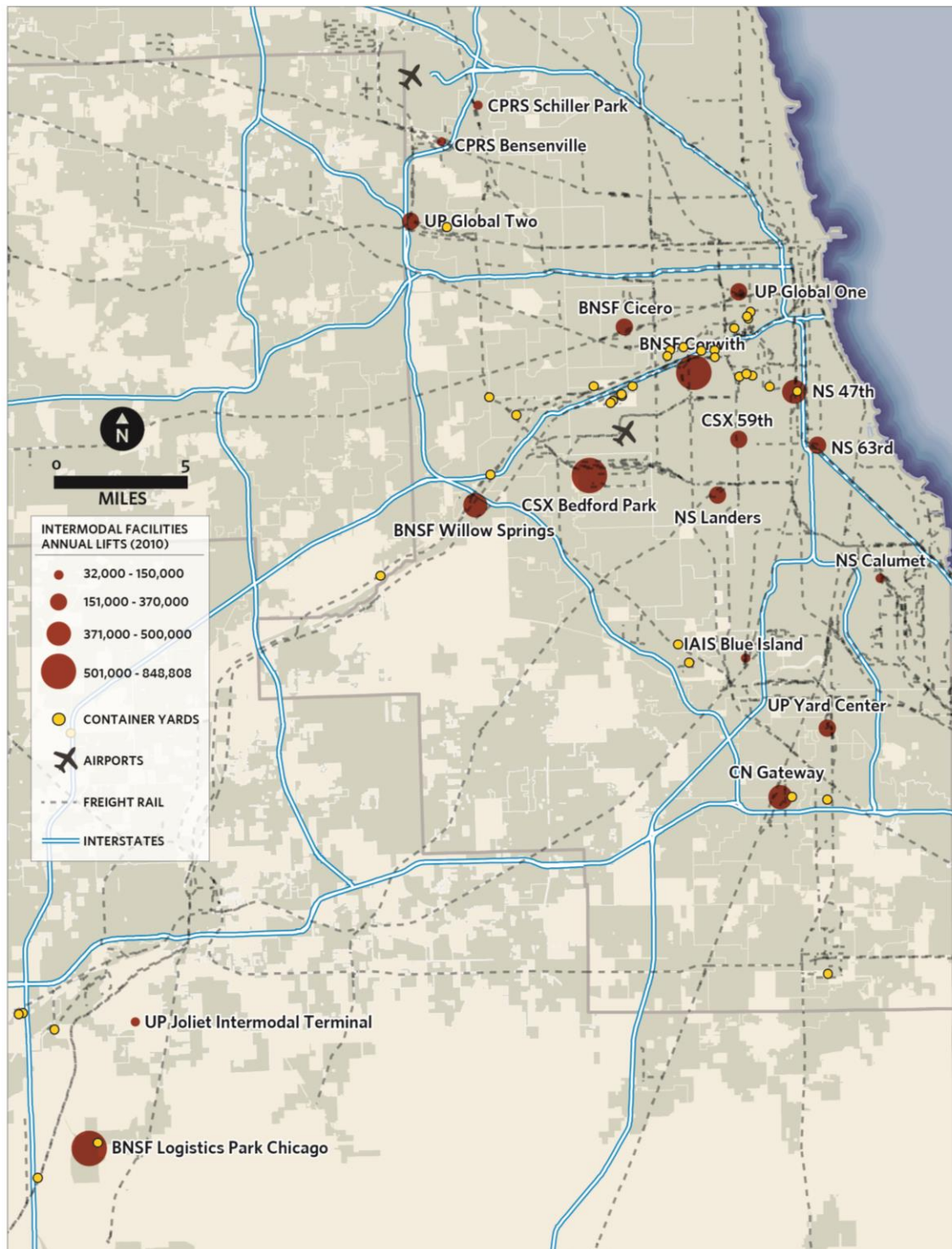
Source: Will County Center for Economic Development, “Inland Port Assets”; OECD 2012, p. 220.

<sup>25</sup> Ibid.

<sup>26</sup> Chicago Metropolitan 2020, 2004 p. 13.



Figure 9. Regional freight facilities



Source: CMAP Regional Freight System Snapshot, 2012.





## **Truck**

More goods travel along metropolitan Chicago's freight system by truck than by rail, air, and water combined. One in every six vehicles on the region's interstate highways is a truck, underscoring this mode's centrality to freight transportation.<sup>27</sup> Trucking is the most versatile of all freight modes. It generally transports goods higher in value than those carried by rail or water. It can transport goods regionally or long distances—across the country even—yet is also integral in local delivery as the mode of choice for first and last mile distribution.

*More goods travel along metropolitan Chicago's freight system by truck than by rail, air, and water combined.*

The Chicago area stands out as a regional hub for freight trucking. Most major U.S. metropolitan areas are less specialized in trucking compared to the national average. For example, the location quotient for trucking in cities such as New York, Los Angeles, or Philadelphia falls below 0.5.<sup>28</sup> In contrast, in 2011 the Chicago MSA had a location quotient of 1.11 in trucking.<sup>29</sup> Between 2001 and 2011, the region gained 7585 jobs in long-distance general freight trucking. Shift-share analysis shows that only 3 percent of the increase in long-distance trucking would be expected from national and industry trends, while 97 percent is due to regional competitive advantage, confirming that the Chicago region is specialized in long-distance trucking.

Metropolitan Chicago's position as a nexus of major interstate highways means that many trucks pass through the region on the way to further markets. Indeed, through trips represent the largest truck freight volumes by trip type, at about a third. These through trips generate little value added for the regional economy, save for the economic activity generated at truck stops and gas stations. Local movements, however, are also concentrated in the region, generate value-added activities, and are expected to grow by 50 percent in the next 30 years.<sup>30</sup> Local movements between points in the region comprised about 200 million tons in 2007. This concentration of local movements hints at the influence of the drayage industry for intermodal movements in the Chicago region. Drayage is the transport of goods over a short distance as a component of a longer overall move. Drayage activities in the Chicago region often take the form of trucks transporting intermodal containers the few miles between eastern and western railroad terminals. These secondary moves are in fact the largest single move by trucks and are

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<sup>27</sup> CMAP, GO TO 2040, 2010.

<sup>28</sup> OECD 2012, p. 208.

<sup>29</sup> CMAP analysis of EMSI data deriving from Bureau of Labor Statistics Quarterly Census of Employment and Wages.

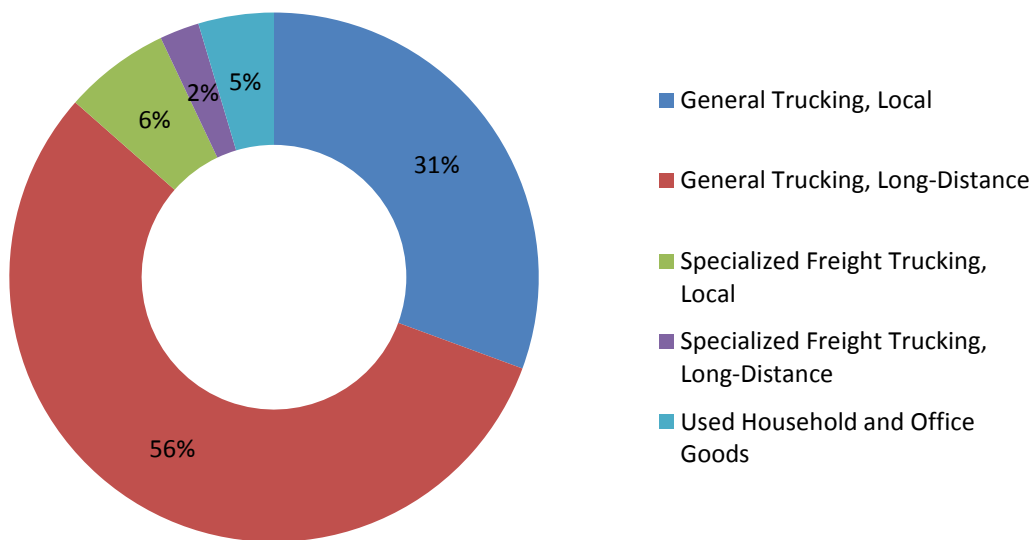
<sup>30</sup> CMAP estimates of Transearch database See <http://www.cmap.illinois.gov/freight-snapshot>.



expected to increase significantly.<sup>31</sup> The prevalence of intermodal drayage perhaps explains metropolitan Chicago’s concentration in local trucking compared to other large metro areas.

Inbound and outbound flows of freight compose the final two trip types for trucking. Global Insight’s Transearch database, which has been used so far to calculate regional freight volumes, varies in its ability to capture the various subsectors that make up trucking.<sup>32</sup> As such, its 2007 trucking volume estimates likely undercount the number of truck trips in the region. An alternative tool used to estimate freight flows and volume is the Freight Analysis Framework (FAF) developed by the Federal Highway Administration.<sup>33</sup> FAF estimates indicate annual regional inbound trucking volume at 364 million tons and outbound at 348 million tons. It is important to make note of the relative parity between inbound and outbound moves, which suggests that metropolitan Chicago is both a point of consumption and production.

**Figure 10. Shares of employment percentage by types of trucking in the freight cluster**



<sup>31</sup> CMAP, “Regional Freight System Planning Recommendations Study,” 2010. See <http://www.cmap.illinois.gov/freight-system-planning>.

<sup>32</sup> IHS Global Insight’s Transearch database estimates current and future national commodity flows by origin, destination, commodity and transport mode based on sample data. The database varies in its ability to capture the various submarkets of the trucking sector, and does not include local distribution to retail, construction-site deliveries, household moving, or package delivery among others. The working assumption is that Transearch undercounts local distribution of trucking by freight, by perhaps as much as one half.

<sup>33</sup> Freight Analysis Framework (FAF) version 3 provides estimates for freight tonnage and value by origin, destination, commodity and mode for 2007 as well as forecasts through 2040, and is the version used for all FAF analysis. The geography for FAF analysis is the Illinois counties of the Chicago MSA.



Unlike rail, trucking is much more dispersed in terms of origins and destinations. Rail traffic is highly concentrated on Class I railroads connecting major ports. For example, just two cities—Casper, WY (for coal shipments) and Los Angeles, CA (ports of Los Angeles and Long Beach) accounted for almost a third of all of Chicago’s rail freight by tonnage. For trucking, Chicago firms have strong linkages to numerous cities across the nation.<sup>34</sup> FAF predictions for 2040 show an increase in trucking volume by about 60 percent. While trucking in the region is expected to rise by volume, it is predicted to soar in terms of the value of goods moved by truck, rising by over 260 percent in the next 30 years.<sup>35</sup>

Trucking is a major source of employment in the freight cluster. The 61,129 regional trucking jobs in 2011 represented 80 percent of total employment in the core operations of the cluster and nearly a third of all cluster employment. There are over 6,000 trucking establishments in the region, almost half the number of establishments in the entire cluster.

## **Air**

Establishments in air freight are primarily engaged in the provision of air transportation of cargo without passengers, including both regular routes and those operating without a schedule. Air freight moves high value, low weight goods. The major commodities by value moving through the Chicago region’s air system include electrical and nonelectrical machinery, transportation equipment and precision instruments.<sup>36</sup>

Air freight is the smallest of the four freight modes in the region in terms of total value and tonnage, with an estimated regional freight volume of 847,000 tons in 2007 (compared to over 600,000,000 tons for rail). However, air moves the highest value of freight per ton, nearly triple that of truck and eight times that of rail.

Despite being the smallest mode, air freight in the region is predicted to experience significant growth in the next 30 years. By 2040 the value of domestic air freight moving through the region is projected to skyrocket, increasing from \$8 billion to \$66 billion. This projected 700 percent increase is by far the fastest growth potential of any mode. However, much of this growth will likely be in the value of inbound air cargo (rising from \$5.4 billion to \$59 billion, while outbound is predicted to rise from \$3.2 billion to \$7.5 billion).<sup>37</sup> If these projections are accurate, they seem to indicate metropolitan Chicago’s evolving role from a point of production to that of consumption in the global supply chain for high value goods such as electronics.

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<sup>34</sup> CMAP, “Regional Freight System Planning Recommendations Study,” 2010.

<sup>35</sup> Freight Analysis Framework version 3.

<sup>36</sup> CMAP “Regional Freight System Planning Recommendations Study,” 2010.

<sup>37</sup> CMAP estimates based on Transearch database. See <http://www.cmap.illinois.gov/freight-snapshot>.





Air freight is also the region's direct gateway for international goods. Metropolitan Chicago's air gateway, consisting of O'Hare International Airport and Midway Airport, is the second busiest international air cargo gateway in the nation by value of shipments. In 2008, total international merchandise trade through Chicago's airports was \$97 billion, compared to the \$8 billion domestic air cargo to move through the region.<sup>38</sup> Chicago/Rockford International Airport is a hub for the United Parcel Service, serving as the company's second-largest parcel sorting facility.

### **Water**

Despite its position as the only location that connects the Great Lakes and Saint Lawrence Seaway to the Mississippi River network, water freight in the region has declined. The approximately 1,000 jobs in the water mode in 2011 represent a 15-percent decrease from employment at the beginning of the decade. This decline is due in part to the rising cost efficiencies of trucking and rail, as well as to the waning of manufacturing activities. Freight that moves through the region via water is almost exclusively low value, heavy goods with less stringent time pressures, such as coal, metallic ore, and non-metal minerals. In 2007 a total of 73 million tons of freight moved in the Chicago region via the waterborne system, split between inbound movements (60 percent), outbound (26 percent), and local (12 percent). Inbound tonnage, which includes coal and ore, is expected to decline in the next 30 years, while outbound volumes are expected to reach parity with inbound shipments due to a rise in waste and scrap materials.<sup>39</sup>

One consequence of the downturn of water freight volumes has been the redevelopment of prior port areas into non-waterborne transportation uses not conducive to freight operations. Additionally, existing port facilities are not well integrated into the regional intermodal system that is projected to drive growth for the cluster.<sup>40</sup> Water freight could benefit from fluctuating and rising petroleum prices as freight shifts towards more cost effective means, yet at present the mode does not exhibit the same growth potential of other core components of the cluster.

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<sup>38</sup> Research and Innovative Technology Administration, "America's Freight Transportation Gateways," Bureau of Transportation Statistics, 2009.

<sup>39</sup> CMAP, "Regional Freight System Planning Recommendation Study," 2010.

<sup>40</sup> OECD 2012, p. 197-235.

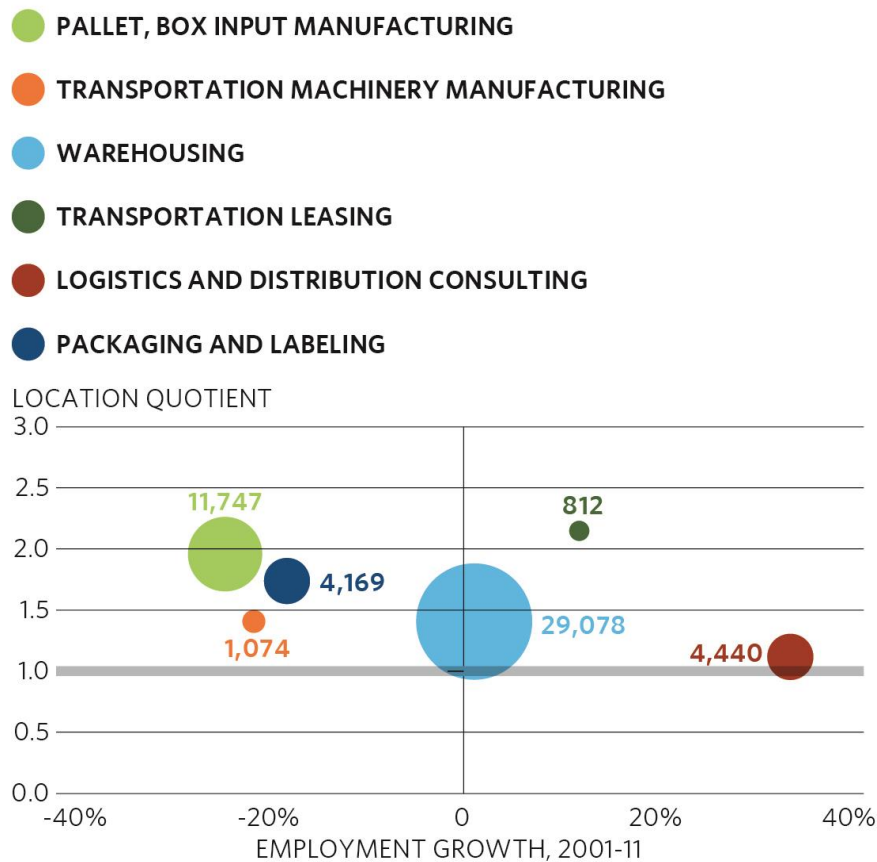


## Direct Supply/Input Industries

Firms in the direct supply/input segment of the freight cluster provide the core industries with production or other value-added inputs for goods and services. Industries in the supply and input segment fall into warehousing, logistics consulting, equipment leasing, packaging, and input manufacturing.

**Figure 11. Supply industries**

Circle size indicates number of jobs per industry



Source: CMAP analysis of EMSI data, 2012.

The direct supply/input component of Chicago's regional freight cluster employed 50,347 people in 2011. The majority of this employment was in warehousing. Employment in this segment of the cluster dipped slightly over the last ten years, falling 6 percent between 2001 and 2011.

### Warehousing

With the advent of just-in-time inventory, warehouses increasingly serve as consolidation and distribution centers. Warehousing can add value to the supply chain through assembly and customization, packaging and ticketing, and product repair. One hallmark of warehousing is



that it is extremely land intensive: a recent study estimated some 1.3 billion square feet of warehouse distribution space in the region.<sup>41</sup> Warehousing in the Chicago region is located in proximity to major transportation infrastructure, and employs about 30,000 people in the region.

### **Packaging**

Firms in the packaging subsection of the freight cluster label, imprint, crate, package, and otherwise prepare goods for transportation. In addition to 4,000 regular employees, this industry uses part-time and temporary help to a large degree, with strong connections to warehousing.

### **Input Manufacturing**

Input manufacturing in the freight cluster can be classified into two components: pallet and box manufacturing and transportation machinery manufacturing. Following a trend common in American manufacturing, both these industries experienced significant employment drops, each around 25 percent in the last ten years. Combined, these manufacturing inputs for freight still employ about 12,000 people in the region at 307 establishments.

### **Consulting**

Firms in this segment of the cluster are engaged in providing assistance and expertise in materials, handling, and inventory management; distribution networks; warehouse use, operations, and utilization; and transportation and shipment of goods. Employment in this portion of the cluster has steadily increased in the past decade to about 4,000 today and is forecasted to continue to climb in the next ten years.

The upsurge of consulting activities stems from the increasingly complex nature of freight logistics today, and the Chicago region is capturing an important share of this market. The location quotient for freight consulting in the region in 2011 was 1.12; by 2021 this is expected to rise to 1.26. Jobs in this industry are centered in Cook County with a scattering of additional firms throughout the region.

### **Leasing**

Leasing of commercial transportation equipment enables core firms who do not own their own equipment to be carriers on the freight network, a vital function for the cluster. The leasing industry is relatively small, employing about 800 people in the region, yet is heavily concentrated, with the location quotient increasing from 1.46 in 2001 to 2.15 in 2011. Shift-share analysis also identifies leasing of transportation equipment as an industry with a strong

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<sup>41</sup> Bill Mongelluzzo, "The Port Moves Inland," *The Journal of Commerce*, no. 36 (September 13, 2010), p. 30–32.



regional competitive advantage: while national trends would suggest a decrease of employment, the region has actually gained jobs in the last ten years.

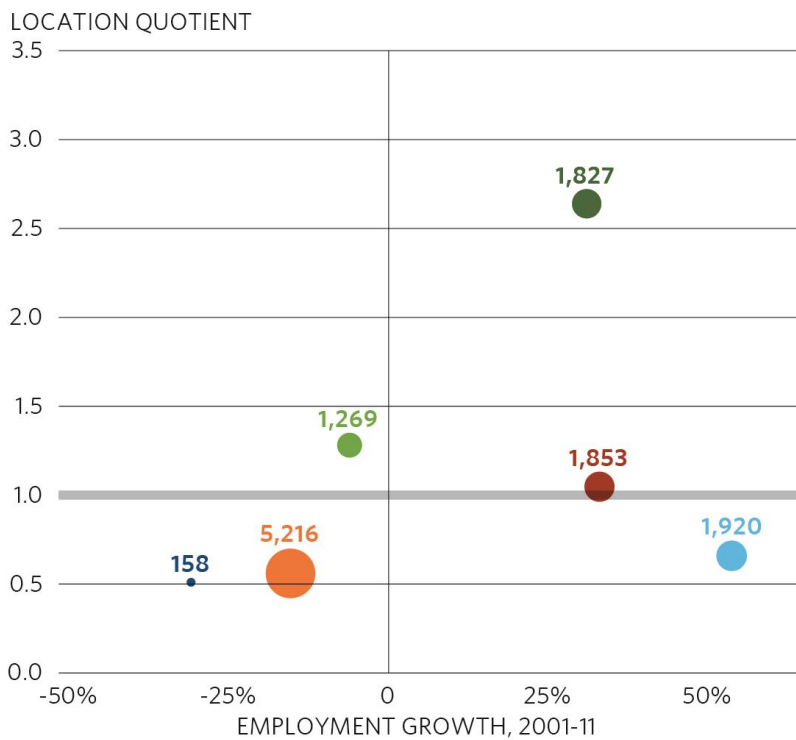
## Indirect Support/Infrastructure Industries

The industries that compose the indirect support/infrastructure segment of the freight cluster operate and maintain the ports, harbors, terminals, and connecting infrastructure that facilitate freight movement in the region as well as provide support activities such as repair, surveying, and inspection.<sup>42</sup>

**Figure 12. Support industries**

Circle size indicates number of jobs per industry

- HIGHWAY, STREET, BRIDGE CONSTRUCTION
- AIRPORT OPERATIONS
- ROAD SUPPORT     ● RAIL SUPPORT
- AIR SUPPORT     ● WATER SUPPORT



Source: CMAP analysis of EMSI data, 2012.

<sup>42</sup> Industries in the core of the freight cluster also receive support from industries such as banking, insurance, or administrative and corporate services. In trucking for example, property, casualty and health insurance are all major costs for the industry while rail requires access to credit and lenders to fund needed improvements. Since these industries are not unique to and are not fundamentally tied to the health of the freight cluster though, they are not included in this analysis.

Total regional employment in 2011 in indirect support/infrastructure was 12,660, representing the smallest of the four components of the freight cluster. Though total employment in 2011 closely mirrored that of 2001, a look at the corresponding industries shows divergent growth patterns between industries.

### ***Highway, Street, and Bridge Construction***

Highway, street, and bridge construction witnessed declining employment, falling 15 percent in the last ten years, though much of this loss was a result of the recent recession that hit construction particularly hard. It is also less concentrated in the region compared to the national average, making it one of the few key cluster activities with a location quotient lower than one. Despite these trends, the industry still provides a vital support role to the cluster.

### ***Port Operations***

Airport and harbor operations are covered under this division of the freight cluster. The operation of rail terminals that exist as independent establishments is included under rail support activities since the majority of this industry performs support instead of operational functions.

Airport operations employed over 1,800 people in the region in 2011, growing by a third in the last ten years. The recent growth in airport operation employment is almost entirely due to regional competitive advantage instead of national trends. In contrast, port and harbor operations employ fewer than 100 people in the region. The location quotient for port and harbor operations, 0.16, illustrates how water is the least concentrated of all the freight modes in the region.

### ***Support***

Support activities include inspection, maintenance, and aircraft ferrying and fueling for air; repair and maintenance of rail cars and independent terminals for rail; unloading, docking, and tugboats for water; and truck weighing, snow removal, and street cleaning for trucking.

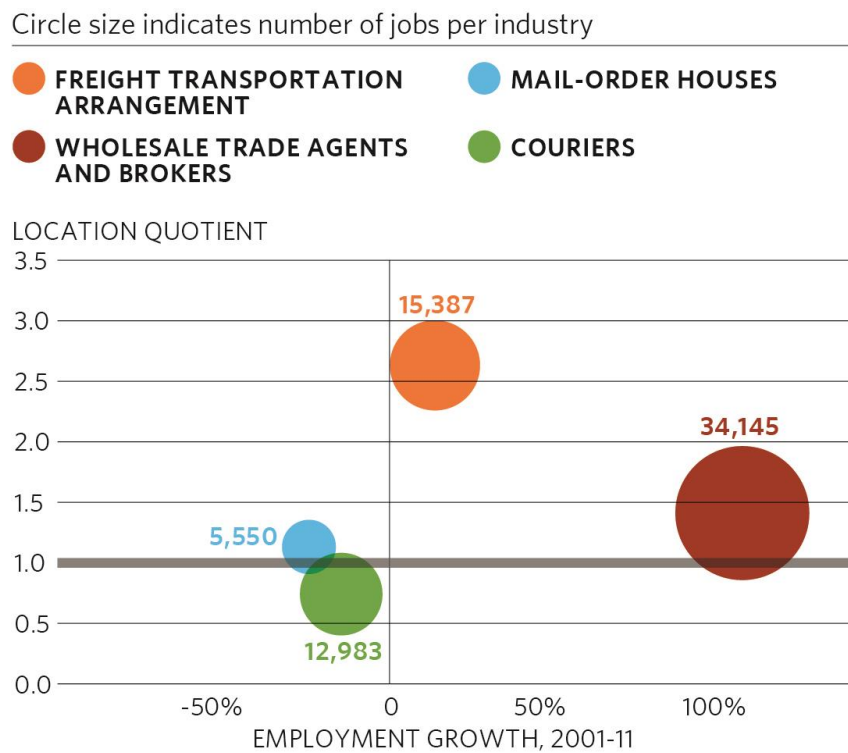
Employment for air and rail support activities was close to 2,000 each for the year 2011, while road support industries employed about 1,300 and water freight support provided 600 jobs. The level of concentration varied by mode: both air and water support was under-specialized in contrast to rail and truck support. Support for rail activities was especially concentrated in the region, with a location quotient of 2.64. Both air and rail support grew in the last ten years and shift-share analysis shows that about half of this growth comes from regional competitive advantages.



## Customer Industries

In some sense, almost every industry in the regional economy could be considered a customer of the freight cluster, given that freight allows firms to gain access to greater markets, receive inputs and supplies necessary for everyday operations, and be consumers of global production. To simplify complex relations and transactions, this analysis defines customers as those most closely related to the modal operations of the core whose purpose is to get freight to the final point of distribution or consumption. For this report, the four industries that compose the customer segment of the cluster are freight transportation arrangement, couriers, wholesale agents, and mail-order houses. With 68,065 jobs in 2011, the customer segment had about a third of all employment in the cluster.

Figure 13. Customer industries



Source: CMAP analysis of EMSI data, 2012.

### Freight Transportation Arrangement

Freight Transportation Arrangement organizes transportation of freight between shippers and carriers. With the advent of globalized supply chains, freight arrangement is becoming more and more important to cluster activities. Establishments in freight transportation arrangement are commonly known as freight forwarders and brokers, cargo agents, and third-party logistics providers. Between 2001 and 2011, the region gained 2,000 jobs in freight transportation arrangement, an increase of almost 15 percent. The industry already is concentrated in the



region, and is becoming increasingly more so: the industry location quotient rose from 2.23 to 2.63 this past decade. Shift-share analysis of job growth shows that freight transportation arrangement in the region is growing at a rate much faster than the national average, with one of the highest competitive effect rates in the region.

### ***Couriers***

Couriers and express delivery services are fundamental to the operations of the freight cluster. They are vital for last mile, door-to-door delivery, especially for high-value and time-sensitive goods. Couriers are dominated by the global firms FedEx and UPS, but other myriad smaller delivery services also operate in the region. Larger couriers are concentrated around O'Hare airport, while smaller firms are scattered throughout the region.

Despite their essential role in getting freight to the final point of consumption, couriers are one of the few elements of the freight cluster where metropolitan Chicago does not have a concentration. Regionally, employment in courier and express delivery service fell 15 percent the last ten years. Using a gap analysis, the final section of this chapter explores why some industries are underperforming.

### ***Wholesale Trade Agents and Brokers***

Wholesale agents and brokers act as intermediaries between manufacturers and consumers. They buy goods in large quantities and then sell to retail for final consumption. Wholesale also sells to institutions (governments, universities, etc.) for internal use instead of consumption. Wholesaling agents are well-represented in the region, with 34,000 employed in 2011. In the past ten years growth in wholesale trade has taken off, with the industry doubling in size according to data from EMSI. Shift-share analysis shows that this industry has the largest competitive effect of any in the cluster. Because of this rapid growth in the past decade, wholesale trade agents and brokers are now heavily concentrated in the region.

### ***Mail-Order Houses***

The final industry of the customer section is Mail-Order Housing. This industry is engaged in retailing all types of merchandise using mail catalogs, television, or the internet. In the past ten years regional employment in mail-order housing has declined by about a quarter, but is still more concentrated compared to the national average. About half of Mail-Order Housing establishments are located in Cook County, with smaller concentrations in Lake and DuPage counties.

## **Cluster Connectivity**

The theory behind industry clusters as regional economic drivers is based largely on the fact that firms in a cluster are interdependent and draw productive advantages that result from their





connections and co-location. To complete the description of metropolitan Chicago's freight cluster we need to further explore the internal connections of the cluster and identify how industries are interrelated. This section analyzes cluster connectivity using multiplier analysis as well as input-output scenario analysis. These tools reveal the ripple effect that takes place when one industry experiences a change in sales or employment. The section concludes with a gap analysis to see which freight cluster industries are underrepresented in the region.

## **Multiplier Analysis**

Multiplier analysis is used to estimate the additional economic activity created when one industry expands. Our analysis draws on two multipliers—sales multipliers and jobs multipliers—calculated using Economic Modeling Specialists, Inc.'s (EMSI) input-output model.<sup>43</sup> Both sales and jobs multipliers are interpreted in a similar manner. The sales multiplier estimates how one dollar of increased sales in an industry affects the economy as a whole. For example, a sales multiplier of 1.75 means that a one-dollar increase in sales in the industry will add an additional 0.75 cents in economic activity. Similarly, the jobs multiplier suggests how many additional jobs will be supported by an increase of one job in an industry. Put simply, an industry with a higher multiplier has a greater ripple effect on the economy as a whole.

### ***Sales Multipliers***

Commercial transportation equipment rental and leasing has the highest sales multiplier of any industry in the cluster. This is likely due to the fact that multipliers are often higher for industries that are positioned early in the supply chain, resulting in a longer, stronger domino effect. Regardless, the high multiplier of transportation equipment leasing suggests that the successful creation of lease deals expands the number of opportunities in the cluster by enabling more firms to be carriers of freight. Industrial transportation machinery manufacturing, with the fourth highest sales multiplier in the cluster, is similarly reflective of how preliminary economic activity results in a larger ripple effect.

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<sup>43</sup> Economic Modeling Specialists, Inc.'s input-output model is built to simulate the effects of industry expansion or contraction on other industries in the region. It reports on single industries as well as industry clusters.





**Table 3. Top sales multipliers of industries in freight cluster**

Industry	Sales Multiplier
Commercial Transportation Equipment Rental and Leasing	2.08
General Trucking	2.05
Specialized Trucking	2.04
Industrial Transportation Machinery Manufacturing	2.02
Packaging and Labeling Services	2
Process, Physical, Distribution, and Logistics Consulting	2
Warehousing	1.97

*Source: EMSI Input-Output model*

General and specialized trucking represent the second and third largest sales multiplier in the cluster, showing that trucking is the most connected of the modes of freight. Packaging and Labeling Services has a high sales multiplier as well, indicating that one way the region adds value to freight is by repackaging, adding customized labeling, and preparing goods for transport. Logistics consulting, followed by warehousing, round out the industries with the highest sales multipliers.

**Jobs Multipliers**

The second multiplier analysis—jobs multipliers—further shows how integral freight activities are to the overall economy. The jobs multiplier estimates how many jobs in the greater economy a one job increase in a particular industry will support. As with sales multipliers, the important point to take away is that a higher jobs multiplier suggests an industry with stronger ripple effects.

**Table 4. Top job multipliers of industries in freight cluster**

Industry	Multiplier
Commercial Transportation Equipment Rental and Leasing	5.71
Water Freight Transportation	3.2
Rail Freight Transportation	2.82
Input Manufacturing (Corrugated and Solid Fiber Box)	2.7
Wholesale Trade Agents and Brokers	2.54

*Source: EMSI Input-Output Model*

The top industry in the job multiplier analysis is commercial transportation equipment rental and leasing, as it is with the sales multipliers. This reinforces the idea that the transportation equipment rental and leasing industry plays a paramount role in enabling projects to go forward, therefore supporting a large number of jobs in affected industries. Water freight’s

inclusion into the most integrated industries suggests that the relatively tepid volume of freight moved by this mode belies an industry with important connections to the cluster.

Rail freight transportation has the third largest jobs multiplier. Though rail had a slightly lower sales multiplier at 1.86, its presence in the top three of jobs multipliers reflects its position as an integral core operation of the cluster. Input box manufacturing, the industry with the fourth highest jobs multiplier, is important for freight but also has a significant portion of its impact addressed outside of the cluster. Finally, wholesale trade agents and brokers provide the link between manufacturer and consumer; this tie is reflected in the industry's high job multiplier.

### **Summary of Multiplier Analysis**

Sales and jobs multiplier analyses help elucidate cluster connectivity by highlighting the industries with the strongest ties to the greater economy. One key takeaway point from the multiplier analyses of the Chicago region is the strong integration of the core transportation operations not only with the other transportation modes but also the other segments of the cluster. Sales multiplier analysis strongly indicates that trucking serves as the transfer mode for rail, air, and water. Rail also is seen to be linked to greater cluster activities, evidenced by its high jobs multiplier. Water freight's position in both sales and jobs multiplier analysis implies that the mode is more connected to other industries in the cluster than is generally noted. Air freight is the only core industry absent from the top multipliers, and this omission is not surprising: air freight is particularly reliant on trucking, is a relatively small mode, and is concentrated geographically, limiting extensive interaction.

Multiplier analysis also calls attention to key supply industries, most notably warehousing and transportation equipment leasing but also logistics consulting, packaging, and inputs. Equipment leasing, as the industry with the highest multiplier in both evaluations, is strongly linked to downstream cluster activities and enables projects to move forward. Warehousing, by distributing goods to their point of consumption, is tied to the modal forms of freight movement, logistical operations, and customers of the freight cluster.

Less integrated in the multiplier analysis are the indirect support and infrastructure firms, likely a result of their specialized functions. As would be expected, customers of freight movement, mainly freight transportation arrangement and wholesale agents, are deeply tied to other cluster activities.

### **Scenario Analysis**

Another tool that helps expose the interactions between industries in the freight cluster is input-output scenario analysis. Scenario analysis allows the researcher to ask targeted questions about the impact of growth in an industry. Scenario analysis, for example, predicts the effects of an increase of 1,000 workers in rail or \$100 million in sales in warehousing. Importantly, the results



also suggest *which industries* are most affected by the increase. As such, scenario analysis is useful in bringing to light the internal linkages between industries in the cluster.

Using EMSI's input-output model, CMAP ran a series of scenarios to reveal how industries interact with each other in the cluster. The results also incorporated how much industries purchase from other industries within the cluster. Scenario input-output analysis shows that each of the core modes of freight movement in the cluster has distinct supply chains. Trucking, as suggested above, has the strongest linkages of the core freight modes. A boost in trucking activity resulted in increased activity in almost all other industries in the cluster. The strongest connections were to couriers, warehousing, and temporary help services. There were noticeable impacts to upstream inputs like manufacturing as well as downstream customers including retail and wholesale trade.

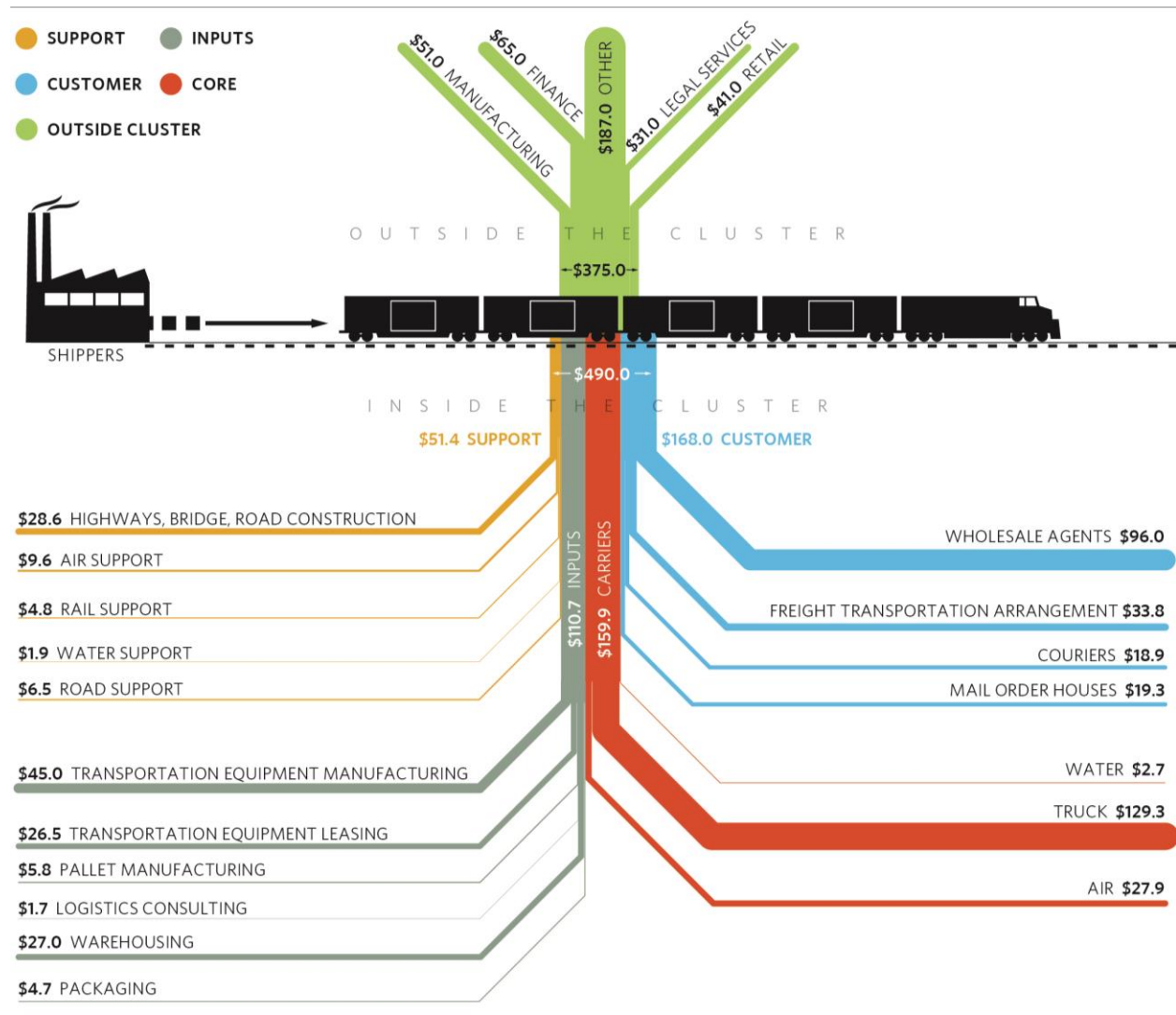
The expansion or contraction of one freight industry has a substantial effect on both the freight cluster and the greater economy. The following graphic is a visual depiction of the ripple effects on the greater economy resulting from an expansion in sales in the rail industry. The scenario assumes a shipper contracts with a rail carrier to move goods for \$1,000, so sales in the rail industry increase by \$1,000.<sup>44</sup> Based on the input-output model, this increase in sales would lead to \$1,865 in economic activity—\$1,000 in the sale itself (the direct effect) and \$865 in additional economic activity as rail firms expand to meet this new demand and rail employees have more income (indirect and induced effects). As the graphic shows, some of the ripple effects from an increase in rail sales (\$375) flow outside of the cluster: rail workers buy more hamburgers and haircuts for example. A \$1,000 increase in sales in the rail industry also leads to a strong ripple effect within the freight cluster itself, generating \$490 in additional economic activity.

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<sup>44</sup> An increase of \$1,000 is relatively small, especially as rail moved \$900 billion in the region in 2007. This sum was chosen to create a simpler graphic; a larger initial sales multiplier would generate a larger ripple effect.



**Figure 14. Economic multiplier from \$1,000 increase in rail sales**



Source: CMAP Analysis of EMSI Input-Output Model, 2012.

Figure 14 depicts the ripple effects of a \$1,000 expansion of the regional rail industry. This increase in sales would lead to \$1,865 in economic activity (\$1,000 in the sale itself and \$865 in additional economic activity resulting from rail’s expansion). Of the \$865 in additional economic activity, \$490 flows to industries within the freight cluster while \$375 goes to industries outside the cluster.

For the major direct supply functions of the cluster, an increase in warehousing activity led to an upsurge in temporary help services. The results also showed that a significant requirement for warehousing is couriers and trucking for delivery of product to retailers and consumers. The customers of the freight cluster are also highly linked to each other and the greater cluster. Couriers purchase from freight transportation arrangement who in turn rely on couriers.



Wholesale agents are strongly connected to warehousing and to a lesser extent trucking and inputs like pallet manufacturing.

The takeaway from the scenario analysis is that industries in freight do not act in isolation, but are instead part of a complex and intertwined cluster drawing advantage from co-location and constant interaction. Some industries are highly connected to most in the cluster while others are more limited, but the overall effect is a highly interdependent cluster.

## Gap Analysis

The evidence presented so far makes a strong case that the regional freight hub exhibits the characteristics of a thriving cluster. The region's concentration in freight is growing and includes a mixture of industries and firms that benefit from co-location, expedited transactions, and dense supply chains. Despite metropolitan Chicago's position as a leading freight cluster, not all freight functions are met entirely in the region. In order to understand how best to support sustainable cluster growth into the future it is important to identify the components currently underrepresented in northeastern Illinois.

The gap analysis for this report draws on input-output purchasing requirements as well as shift-share competitive effects and location quotients, all highlighting the areas within the regional cluster that are less concentrated or relatively weak. Using an input-output model, CMAP conducted an economic analysis to estimate how much the regional freight cluster purchases from other industries.<sup>45</sup> Part of this analysis determined how much of the freight cluster's requirements (in terms of purchases) are met within vs. outside the region. Overall, the input-output model shows that most of the cluster's needs are met internally – the cluster is not heavily dependent on imports to meet its requirements. In a few industries, however, less of the region's freight requirements were met internally and instead satisfied outside the region. In these industries the region is less competitive; often these industries correspond with relatively low location quotients and shift-share effects.

Knowing where the region is less specialized will help inform future cluster strategies as well as return economic benefits to the region. For example, upwards of \$2 billion of the requirements needed for the regional freight cluster to function are exported

*Bolstering local and attracting underrepresented freight industries to the region can return upwards of \$2 billion each year to the regional economy.*

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<sup>45</sup> For this analysis CMAP used an input-output model developed by Economic Modeling Specialists, Inc. Unless otherwise noted, supporting statistics for the gap analysis section come from this model.



from outside of the region each year.<sup>46</sup> Advancing strategies that could capture that demand locally thus has the potential to make a significant impact on the regional economy.

### ***Couriers***

The major cluster activity that stands out as being underrepresented in the region is couriers and express delivery services. With a location quotient of 0.74 in 2011, couriers were one of only a handful of industries within the cluster to fall below the national average. Looking at what industries buy in the cluster suggests that about only 50 percent of needed courier activity is met within the region while the other half comes from outside the region. Contrast this to core cluster activities such as rail or trucking—that satisfy about 95 percent of their requirements within the region—and the under-specialization becomes more apparent. Part of the explanation for this dearth of courier activity likely comes from the geographic constraints of this cluster analysis. Data for this report chiefly are for the seven-county CMAP area. Major courier activities, such as UPS’s hub at Rockford International Airport (their second largest in the country), do not fall in the geographic scope of this analysis since they are outside the CMAP planning area. Another possible reason for the lack of specialization in courier activities is that the region serves as a transcontinental reshipment point; much of the freight moving in the region is through traffic, which in turn does not need local delivery. Even with these qualifiers in mind, the region’s under-specialization in courier activity limits the potential of the cluster moving forward. Most notably, input-output scenario analysis identified couriers as one of the most interrelated industries in the cluster, serving the important task of getting freight to points of consumption as well as abetting movement between firms.

### ***Specialized Freight***

In addition to couriers, gap analysis identified specialized freight as another industry where the region is less represented. Specialized freight moves goods that due to unique size, weight, or shape requirements cannot be palletized and need specialized equipment. While nationally this industry has been growing, regional employment in specialized freight has shrunk by a quarter in the past ten years. Shift-share analysis draws further attention to the region’s underperformance in specialized freight: instead of the job increase that would be expected due to national growth effects, the region lost over 2,000 positions. As the industry within metropolitan Chicago has become less competitive, about a third of the requirements for specialized freight are now met outside the region. Part of the explanation behind the region’s underperformance in this industry is that much of regional freight flows are intermodal. Intermodal freight is predicated on standardized equipment such as containers, so that there may be less demand for specialized equipment.

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<sup>46</sup> This excludes petroleum, which is the single largest requirement of the cluster. Based on EMSI Input-Output model.





### **Access to Capital**

A third area where metropolitan Chicago's freight cluster relies more heavily on external support is access to capital. Freight investments such as new transportation machinery are extremely expensive so firms looking to expand their fleets must have access to financing and capital. Compared to core functions, the regional cluster meets much more of its freight demand for capital from outside the region. Industries such as commercial banking, lessors, and real estate credit have some of the highest percentages of requirements that are satisfied outside the region. This report focuses less on these types of support functions since they are not unique to freight, yet moving forward stakeholders should be at least cognizant of the role financing plays in the cluster.

### **Water Freight**

As explained earlier in this chapter, water freight in the Chicago region is relatively underutilized compared to other freight modes. This is most evidenced by the extremely low location quotients in the industries that make up water freight. Indeed, five of the six lowest location quotients in the entire cluster are in the water mode. The region's lack of concentration in water freight can be attributed to multiple factors. First, despite their size, sections of the Great Lakes freeze in the winter, interrupting shipping. Additionally, the locks that connect the Great Lakes to the ocean limit the maximum size of ships moving through the system. Water freight traditionally served heavy industry; as those industries have declined in the region so has the mode. Additionally, the infrastructure that serves the water system typically suffers from poorer intermodal access and the mode has faced intense competition from trucking and rail. Finally, while northeastern Illinois is underrepresented in the mode, the greater tri-state region has other water freight assets, such as the Port of Indiana-Burns Harbor.

**Table 5. Five of six lowest location quotients in cluster are in water freight**

Industry	Location Quotient (2011)
Marine Cargo Handling	0.11
Port and Harbor Operations	0.16
Navigational Services to Shipping	0.34
Inland Water Freight Transportation	0.38
Specialized Freight Transportation (Long-Distance)	0.42
Coastal and Great Lakes Freight Transportation	0.44
Cluster Average	1.21

### **Freight Transportation Arrangement**

Between a quarter and a third of all freight in the nation moves through the Chicago region. So while freight transportation arrangement (FTA) is actually one of the strongest components of the freight cluster, the sheer size of freight movements in metropolitan Chicago means that the



cluster purchases about a quarter of freight transportation arrangement from outside the region. As third-party logistics providers continue to rise in importance due to more complex supply chains, there is an opportunity for the region to build upon its concentration in FTA to meet more demand internally. The region can become even more competitive by capturing an even greater share of logistics provision.





# International and National Developments in Freight

Freight movement in the Chicago region is impacted by developments across the globe. Increased international trade, global infrastructure investments, or movements in manufacturing and production will affect how freight moves through northeastern Illinois. Some changes will present opportunities for the regional freight cluster to grow while others may divert freight flows away from the region. This section explores recent international and domestic trends in freight and addresses how these changes will impact future growth.

## International Developments

### Increased Global Trade

International trade is continuing to rise as the global economy rebounds. Fueling much of this growth is the rapid development of countries such as China, Brazil and India. While imports to the U.S. still outpace exports, the U.S. Department of Commerce predicts an upsurge in U.S. exports to meet the new demand emerging in the developing world.<sup>47</sup> The Brookings Institution found that export sales in the U.S. grew by more than 11 percent in 2010 real terms—the fastest growth since 1997. At the same time, the number of U.S. export-supported jobs increased, by nearly 6 percent, even though the overall economy was losing jobs.<sup>48</sup> Metropolitan Chicago is the nation’s third largest export region by value, with manufacturing leading its growth in exports.<sup>49</sup> Thus, not only will the increase in global trade bring more freight to the region in terms of imports, but metropolitan Chicago’s strong industrial core also has the potential to increase freight through exports.

## Port Expansions

### *Prince Rupert*

Prince Rupert port in British Columbia lies at the end of the shortest shipping route between Shanghai (China’s easternmost mainland port) and North America.<sup>50</sup> Prince Rupert is nearly 1,200 nautical miles closer to Shanghai than L.A.- Long Beach.<sup>51</sup> Because of this geographic advantage, the port is in the midst of a substantial expansion program to increase its capacity

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<sup>47</sup> U.S. Census Bureau of Economic Analysis, “U.S. International Trade in Goods and Services,” February 10, 2012.

<sup>48</sup> Brookings Institution, “Export Nation 2012: How U.S. Metropolitan Areas Are Driving National Growth,” See <http://www.brookings.edu/research/reports/2012/03/08-exports>.

<sup>49</sup> Illinois Innovation Index, “Robust manufacturing puts Illinois among nation’s export leaders,” April 2012 edition.

<sup>50</sup> Peter Leach, “Lindinksy to Ask FMC to Study Prince Rupert,” *Journal of Commerce* online news story, September 21, 2011.

<sup>51</sup> Prince Rupert and Port Edward Economic Development Corporation, “Transportation and Logistics Sector Profile.”



from 350,000 TEUs to 2 million by 2014. This expansion could lead to more freight moving through the Chicago region because in addition to serving Canadian cities, Prince Rupert is directly linked to U.S. markets through CN Railway. Its U.S. bound freight can be routed to south suburban Harvey or to Memphis. Strategies to actualize the benefits of this increase in freight flows to the Harvey terminal—such as the Green TIME Zone—are explored in more detail in the Cluster Support Strategies section of this report.

### ***Port of Punta Colonet***

In 2008, a project was launched in Baja California to develop the third largest deep sea port in the world—larger than both Los Angeles and Long Beach combined. If constructed, the port will be located close to Mexican Federal Highway 1 with a direct route to the U.S. Plans for the port include building 200 miles of rail to the US border and an intermodal facility that would direct goods to Southern California, Nevada, and the growing southwestern states.<sup>52</sup> Although the port has strong backing from the Mexican government, progress has been slow. As of the end of 2011, port developers still had no detailed plans for the construction of an adequate new border crossing and international trade zone that could accommodate moving an additional million TEUs across the border quickly. Several rail lines connecting Punta Colonet to inland markets are still under consideration. It remains to be seen whether the proposed port would divert freight from or direct freight towards the Chicago region. If built, this port could have a large impact on North American freight flows.

### ***Port Lazaro Cardinas***

In the absence of the Punta Colonet port, Mexico's dominant Pacific port remains Lazaro Cardinas. In 2011, the port announced plans for a \$900 million expansion that will nearly double the size of the current facility to compete for imports heading to Mexican and U.S. ports on the west coast. Lazaro Cardenas has a direct rail connection to Chicago via the Kansas City Southern railroad. The first phase is scheduled to open in 2015 on 100 acres including two berths, and the completed site will encompass 250 acres with four berths and include nearly 5,000 feet of docking space and an on-dock rail yard.<sup>53</sup> The port will also feature berths large enough for much larger vessels.<sup>54</sup> Increased capacity in this port will add another connection between Pacific ports and Chicago.

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<sup>52</sup> Ryan Forster, "A Concise Background and History of the Punta Colonet Multimodal Project in Baja California," University of San Diego Trans-border Institute, December 2009.

<sup>53</sup> Journal of Commerce, "AMP Terminals Wins Lazaro Cardenas Bid," December 29, 2011.

<sup>54</sup> American Association of Port Authorities Seaports Magazine, "Terminal Expansion Moving Forward," Summer 2009. See <http://bit.ly/Ng44Zm>.



Figure 15. Major international and domestic freight trends that will impact metropolitan Chicago

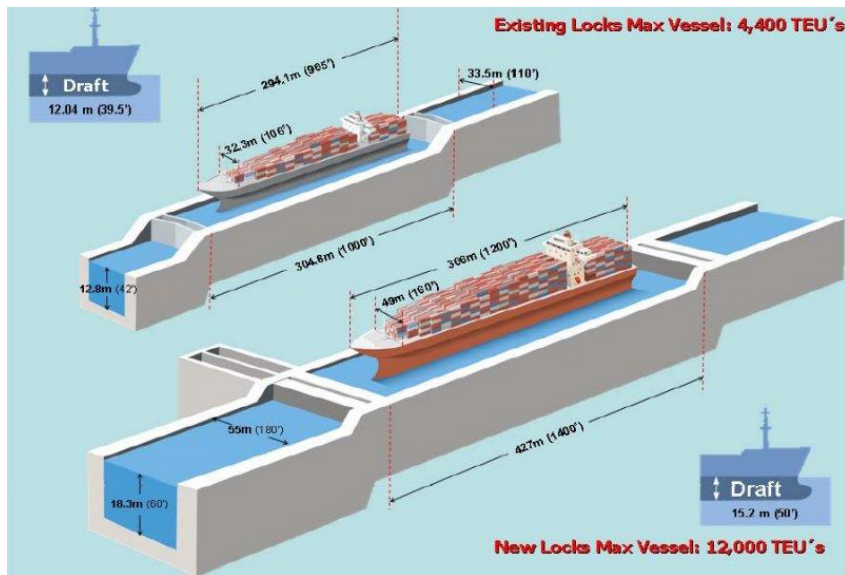


As shown in the figure above, the metropolitan Chicago freight cluster will have to adapt to external changes in freight and stay ahead of large developments to retain its status as the nation's freight hub. The above graphic marks some of the major trends affecting future freight flows.

## Expanded Ship Capacity

Increased global container trade has prompted the modernization of the Suez and Panama Canals. Both canals will have the capacity to receive larger container ships which now operate around the world.

Figure 16. Panama Canal lock improvements under construction



## Panama Canal Expansion

In time for its hundredth anniversary in 2014, the Panama Canal is poised to have finished a major expansion program. The improvements to the 50-mile waterway will include locks that are approximately 60 percent wider and 40 percent longer. Ships triple the size of the previous limit, known as post-Panamax, will be able to traverse the canal.<sup>55</sup> The improved canal will accommodate all but eight of the world's container vessels.<sup>56</sup>

<sup>55</sup> Image of Panama Canal Expansion source: Panama Canal Authority.

<sup>56</sup> The Economist, "The Panama Canal: A Plan to Unlock Prosperity," July 2009.



Currently many of the container ships that leave Asia for the U.S. are too large to move through the canal. The vast majority of these ships offload at west coast ports such as Los Angeles/Long Beach. The expansion of the Panama Canal will likely divert some of this freight to the eastern seaboard and Gulf Coast. The canal expansion has the potential to diminish freight flows in Chicago since the region currently serves as a mid-journey staging ground for freight moving from Pacific ports to eastern markets.

While an expanded canal has the potential to divert freight away from the Chicago region, many eastern ports are not yet ready to receive the new fleet of larger ships.<sup>57</sup> As late as 2011, only Norfolk, New York/New Jersey, and Halifax have the capacity to accommodate the larger ships.<sup>58</sup> The future impact of the Panama Canal expansion for freight movements in metropolitan Chicago is unclear. Much depends on the economics of the canal: if the Panama Canal Authority sets tolls too high, multinational shippers will continue to call on Pacific ports and use rail to move goods to North American markets.<sup>59</sup> At this point, the pricing scheme for the improved canal remains uncertain.

### **Suez Canal**

Unlike Panama, the Suez Canal contains no locks because it is at sea-level throughout. While the canal has been widened and deepened over the years, it remains a single lane with sections where ships can pass. Improvements completed in 2010 allow 63 percent of the world's tanker fleet and 96 percent of the world's bulk carrier fleet to pass through the channels.<sup>60</sup> As the production of some high-value imports shifts from China to other areas of Southeast Asia, some freight could be rerouted from Asia to the West Coast through Suez to eastern U.S. ports, producing a similar effect on the Chicago region to that of the expansion of the Panama Canal.

#### **Export potential in region for containerized agricultural products**

Another important development in shipping is the containerization of dry bulk commodities such as rice or soy beans. This containerization is desirable for consumers because they can now select for precise products with favorable attributes. Shipping commodities in containers is also beneficial for shippers, taking three to four weeks to reach Asia compared to the three to four months needed on bulk carriers. The containerization of dry bulk commodities, especially grains and other food staples, is emerging as a major domestic export to Asia. Located in the middle of the Midwest agriculture heartland, metropolitan Chicago can capture a significant share of this growing market.

Source: "Containerized Shipping opportunities for Soy Products," U.S. Soybean Export Council. [http://www.ussec.org/resources/USSEC\\_container.pdf](http://www.ussec.org/resources/USSEC_container.pdf)

<sup>57</sup> Savannah Morning News, "Panama Canal boss criticizes slow ports deepening," February 8, 2012.

<sup>58</sup> Bob Trebilcock, "The new Panama Canal: It's all about connectivity," Modern Materials Handling, February 7, 2012.

<sup>59</sup> Liliana Rivera and Yossi Sheffi, "Logistics: Shipping on the Panama Canal," *Americas Quarterly*, Spring 2011.

<sup>60</sup> Suez Canal Authority, "The Canal." See <http://www.suezcanal.gov.eg/sc.aspx>.

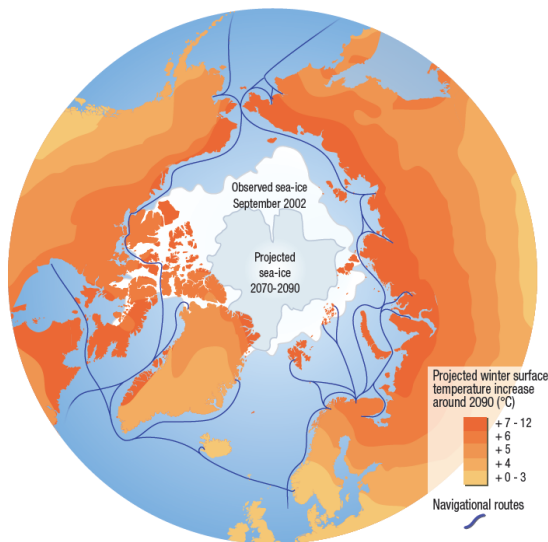




### **Arctic Circle Shipping Routes**

According to the United Nations' Environmental Programme work on the Polar Regions, increasing polar temperatures, receding icecaps, and decreases in permafrost will open up several shipping routes in the Arctic Circle in the near future.<sup>61</sup> In 2011, 18 cargo ships made the journey without encountering any ice impediments.<sup>62</sup> Until recently, this shortcut linking the powerful markets of Asia to Europe was not an option. A traditional route from South Korea to Rotterdam is approximately 11,000 miles, but using the Northeast Passage could shave ten days off of the journey by reducing the distance to 3,000 nautical miles.<sup>63</sup> The route is still not entirely reliable as local weather patterns can still freeze the route for long periods of time, but Korean and Japanese shipbuilders are working to develop icebreaking technology on cargo ships.<sup>64</sup> If the icepack continues to thin, the Arctic waters will become much more reliable shipping routes in the coming years. While it is still unclear how this development might impact the Chicago region, the development illustrates how the global freight landscape can change in dramatic and unforeseen ways.

**Figure 17. Arctic Circle shipping routes**



<sup>61</sup> Arctic icepack image from United Nations Environmental Programme, "Projected changes in Arctic climate." See <http://tinyurl.com/85nm4vy>.

<sup>62</sup> Andrew Kramer, "Warming Revives Dreams of Sea Route in Russian Arctic," New York Times, October 17, 2011.

<sup>63</sup> Ibid.

<sup>64</sup> Congressional Research Service, "Changes in the Arctic: Background and Issues for Congress," April 5, 2012.





## ***Near-sourcing***

Global supply chains have enabled companies to increase profitability by sourcing production to areas where wages are low, facilities are less expensive to construct, and tax burdens are small or nonexistent. However, the vulnerability of longer supply chains in the developing world is leading some firms to reconsider the benefits of worldwide sourcing. Recent events like flooding in Thailand and the earthquake in Japan disrupted supply chain flows, causing major repercussions for firms operating under just-in-time production. Increasing energy prices also incentivize companies towards shorter transportation distances. Lastly, wages are increasing, particularly in China, while manufacturers in the U.S. are achieving greater efficiencies through technological automation.<sup>65</sup> All these factors are leading some companies to locate production and suppliers closer to the end consumer, a process known as near-sourcing.<sup>66</sup>

While many firms will continue to employ global production strategies, near-sourcing will bring some manufacturing back to North America. This relocation will likely concentrate in the U.S., Mexico, and Central America.<sup>67</sup> It remains to be seen if this shift will benefit competing freight centers like Houston or Kansas City more than metropolitan Chicago since these regions have better access and linkages to the low-cost production centers in Mexico and Central America.

## **National Developments**

### **Just-in-Time Production and Delivery**

Just-in-time strategies aim to keep inventory levels low and reduce the amount of time a good sits until it reaches the consumer. In addition to minimizing inventory costs, just-in-time allows a firm to better respond to consumer demand; instead of holding massive amounts of a product that proved to be unpopular, a firm using just-in-time processes could simply shift to a new product line and not be faced with dumping excess inventory. Just-in-time production and distribution relies heavily on coordinated logistics to move goods through the supply chain with precision.<sup>68</sup> Because transfer windows are so tight, firms using a just-in-time distribution model must have a reliable transportation system. High levels of traffic congestion and deteriorating infrastructure remain large challenges for the Chicago region, and these will be explored in more depth in chapter three.

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<sup>65</sup> Dustin Walsh, "Overseas oversold? Companies find onshoring makes financial sense," *Crains Detroit Business*, March 11, 2012.

<sup>66</sup> Tom Krishner, *Ford Says its UAW Deals are Bringing Back Overseas Jobs*, *USA Today*, August, 2010; Harold Sirkin, Michael Zinser, and Douglas Hohner, "Made in America, Again," *Boston Consulting Group*, August 25, 2011.

<sup>67</sup> John Ferreira and Mike Heilala, "Manufacturing's Secret Shift," *Accenture*, 2011, p. 10.

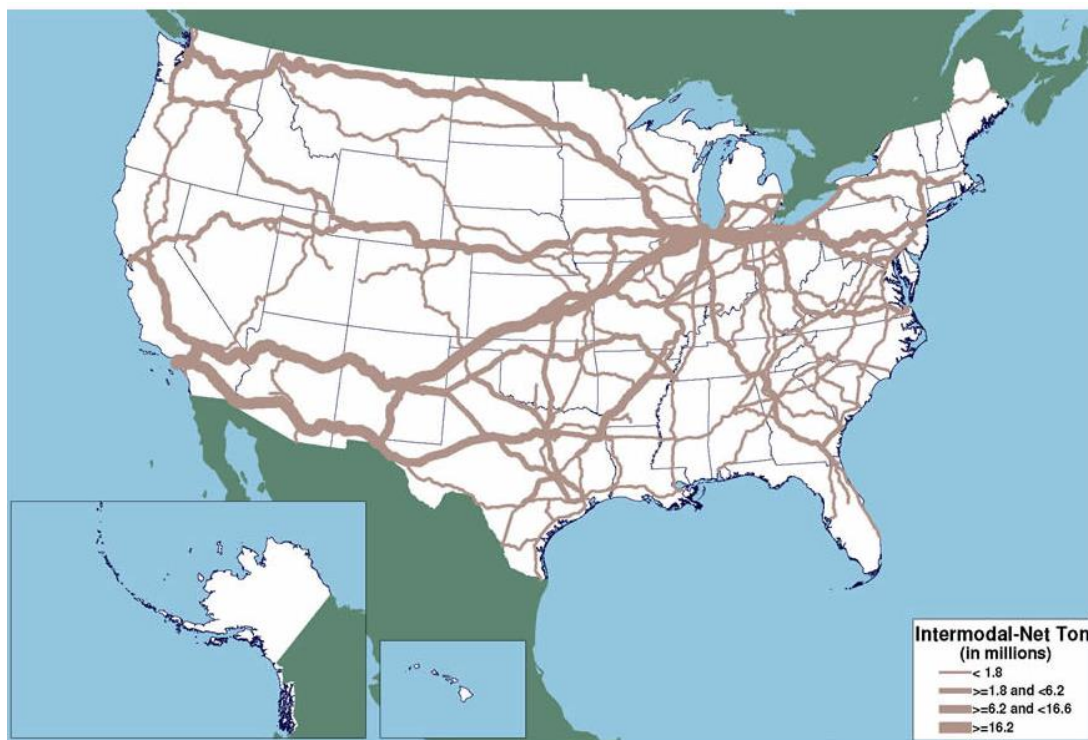
<sup>68</sup> IHS Global Insight, "Memphis Regional Freight Infrastructure Plan," Prepared for Greater Memphis Chamber of Commerce, March 2010, p. 19.



## Multi-Modalism and Increased Rail Use

In a cluster particularly prone to price pressures, shippers seek more flexibility when moving goods in order to gain efficiencies. High and fluctuating fuel prices push shippers to re-examine many longstanding practices and assumptions about transportation mode choices. Most notably, as rail technology improves and fuel prices continue to rise, rail is becoming much more price competitive. As firms face more internal and external pressure to mitigate their emissions from freight, rail's attractiveness as a mode choice is amplified. Multimodalism is facilitated by intermodalism and metropolitan Chicago is both the intermodal and rail capital of the U.S. (See map below: Tonnage of Trailer-on-Flatcar and Container-on-Flatcar Rail Intermodal Moves: 2008.<sup>69</sup>) As cost pressures lead shippers to look to intermodal and rail moves, more freight will be channeled to the region.<sup>70</sup>

**Figure 18. Tonnage of trailer on flatcar and container on flatcar rail intermodal moves, 2008**



Source: U.S. Department of Transportation, Federal Railroad Administration, October, 2010

<sup>69</sup> Intermodal Moves Graphic from Freight Analysis Framework, Federal Railroad Administration.

<sup>70</sup> Jason Mathers, "Smart Moves: Creative Supply Chain Strategies Are Cutting Transportation Costs and Emissions," Environmental Defense Fund, 2012.



## Domestic Competition

Emerging domestic developments also have the potential to shape future freight flows to the region and thus impact growth in the regional cluster. While some trends may divert freight away from the region, metropolitan Chicago's status as a current hub means the region is well-positioned to take advantage of expanding freight demand. Despite this marked advantage, competitor freight regions in the Midwest and the South devote significant resources to grow their freight clusters. As the Chicago region is already plagued by serious congestion, these competitor regions may be able to siphon away future freight flows.

### **Memphis**

Memphis is home to the world's largest cargo airport, is served by five Class I railroads, has the nation's fourth largest inland water port and access to 11 Interstate and U.S. designated highways.<sup>71</sup> Memphis's regional freight cluster grew by 12 percent in the last decade, outpacing Chicago's growth over the same period.<sup>72</sup> Home to the headquarters of FedEx, the region specializes in courier services—evidenced by its remarkable courier location quotient of 10.9. For comparison, Chicago's is 0.74.<sup>73</sup> This focal point allowed Memphis to emerge quickly as a national distribution and logistics hub. Memphis competes directly with Chicago to serve as a continental transshipment point, and the region is devoting resources to expand its rail and intermodal access. The Greater Memphis Chamber developed the Memphis Regional Freight Infrastructure Plan in 2010 for the region's freight development. The freight plan lays out a comprehensive supply chain strategy, emphasizing the importance of clustering manufacturing with freight. As of 2011, carriers had already invested over \$500 million in upgrading or constructing tracks and new intermodal facilities. Memphis's existing infrastructure and availability of land make the region attractive to freight investment, and the region is positioned to become even more competitive in logistics and freight, challenging metropolitan Chicago's status as the nation's dominant transshipment hub.<sup>74</sup>

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<sup>71</sup>IHS Global Insight, "Memphis Regional Freight Infrastructure Plan," Prepared for Greater Memphis Chamber of Commerce, March 2010.

<sup>72</sup> Data for the Memphis MSA based on Quarterly Census of Employment and Wages, Bureau of Labor Statistics, 2010. The Memphis freight cluster is defined as to include the 42 NAICS codes used in this study. Growth may actually have been higher because data were not disclosed for rail (NAICS 482), NAICS 333924 (transportation machinery manufacturing), NAICS 481212 (nonscheduled air freight), NAICS 483111 (deep sea freight), and NAICS 561910 (packaging and labeling services).

<sup>73</sup> Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2010.

<sup>74</sup> IHS Global Insight, "Memphis Regional Freight Infrastructure Plan," Prepared for Greater Memphis Chamber, March 2012; Martin Lipinski, "Strategic Plan," University of Memphis Center for Intermodal Transportation Studies," December 10, 1996.



## **Kansas City**

Kansas City has long been an important freight center and the region's freight cluster focuses on shorter supply chains and just-in-time shipping.<sup>75</sup> The region features four updated intermodal logistics parks, five Class I rail lines, connectivity through three interstates, and access to the Missouri River. Several intermodal sites and industrial parks linked in close proximity to freight are in final stages of upgrades and development. KC Logistics Park, a 550-acre site located next to the BNSF intermodal facility, is expected to open in September 2013. CenterPoint is developing a 1,000-acre industrial park directly adjacent to the Kansas City Southern Facility that opened in 2008. Kansas City has direct rail links to Mexico through both U.S. and Mexican railroads and would allow companies to increase sourcing from Latin America. As Kansas City is markedly less congested than metropolitan Chicago region, these developments could divert freight from the region.

The Kansas City region has been particularly successful in organizing support around its freight cluster. KC SmartPort, a nonprofit economic development organization, coordinates freight efforts in the bi-state region and helps inform regional planning activities.<sup>76</sup> KC SmartPort offers a particularly important lesson for the Chicago region: regional collaboration, instead of internal competition,

## **Changing Freight Needs: Coal**

Coal made up over 40 percent of Class I railroad tonnage and 20 percent of rail revenue in 2005. Illinois is the 9<sup>th</sup> largest producer of coal in the nation, exporting and importing more tons of coal than any other single commodity.

While coal currently meets around half of the nation's energy demand, environmental regulations will transform the industry in the coming years. Increasingly strict standards from state and federal lawmakers will cause utilities to incorporate more renewable energy in their production of electricity. While coal remains a good backup—unlike natural gas it does not require that contracts be made well in advance, is relatively readily available, and can be stored at a low cost—it is still the country's leading source of global warming pollution. Coal is the single largest commodity moving by rail in the Chicago region; heightened environmental concerns could lead to a significant reduction in this major rail flow.



Source: "Challenges and Opportunities for the Illinois Coal Industry," University of Illinois Urban Transportation Center. 2011. Image from U.S. National Archives' Local Identifier: 412-DA-1395

<sup>75</sup> Ron Achelpohl, Assistant Director of Transportation, Mid-America Regional Council (MARC), in an interview with CMAP, April 2012.

<sup>76</sup> Ibid.



boosts the economic performance of the cluster as a whole.<sup>77</sup> With the support of an economic development organization that works across many political boundaries, including the Missouri-Kansas state line, the region has been able to attract many freight firms from outside the region. Kansas City's proactive freight cluster development approach includes strong linkages to manufacturing and shortening the supply chain.

### **Ohio**

In 2011, CSX completed its Northwest Ohio Terminal Facility marking its move of major operations from Chicago to Ohio. This development is being closely watched by the industry. The facility includes several technological innovations in the 185-acre freight distribution hub. The yard is not a traditional flat switching yard but instead uses a "center ladder" design that allows access to any of the tracks.<sup>78</sup> It will also use advanced cranes that incorporate tracking technology for more efficient stacking. The Northwest Ohio Terminal is the cornerstone of a public-private infrastructure initiative called National Gateway that is investing large sums to allow double-stack trains to run between the Midwest and the Mid-Atlantic.<sup>79</sup> As freight along the improved corridor increases, CSX will transfer the lion's share of shipments to this new innovative terminal.

The Heartland Corridor, a public-private partnership among Norfolk Southern and federal and state agencies, also is making Ohio a more competitive destination for freight. The Corridor cleared the way for double-stack containers to travel by rail from the Port of Virginia in Roanoke to Columbus, Ohio and then on to Chicago. In total the \$320 million project improved 28 tunnels in the Appalachian Mountains and removed 24 other obstructions.<sup>80</sup> The Corridor opened in September 2010 and is now the shortest, fastest double-stack route from the Port of Virginia to the Midwest, saving up to two days in transit time while also increasing volume by using double-stack trains.<sup>81</sup> The investments come at an opportune time. The Port of Virginia is currently the only deep water port with the capacity to unload the larger vessels that will be coming through an expanded Panama Canal. Ohio is well suited to take advantage of this development, though the Heartland Corridor also directly benefits the Chicago region.

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<sup>77</sup> Ibid.

<sup>78</sup> American Railway Engineer and Maintenance-of-Way Association, "Northwest Ohio Trans-shipment Terminal," June 15, 2011, 6. See: [http://www.arena.org/files/library/2011\\_Conference\\_Proceedings/Northwest\\_Ohio\\_Trans-shipment\\_Terminal.pdf](http://www.arena.org/files/library/2011_Conference_Proceedings/Northwest_Ohio_Trans-shipment_Terminal.pdf)

<sup>79</sup> "Background," The National Gateway. See <http://www.nationalgateway.org/background>

<sup>80</sup> Railway Gazette International, "Norfolk Southern Opens Heartland Corridor," September 9, 2010.

<sup>81</sup> Mid-Ohio Regional Planning Commission, "Heartland Corridor: What is it and why is it so important?" June 23, 2011.





## **Northwest Indiana**

While the data and analysis in this report focuses on the seven-county region of northeastern Illinois, a considerable portion of freight activity also moves through or stops in northwest Indiana. As such, both states stand to benefit from infrastructure improvements and efforts to generate new economic activity, regardless of which side of the state line these occur. Like northeastern Illinois, northwest Indiana is engaged in several economic development and infrastructure efforts to strengthen the cluster.

For example, the Gary International Airport is working to expand its air cargo capacity. With excellent access to rail, highways, and intermodal facilities, an enhanced Gary airport could help that part of the region develop into an air freight hub close to production and population centers. The Port of Indiana Burns Harbor is also undergoing strategic redevelopment to include more industry and logistics in its operations. As one of the closest water ports to metropolitan Chicago, its development could expand freight in one of the little used and perhaps underutilized modes. Finally, Indiana and Illinois are currently engaged in a partnership to connect I-55 in Illinois to I-65 in Indiana, via the Illiana Expressway. If constructed, the highway would pass through the southern part of the Chicago metropolitan area, potentially expanding capacity for freight movement through Will County, Illinois and Lake County, Indiana.

Moving forward, Illinois and Indiana will have many opportunities to collaborate around commonly shared challenges. Unfortunately, this has not always been the case to date, due to interstate competition over economic development and tax revenues. Moving away from this zero-sum game approach and toward shared growth strategies is a key theme in a recent report by the Organisation for Economic Co-operation and Development (OECD) on the tri-state area's economy. The report asserts that the states should shift the paradigm from competition for one another's assets to collaboration to build on the strengths and address the challenges of the tri-state area's many assets.<sup>82</sup>

## **Looking Ahead**

The regional freight cluster is just one of many integrated components that constitute a worldwide freight system. Changes across from across the world and country will impact the Chicago region. Several emerging trends may shift freight flows away from the region. A widened Panama Canal could disrupt the standing transcontinental pattern that has metropolitan Chicago at its center. The increased adoption of just-in-time methods may be undermined by regional congestion. And competitor regions such as Memphis or Kansas City

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<sup>82</sup> Organisation for Economic Co-operation and Development, "OECD Territorial Reviews: The Chicago Tri-State Metropolitan Area," 2012, p. 20.





are dedicating major resources towards bolstering their freight clusters. Even with these challenges, it seems likely that global developments will have a net positive effect on metropolitan Chicago's freight cluster. The escalation of global trade will double demand for freight in the next 20 years, and the region's standing as the nexus of much of the nation's transportation infrastructure suggests it is poised to capitalize on this upsurge. Additionally, the region's strength in intermodal and rail freight also positions it well to take advantage of emerging changes in shipping. External infrastructure investments, such as Prince Rupert or Lazaro Cardenas, will continue to funnel freight towards metropolitan Chicago. While the regional freight cluster should experience increased freight flows, the region's ability to seize this opportunity will dictate the future growth trajectory of the cluster. The following chapter turns to the major challenges and opportunities facing the freight cluster within the Chicago region.



# Challenges and Opportunities: Infrastructure, Innovation, and Workforce

The Chicago region is the nation's freight hub yet serious internal challenges may stifle or even prevent growth in the cluster. GO TO 2040 calls attention to three areas with the most potential to affect the future economic vitality and global competitiveness of the freight cluster: infrastructure, innovation, and workforce. The regional mobility section of GO TO 2040 discusses infrastructure in the region at length while the freight chapter of the plan highlights those elements specific to the freight system. The human capital section of the comprehensive plan describes how the availability of skilled workers and a climate of commercial creativity are crucial for sustaining economic prosperity. This report builds on the foundation of GO TO 2040 to more deeply explore the infrastructure, innovation, and workforce issues central to the freight cluster. Challenges within each area are discussed as well as opportunities moving forward to bolster regional strengths in freight.

## Infrastructure

### Congestion

Congestion remains the most visible and most explored challenge facing the freight cluster. The region's congestion levels are among the highest in the nation. Metropolitan Chicago's I-290 at I-90/I-94, for example, ranks as the most congested exchange in the entire country based on an index developed by the Federal Highway Administration.<sup>83</sup> Projected increases in population, jobs, and freight traffic will only add to regional congestion. Rail tonnage moving to and from and traveling through the region is projected to increase by more than 60 percent by 2040, trucking tonnage by 70 percent, air tonnage by 142 percent and intermodal tonnage by almost 200 percent.<sup>84</sup> Freight shares common infrastructure with passenger travel, exacerbating congestion levels. Trucking moves about two-thirds of all freight in the region, yet competes for limited space with commuters, shoppers, and other cars on the region's highways, arterials, and roads. Rail freight shares some right of way with Metra lines, and rail's at grade crossings slow down auto traffic. Likewise, air freight uses runway and hanger space that otherwise could be used for passenger travel.

Congestion directly impacts the freight cluster by increasing costs for firms and reducing reliability for shipments (see Figure 19). According to the Texas Transportation Institute, truck

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<sup>83</sup> Office of Freight Management and Operations, "Freight Facts and Figures 2011" U.S. Department of Transportation Federal Highway Administration, 2011, p. 41.

<sup>84</sup> CMAP, "Regional Freight System Snapshot," for Chicago BEA. See <http://www.cmap.illinois.gov/freight-snapshot>.



congestion alone cost the region \$3.3 billion in 2009, the highest among any metropolitan area in the U.S.<sup>85</sup> As a result of congestion, truckers may run out of the number of hours they are allowed to drive before mandated rest periods, further delaying deliveries. A May 2012 New York Times article defined Chicago as “America’s speed bump” for rail, suggesting that the average speed that trains moved through the city was about a quarter the pace of electric wheelchairs.<sup>86</sup>

**Figure 19. Gridlock at a glance**

Number of rail freight cars moving daily through the region	<b>37,500</b>
Average train speed across region	<b>6.8 - 12 mph</b>
Average truck speed across region	<b>10 - 15 mph</b>
Number of at-grade railroad crossings	<b>1,953</b>
Number of intermodal yards	<b>26</b>
Number of daily truck trips between railyards	<b>3,500</b>
Ranking among nation’s most congested metropolitan areas	<b>third worst</b>

Source: Business Leaders for Transportation, “Gridlock at a Glance,” Metropolitan Planning Council, 2002, p. 1.

Congestion also increases costs as shippers are forced to store higher inventories. A Government Accountability Office (GAO) study suggests that should freight mobility continue to decline, current supply chain strategies targeting metropolitan Chicago will no longer be economically viable as higher transportation costs will lead to higher overall operating costs as well as missed opportunities for investment and expansion.<sup>87</sup>

Congestion is already adversely impacting the region’s status as a freight center. The Metropolitan Planning Council estimates that congestion costs the region \$7.3 billion each year.<sup>88</sup> Many carriers look for ways to route freight not bound to the Chicago region through other shipping lanes, while some companies are moving operations entirely. For example, the Class I railroad CSX is investing heavily in northwest Ohio as a new center of operations. Other regions, such as Memphis or Kansas City, are devoting significant resources towards improving their freight infrastructure.

<sup>85</sup> Urban Mobility Information, “Annual Urban Mobility Report: 2009,” Texas Transportation Institute. See <http://mobility.tamu.edu/ums/>.

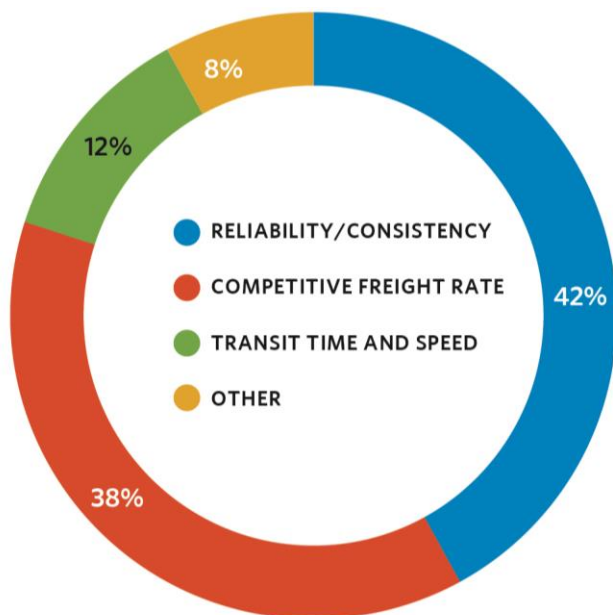
<sup>86</sup> John Schwartz, “Freight Train Late? Blame Chicago,” New York Times, May 7, 2012.

<sup>87</sup> U.S. General Accountability Office, “Freight Transportation, National Policy and Strategies Can Help Improve Freight Mobility,” GAO-08-297, January 2008.

<sup>88</sup> Metropolitan Planning Council, “Moving at the Speed of Congestion,” 2008, p. 5.



Figure 20. Top concerns of freight shippers



Source: Vickerman, 2012.

Even more than lost fuel and time, firms in the region’s freight cluster may be most impacted by decreased shipment reliability if congestion continues to increase. Just-in-time inventorying and production means reliability is paramount as the window for transfers and deliveries decreases; in a 2012 poll of 1,000 of the top multi-national shippers, reliability/consistency of shipments was the number one concern facing freight transport.<sup>89</sup> Reduced reliability has direct financial impacts for industries in the freight cluster. The firm Eby-Brown, for example, is contractually bound to make deliveries within a two-hour timeframe, incurring a financial penalty if it doesn’t meet this window 97 percent of the time.<sup>90</sup> If increased congestion prevents predictable transportation times then firms in the region may not be able to operate under just-in-time processes that are now entrenched as profit-maximizing strategies.

Like other parts of the country, the region faces serious challenges in financing infrastructure improvements. The rising cost of construction and operations has significantly undercut the purchasing power of federal and state motor fuel tax receipts, which have fallen in real terms over the last 20 years. Traditional means of funding transportation such as the gas tax may no longer be as effective as fuel economy improves and efforts continue to promote alternative energy. Moreover, scarce transportation resources are not always allocated based on

<sup>89</sup> John Vickerman, “Rail Delivers Jobs and Drives Economic Development,” *The Rail Summit* hosted by Lakeshore Chamber of Commerce, Chesterton, IN, March 16, 2012.

<sup>90</sup> Center for Neighborhood Technology, “Prospering in Place: Linking Jobs, Development and Transit to Spur Chicago’s Economy,” February 2012. See <http://www.cnt.org/repository/Prospering-in-Place.pdf>.



performance-driven criteria. In short, there is growing recognition across the nation that the methods and sources for financing transportation infrastructure are not keeping pace with the demand for maintenance, modernization, and expansion. This holds true for metropolitan Chicago as well, where financing transportation projects is a key challenge moving forward.

*The methods and sources for financing transportation infrastructure are not keeping pace with the demand for maintenance, modernization and expansion.*

As congestion is perhaps the most pressing issue facing the cluster, its impact on constraining growth is well documented. GO TO 2040 recommends a series of actionable items to modernize the existing system, invest in public transit to alleviate some of the pressure on regional road network, establish user fees to manage demand, and focus on a handful of major capital projects that have the most potential to maximize regional mobility.<sup>91</sup> Because of the significant resources already devoted to freight infrastructure, this report does not delve into the intricacies of congestion management. Instead, the focus is on implementing the recommendations of existing plans, namely modernizing the current freight system and being strategic about future freight investment. Strategies to support these implementation activities are identified in the opportunities section of this chapter.

## Freight Land Use Challenges

In addition to transportation infrastructure, regional land use will affect future growth in the freight cluster. Just as freight and passenger travel compete for limited space on the region's infrastructure, freight must often contend with commercial and residential land use. Many freight activities cause noise and congestion, exacerbate air and water pollution, and affect public safety so that freight represents uses that "most municipalities do not want."<sup>92</sup> Municipalities in the region also have a fiscal incentive to emphasize land use that maximizes municipal revenue streams: despite producing higher economic output, freight and industrial

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<sup>91</sup> Many other efforts have provided in depth analysis on regional congestion and put forward further recommendations. Some examples include: Regional Freight System Planning Recommendations Study commissioned by CMAP and conducted by Cambridge Systematics that provides a list of recommended infrastructure projects for the regional freight system; the CREATE program prioritizing critical improvements to increase the efficiency and investment in the region's rail infrastructure; localized studies such as the *South Suburban Freight Study* that developed an inventory and profiles the area's existing freight infrastructure; the *Inland Port Study* conducted by Will County Center for Economic Development focusing on the expansion of freight infrastructure in Will County; and the *Chicago Railroad Economic Opportunity Plan* that analyzes rail infrastructure and development potential in the City of Chicago.

<sup>92</sup> South Suburban Mayors and Managers Association, "South Suburban Freight Study, Technical Memorandum 1: Study Area Profile and Inventory," June 2008, p. 6-7.





*Though the entire region relies on the freight cluster to efficiently deliver goods and increase access to markets, individual municipalities often do not want to be the ones to house freight infrastructure.*

land use rarely generate any sales tax, making them much less attractive to municipalities that are looking for ways to increase revenue.<sup>93</sup> As municipalities in the region orient land use planning to maximize local revenues and seek to minimize the negative impacts associated with freight, “freight-related land use designation and land use has not kept pace with designation of other types of land uses.”<sup>94</sup>

The loss of industrial and freight zoning designation seriously threatens the sustained viability of metropolitan Chicago’s freight system and the challenge is further compounded by the fact that freight activities are land intensive by nature. In addition to large-scale terminals and facilities that directly move goods, further land is needed for support activities such as rearrangement, assembly, logistics, and most notably storage and distribution. For example, CenterPoint’s 2,500 acre intermodal freight facility in Elwood is anchored by the 770 acre BNSF terminal as well as almost 12 million square feet of industrial space set aside for logistic, distribution, and supplier firms. For comparison, this is about twice the size of the Loop in downtown Chicago.

**Figure 21. Aerial view of CenterPoint Logistics Park in Elwood, IL**



<sup>93</sup> CMAP, GO TO 2040, p. 210.

<sup>94</sup> CMAP, “Regional Freight System Planning Recommendations Study,” 2010, p. 5-36.



As seen in this aerial photo,<sup>95</sup> CenterPoint's Logistics Park in Elwood shows land intensity of freight activities that include not only terminals but also warehousing, distribution, and logistics.

Redevelopment also remains a serious challenge. As manufacturing and industrial activities have declined across the nation and the region, many communities have numerous sites of vacant or underutilized industrial land. Often this land is adjacent to areas served by superior freight infrastructure—prime locations for new freight investment. However, land that has been in industrial use for a century or more has often been split into numerous smaller parcels with individual owners. Because of this fragmentation of parcels, underutilized land in existing communities is less attractive for freight purposes requiring large footprints for terminals, warehouses, or other uses. Land assembly remains an expensive and time-consuming process, and a key challenge moving forward is how to make underutilized land in existing communities more appealing for freight investments.

As many freight terminals in the central part of the region have reached capacity, new freight development is increasingly concentrated on the outskirts of the region where land is more readily available. The suburbanization of warehousing, logistics, and freight leads to an incongruity between where jobs are located and where workers live, meaning more congestion as employees travel farther to get to work and have less public transportation options.

Another freight land use issue that adds to regional congestion is the lack of adequate space for support facilities. Even where land is more accessible, many municipalities discourage the development of ancillary support facilities such as container storage locations, truck parking areas, or repair facilities for train engines which are essential for effective cluster operations.<sup>96</sup> And while terminals stimulate warehouse and distribution development within at least a 10 to 20 mile radius, planners often neglect to account for this added demand so that there is less warehousing space available near terminals. As a result, support facilities for freight are often inconveniently located, leading to more regional congestion as freight transportation is forced to move between scattered facilities.

Intermodal moves require easy connections between terminals, distribution centers and storage areas. Freight land use challenges including loss of designation, land assembly difficulties and inadequate support systems lead to a more fragmented freight system. A recent survey of 1,000 industrial businesses found that close to two thirds operate in metropolitan Chicago because of

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<sup>95</sup> Image courtesy of Will County Center for Economic Development. See [http://www.willcountyced.com/midwestempire/inland\\_port\\_assets.aspx](http://www.willcountyced.com/midwestempire/inland_port_assets.aspx).

<sup>96</sup> South Suburban Mayors and Managers Association, "South Suburban Freight Study, Technical Memorandum 1: Study Area Profile and Inventory," June 2008, p. 6-7.



the air, truck, rail, and intermodal connections.<sup>97</sup> Thus the economic impacts of both incompatible land use and congestion are particularly concerning in that they arrest the progress of two major drivers of profitability in modern supply chains: just-in-time production and intermodal connectivity.

## **Opportunities to Improve Freight Flow and Protect Freight Land Use**

Despite the challenges associated with congestion and incompatible land use, the region also has a tremendous opportunity to preserve its status as a national freight hub. This includes utilization of the region's superior multimodal system; promoting existing infrastructure investments identified in the regional comprehensive plan; drawing on alternative financing schemes for infrastructure improvements; building on recent interest in freight to augment institutional support; and emphasizing regional planning to preserve existing and protect future freight corridors. In light of an upsurge of regional visioning, such as the Organisation for Economic Cooperation and Development's (OECD) Territorial Review of the Chicago tri-state region or World Business Chicago's *Plan for Economic Growth and Jobs* situated in the 14-county metropolitan area, there is also an opportunity to expand the scope of the regional freight cluster to build on the strengths of neighboring freight networks in northwest Indiana and southeast Wisconsin.

### ***Multimodal System to Meet Rise in Intermodal Freight***

The Chicago region is uniquely positioned as the premier multimodal freight system in the country. While other regions certainly have vibrant freight clusters, greater Chicago stands out because of the variety of modes that converge on the region: rail, truck, and air freight are among the most concentrated in the nation and the region's water infrastructure serves as the only connection between the Mississippi River waterway and the Great Lake and Saint Lawrence system. Much of the anticipated increase in freight transport is projected to be in intermodal moves.<sup>98</sup> Since intermodal moves by nature require access to multiple transportation modes, metropolitan Chicago is well positioned as one of the few regions that can deal with intermodal's expansion by utilizing all modes of transport. One particular opportunity to relieve congestion comes from the region's water system. Currently over 10,000 barges move into the Illinois River empty, and the same barges that move dry bulk could also move containers, at around 75 TEUs per barge.<sup>99</sup> The inland waterways could support more container traffic and absorb excess demand from the region's other freight modes.

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<sup>97</sup> CNT, "Prospering in Place," 2012, p. 22.

<sup>98</sup> Bulk rail freight in the Chicago region, for example, is projected to increase by 34 percent in the next 30 years while intermodal rail freight is projected to increase by 200 percent. Data based on CMAP analysis of Transearch data. See <http://www.cmap.illinois.gov/freight-snapshot>.

<sup>99</sup> "Making the Chicago Region More Competitive in the Global Supply Chain," forum at the University of Illinois Chicago, November 21, 2006.



## Infrastructure Projects

The region's comprehensive plan emphasizes that moving forward, the region should prioritize efforts to modernize existing transportation infrastructure rather than focus exclusively on expanding capacity. GO TO 2040 also spotlights a short list of major capital projects including a balance of transit, highway, and multimodal projects. This is a major opportunity as regional entities and stakeholders can devote scarce resources to implement a series of priority projects that promise to return great benefits to the region.

## Alternative Financing

While the rail industry makes significant private investments, the public sector funds the vast majority of freight infrastructure. Targeted public investments in freight infrastructure thus directly benefit the cluster by improving mobility and reliability. New ways of funding freight investments are emerging across the country that could be replicated in the Chicago region. For example:

- Targeted user fees have successfully funded freight infrastructure on both coasts, such as the Alameda Corridor in California or the Shellpot Bridge in Delaware.<sup>100</sup>
- Vehicle-miles traveled (VMT) fees charge on a per-mile fee so are less vulnerable to rising fuel economy or alternative fuel types. Using VMT fees to fund freight infrastructure has been studied in the U.S. and implemented for trucks in Germany.<sup>101</sup>
- Public-private partnerships provide an expanded role for the private sector in the design, construction, financing, and management of freight facilities. A prominent Chicago example, the CREATE program, is described later in this report.

### Infrastructure Projects: Elgin-O'Hare West Bypass

Few regional infrastructure projects have more potential to support freight movement than the Elgin-O'Hare West Bypass project. O'Hare is the nation's second busiest airport for international freight and freight transportation arrangement firms are heavily concentrated nearby. Major rail corridors and intermodal facilities are also in the project area. GO TO 2040 identifies this project as needed to relieve congestion and improve accessibility through the O'Hare area, which is a major freight and economic driver for the region. A recent Advisory Council convened by the Governor of Illinois found that implementing the Elgin-O'Hare West Bypass project would significantly reduce travel delays, saving \$145 million annually by 2040. Taking no action, in contrast, would lead to stagnation in one of the region's major freight centers.

*Source: "Final Report to Governor Pat Quinn," Elgin-O'Hare West Bypass Advisory Council, June 30, 2011.*

<sup>100</sup> Federal Highway Administration, "Financing Freight Improvements." Office of Freight Management and Operations, U.S. DOT, January 2007.

<sup>101</sup> Federal Highway Administration, "Road Pricing Defined: Vehicle-Miles Traveled (VMT) Fees." Office of Innovative Program Delivery, U.S. DOT, undated.



## **Regional Land Use Coordination**

Freight and logistics benefit from economies of scale, scope, and density. Future growth in the cluster therefore is predicated on the availability of adequate land and appropriate corridor space for efficient operations. As land use planning is primarily controlled by local governments, land use accommodation of freight needs is typically not conducted in a comprehensive fashion. For example, a Cambridge Systematics survey on the region found that three-quarters of communities in the study did not coordinate freight planning with neighboring jurisdictions, while half did not consider freight when developing land-use policies.<sup>102</sup>

Most notably, local decisions on freight facilities and designation have far-reaching effects that extend beyond municipal boundaries. A number of local efforts aim to protect land for freight use. The City of Chicago's industrial corridor districts preserve land for industrial development and related freight uses through zoning designations while Will County has an ordinance regulating freight and intermodal facilities.<sup>103</sup> Regional freight planning is needed to ensure that these local efforts are synchronized. Region-wide strategic planning can preserve existing freight use, ensure sufficient industrial space for necessary support facilities such as warehousing, and protect land along key corridors to meet future freight demand.

## **Institutional Support for Freight**

The efficient movement of goods through metro Chicago contributes to growth in the greater U.S. economy. Despite the importance of regional freight movement for national performance, discussions and decisions around the movement of goods are dominated by port cities and states.<sup>104</sup> According to the OECD's review of the Chicago mega-region, "currently, the federal government appears to be virtually absent from the policy design process for the long-term sustainability of the tri-state region's logistics hub."<sup>105</sup> The recent focus on Chicago's regional economy—evidenced by the OECD's territorial review or World Business Chicago's *Plan for Economic Growth and Jobs* among others—represents an opportunity to showcase freight's role in economic growth. The convergence of interest around how to use freight as a means of economic development is an opportunity to provide more institutional support for the cluster. Along with other regional partners, CMAP is expanding its focus on freight planning and exploring innovative strategies to increase freight mobility.

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<sup>102</sup> CMAP, "Regional Freight Systems Planning Recommendations Study," p. 4-44.

<sup>103</sup> Will County Center for Economic Development, "An Ordinance Regulating the Location and Use of Cargo Container Facilities for Governmental Units within Will County". Available at <http://ww2.willcountycd.com/data-source/containers/ordinance.pdf>.

<sup>104</sup> CMAP, GO TO 2040, p. 313.

<sup>105</sup> OECD 2012, p. 232.



## **Mega-region Coordination**

In spring of 2012 the OECD completed an in-depth economic study of the tri-state Chicago metropolitan region, the first ever territorial review of an American metro region. The OECD study identified several key economic challenges faced by the region. One challenge reiterated throughout the report was that greater coordination is needed within the Chicago mega-region, including southeast Wisconsin and especially northwest Indiana, which is home to significant freight activity.

## **Innovation**

### **Role of Innovation in Stimulating Economic Growth**

Innovation is the process of conceiving and developing new products, processes, technologies and business models that result in goods and services that are faster, cheaper, or otherwise improved. It plays a major role in producing sustained prosperity and enhancing the economic competitiveness of regions around the world.<sup>106</sup> Innovation as a driver of economic growth is particularly important in the current era of globalization as firms are less tied to space and can more easily locate in lower cost regions. Over time production processes become standardized and routinized, often dispersing to regions with a lower cost of labor.<sup>107</sup> Relatively advanced and wealthy regions like metropolitan Chicago then must generate new efficiencies and production methods so that even if the regional workforce is more expensive on a global scale, it is also more productive. For the Chicago region to maintain its status as a leading economic center it must use innovation to spur job creation and economic growth.<sup>108</sup>

Past innovations in freight have driven productivity gains and made industries and regions more competitive. The emergence of a standardized container in the 1950s, for example, revolutionized not only freight carriers but also logistics, distribution, and port operations. Transporting goods in a uniform container reduced the physical unloading of ships from hundreds of workers taking many days to a few workers taking only a couple hours. The impact of this innovation was a dramatic reduction in labor cost; with transport so much cheaper, production systems spread across the globe.<sup>109</sup>

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<sup>106</sup> CMAP, GO TO 2040, p. 164-196.

<sup>107</sup> R. Norton and J. Ress, "The Product Cycle and the Spatial Decentralization of American Manufacturing." *Regional Studies*, v. 13, p. 141-151, 1979.

<sup>108</sup> Bay Area Council Economic Institute, "The Innovation Driven Economic Development Model: A Practical Guide for the Regional Innovation Broker." September 2008.

<sup>109</sup> Mark Levinson, "The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger," Princeton University Press, 2008.



Innovation can help industries stay profitable even in the face of external challenges. In the early 1980s the rail industry was deregulated, leading to extreme downward pressure on rail prices, which fell almost every year between 1982 and 2005. Deregulation also put rail in direct competition with truckload carriers, who until recently had the advantage of cheaper fuel prices. In order to stay competitive as a major freight mode the rail industry has embraced advances in rail track technology which have decreased maintenance expense per ton-mile by about half over the last 30 years. At the same time, pound load limits on rail cars have increased 20 percent. The introduction of double-stack container trains means that trains can carry twice the number of containers than before with very little increases in total cost. In the face of downward price pressure, innovations since 1980 have helped the railroad industry triple their productivity, double their value, and cut their average rates in half.<sup>110</sup> Indeed, since the late 1990s U.S. freight railroads have set new volume records nearly every subsequent year.<sup>111</sup>

*Companies within a cluster are more likely to generate innovations compared to isolated firms.*

Industry clusters can help spur innovative activity, and understanding this is crucial for advanced economies to increase productivity and prosperity. Firms in a cluster are better poised to anticipate and react to new buyer needs. Ongoing relationships with other entities within the cluster assist the progress of formulating new technological, operating, or delivery possibilities. Once new innovative processes are identified, firms with a cluster can “more rapidly source the new components, services, machinery, and other elements needed to implement innovations, whether in the form of a new product line, a new process, or a new logistical model.”<sup>112</sup> Clusters benefit from a specialized labor pool so that firms are more flexible to act on new innovations. Finally, the dynamic between cooperation and competition for firms within a cluster fuels innovation. Collaboration and partnerships that pool resources to develop breakthroughs are easier to accomplish in a cluster while at the same time the competition engendered by cluster participation forces firms to develop novel ways to distinguish themselves from rivals.<sup>113</sup>

Indicators such as number of patents, research and development funding, level of venture capital financing, or licensing revenue are commonly used to measure a region’s standing in

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<sup>110</sup> “Regional Freight System Planning Recommendations Study,” p. 7-6; John Vickerman, “Rail Deliveries Jobs and Drives Economic Development.” *The Rail Summit*, Chesterton, IN, March 16, 2012.

<sup>111</sup> “Regional Freight System Planning Recommendations Study,” p. 7-7.

<sup>112</sup> Michael Porter, “Location, Competition, and Local Economic Development: Clusters in a Global Economy.” *Economic Development Quarterly*, Vol. 14 No 1, (February 2000), p. 15-34.

<sup>113</sup> Ibid.





many forms of innovation. Assessing a region's innovative activity in freight is more complicated because unlike fields such as engineering or biotech, few detailed statistics exist about freight research and development or university expenditure. The available data suggest that regional firms benefit from the innovative advantages of participating in a cluster and that metropolitan Chicago plays a central role in freight innovation. According to the OECD Patent Database, the region is the fourth most important in the world (as measured by total patent applications) in railway transportation as well as the second most important in logistic-related activities such as conveying.<sup>114</sup> The region is home to innovative firms such as Mi-Jack, manufacturer of the world's first hybrid intermodal crane, as well as Coyote Logistics, a 3PL that uses technology to maximize supply chain operations. In addition to these established innovators, the region also has strong startup activity in freight. In the last year alone over 600 new freight startups were created in the region, almost double the number created ten years ago.<sup>115</sup>

Since innovation often emerges out of the dense interactions and relationships of a cluster, the region's concentration as a major freight center represents an opportunity to capture an increasing share of innovative activity and a way to stay competitive into the future.

## **Innovation in Technology-driven Supply Chain Management**

Innovation will change the needs of the industry cluster, both from breakthroughs by regional firms as well as external developments that percolate into the region. Due to the fragmented nature of innovation it is impossible to predict with accuracy what the new innovations will be, where they will be generated, and how they will impact the cluster. For example, few foresaw the fundamental reshaping of freight engendered by containerization. Some emerging trends in freight that likely will alter the structure of freight operations in the region include technology-driven supply chain management, terminal and carrier improvements, and "green" innovations for greater fuel efficiency and less energy consumption.

Supply chain management contains a series of complex decisions about how to get a product from production to consumption. Decisions include what inputs to use, how to get raw, intermediate and finished goods to their destinations, how much inventory to maintain, and shipment characteristics such as mode choice. Supply chain management in today's global marketplace often requires controlling the flow of inputs and materials from across the world to converge for just-in-time production or distribution. This complexity is only enabled by

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<sup>114</sup> OECD 2012, p. 215.

<sup>115</sup> Dun and Bradstreet, April 2012.



increasing sophistication in supply chain technologies. While some early adopters such as FedEx or UPS have incorporated new supply chain management tools, many firms are not equipped to cope with the intricacies of global flows.<sup>116</sup> Technologies that assist in supply chain management have the potential to increase efficiencies in freight movements across the globe; firms that can offer these efficiencies are poised to capture increasing segments of the freight market.

Radio Frequency Identification (RFID) is a developing technology that can be used to identify and track inventories. RFID uses a transponder to submit data via an antenna and unlike barcodes does not require direct contact or line-of-sight scanning. RFID and other freight tracking applications can monitor, detect, and communicate freight status information in real time and while freight is in motion. The first patent associated with RFID was granted in 1983, but the high costs of tags meant that the technology was cost prohibitive for most firms. As the price of radio frequency technology has decreased, RFID is starting to become more prevalent in freight. The U.S. Department of Defense, for example, uses RFID active tags on their approximately one million shipping containers that travel outside the country in order to constantly monitor the movement of sensitive materials. WalMart is another early adopter of RFID for its massive supply chain, requiring in 2005 that its top 100 suppliers apply RFID labels to all shipments.<sup>117</sup> The implementation of RFID technology by integral firms such as WalMart presages that though RFID is not yet fully implemented, it has the potential to transform how goods are monitored and supply chains are controlled.

Another technology that aids in supply chain management is Global Positioning Systems (GPS). While GPS applications such as navigation have already been implemented in freight, newer integrated GPS systems have the potential to further enhance the efficient movement of goods through inter-vehicle, and vehicle to roadway communication. One likely product of integrated GPS is an improved commercial navigation system capable of route optimization based on real time conditions. Currently navigation systems abound yet few are able to deal with the plethora of issues facing freight movement. For example, one trucking executive remarked that he has been unable to find a routing system that doesn't run into pitfalls such as sending a driver under a bridge that is not tall enough for the truck.<sup>118</sup>

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<sup>116</sup> Yogesh Malik, Alex Niemeyer, and Brian Ruwadi, "Building the Supply Chain of the Future," *McKinsey Quarterly*, January 2011. See [http://www.mckinseyquarterly.com/Building\\_the\\_supply\\_chain\\_of\\_the\\_future\\_2729](http://www.mckinseyquarterly.com/Building_the_supply_chain_of_the_future_2729).

<sup>117</sup> Bill Hardgrove, "Promising RFID Business Applications" podcast, *RFIDradio.com*, July 2007.

<sup>118</sup> Con-way Truckload President Herb Schmidt, quoted in "Expedited Carriers: The Fast and the Furious" by Amy Roach Patridge, *Inbound Logistics*, November 2011.



While less complicated and developed than GPS and other complex supply chain systems, social media, and smart phone applications are also being explored by firms in the freight cluster. For example, smart phones can be used to take a picture of a received shipment, removing paper and time from the process. Likewise, a trucker could use social media to “check in” when a delivery is made. Compared to other technology systems, social media is asset light. As smart phones and social media become more widely adopted by wide swaths of the general public, their applications for freight and logistics represent an untapped market for innovative firms.

Technology driven supply chain management also has the potential to overcome one of the persistent challenges facing freight movement: how to reduce empty backhauls in trucking. Currently, more than a quarter of all tractor trailers on U.S. highways are empty.<sup>119</sup> As carriers gain no value from an empty backhaul, using technology to match shippers with carriers to increase backhaul utilization will greatly increase revenue in the cluster. For example, the Chicago 3PL Coyote Logistics has developed a proprietary software system to arrange pickups and deliveries as well as set rates based on multiple variables. From its Chicago office, the firm is able to utilize its innovative software system to connect shippers and carriers across the country.<sup>120</sup> Another example of using emerging technologies to reduce empty trips comes through the Empty Miles Service operated by the Voluntary Interindustry Commerce Solutions Association. This online program identifies matches for empty backhauls by connecting shippers to carriers. In the pilot project of the service, Macy’s and the large trucking company Schneider National realized about \$25,000 annual savings per shipping lane; as Macy’s operates over 800 shipping lanes, the cost savings of using software to reduce empty miles are significant.<sup>121</sup>

*One in four tractor trailers on U.S. highways are empty.*

### ***Impacts and Outcomes of Innovation in Supply Chain Management***

The adoption of technology-based supply chain management will allow firms in the freight cluster to realize cost savings and be more competitive compared to their rivals. Technologies such as RFID can save loading time through advanced scheduling and reducing inventory loads in warehouses. Other benefits of using technology to monitor freight include reduced labor costs, simpler business processes, and decreased inventory inaccuracies due to human error.

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<sup>119</sup> Carrie Denning and Camille Kustin, “The Good Haul: Innovations that Improve Freight Transportation and Protect the Environment,” Environmental Defense Fund, 2010, p. 10.

<sup>120</sup> Chris Pickett (Chief Strategy Officer, Coyote Logistics) in an interview with CMAP staff, April 10, 2012.

<sup>121</sup> Denning and Kustin 2010, p. 10.



For example, testing of an electronic freight management system used by a Kansas City importer for international supply chain operations found the system reduced inventory backorders, increased shipping container utilization, and facilitated customs paperwork.<sup>122</sup> WalMart has used RFID to reduce out of stock items by 30 percent, replenish inventory three times faster, and save labor by a 10-percent reduction in manual orders.<sup>123</sup>

*“The competitor that’s best at managing the supply chain is probably going to be the most successful competitor over time. It’s a condition of success.”*

Supply chain management will likely play a paramount role in determining future success for firms in the cluster. According to the former chairman and CEO of the transportation machinery maker Caterpillar, “the competitor that’s best at managing the supply chain is probably going to be the most successful competitor over time. It’s a condition of success.”<sup>124</sup> Paul Simmons, vice president of the trucking company Schneider National, suggests that technology-based supply chain management will become a precondition for securing business in the future. “Technology is a must-have for expedited shipments. Shippers will not use an expedited carrier that doesn’t at least utilize a Qualcomm system in their tractor-trailers,” he claimed, referring to the in-cab system used to communicate with drivers.<sup>125</sup>

The increased adoption of technology-based supply chain management will likely hasten the ascendancy of 3PLs and brokers as a major force in the freight cluster. Enabling more control over delivery and flow of goods will allow firms to maximize the benefits of just-in-time, lean-inventory business models. Creating better technologies that control supply chain movements presents a huge opportunity for firms to capture market share, add jobs, and return economic benefits to the region.

Metropolitan Chicago may be poised to capture innovative supply chain management techniques because of its concentration in freight transportation arrangement, whose activities include arranging and coordinating transportation of goods. In addition to carriers, these are the firms most likely to benefit and thus implement new technology-driven supply management tools. The region’s location quotient in freight transportation arrangement grew

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<sup>122</sup> Research and Innovative Technology Administration, “Intelligent Transportation Systems: Benefits, Costs, Deployment and Lessons Learned, 2011 Update” U.S. Department of Transportation, 2011, p. 181.

<sup>123</sup> Rowland Whitsell, (Director of Global Supply Chain, Walmart) “Technology: How it is changing the supply chain and how can it be used to make our region’s freight system more efficient?” panel at *Making the Chicago Region More Competitive in the Global Supply Chain*, November 21, 2011.

<sup>124</sup> Jim Owens quoted in Yogesh et al., 2011.

<sup>125</sup> Quoted in Patridge, 2011.



from 2.23 in 2001 to 2.63 a decade later. Not only is the region highly concentrated in freight transportation arrangement, but there is a wide variety of firms in the cluster, ranging from logistics giants like Exel to mid-sized firms bunched around O’Hare airport to 3PL startups. Indeed, in 2011 freight transportation arrangement was second only to local trucking for the most new businesses created in the cluster.<sup>126</sup>

**Table 6. Innovative Chicago-area companies in supply chain management**

Firm	Specialty	Year Founded	Headquarters	Revenue in millions	Note
Echo Global Logistics	Technology-enabled supply chain management	2005	Chicago	\$426 (2010)	CEO was Ernst & Young 2009 Entrepreneur of the Year
Navman Wireless	GPS, fleet management	2007*	Glenview	NA	Winner of 2011 Chicago Innovation Award
Coyote Logistics	Technology-enabled supply chain management	2006	Chicago	\$550 (2011)	Fastest growing 3PL on record
NAVTEQ	GIS, navigation services, mapping	1985**	Chicago	\$853 (2007)	Used in smart phones, internet providers, navigation systems

*Source: Data compiled from individual company websites as well as manta.com*

\* As independent company  
 \*\* Initial Public Offering in 2004

<sup>126</sup> Based on Dun and Bradstreet data accessed April 2012.



The recent startup Coyote Logistics, referenced above, serves as a prime example of the region's strength in innovative freight transportation arrangement. Founded in 2006, the firm holds the record for the fastest growing 3PL in transportation following acquisitions as well as an upsurge in hiring. Coyote's innovative software system means its employees arrange two to three times more truckloads per day compared to the industry average. As the firm has grown revenue has surged as well, increasing twentyfold between 2007 and 2011.<sup>127</sup>

While the region is a center for freight transportation arrangement, several barriers may inhibit the proliferation of innovative supply chain management techniques. Most prominently, firms in the region have expressed difficulty in attracting the high skilled workers needed to manage supply chain solutions as well as familiarize existing workers with new technology requirements. This barrier is explored in greater detail in the workforce section of this report. Another barrier to widespread implementation of innovative supply chain management techniques is cost. This barrier is not unique to the Chicago region, though the cluster gap analysis earlier in this report identified access to capital as an area where firms rely more heavily on external support. Currently technologies such as RFID or GPS route optimization or proprietary software systems are cost prohibitive to many firms. Though asset light applications such as social media have the potential to mitigate some of the price concerns, incorporating novel ways to manage freight movement represents a major investment for firms in the cluster. The cost of complex software systems and electronic management devices may lead to a consolidation of logistics functions as firms continue to farm out logistics to third party providers.

### Mi-Jack's Rubber Tire Gantry Cranes

South Suburban Hazel Crest is home to one of the world's leaders in intermodal equipment manufacturing.

Mi-Jack's Rubber Tire Gantry cranes, now in use on six continents, have changed the standard for modern material handling practices by increasing the possibilities for yard storage and layout potential. The crane's integrated on-board computer is capable of monitoring, collecting and transmitting data related to machine condition, position and operational systems. The system can provide real time off-site monitoring and reporting for an entire yard. Mi-Jack has also developed what is widely acknowledged as the world's first electric hybrid intermodal crane and a hybrid retrofit system for port cranes.



Source: CMAP interview with CJ Rog, Government Affairs Manager, Mi-Jack. April 26, 2012. Image: Hofstra University <http://people.hofstra.edu/geotrans/eng/ch4en/conc4en/translift.html>

<sup>127</sup> Antone Gonsalves, "Coyote Logistics's Software Moves Trucks of Heineken for Less," Bloomberg.com, August 18, 2011; Marianne Silver, "Coyote Logistics, the Fast-growing 3PL Provider in Transportation, Selects Green Exchange in Chicago as its New Headquarters," prweb.com, October 14, 2010; Chris Pickett, interview.





## Innovation in Terminal and Carrier Operations

Improvements in port and carrier operations represent a second arena where innovation is changing the freight cluster. In addition to controlling freight movement while in motion, intelligent software systems are emerging to increase efficiencies in intermodal ports and terminals. Complex facility management software, for example, can indicate in seconds the optimal location to store each container, replacing human estimates that took hours and were often inaccurate or inefficient. Computers are now used to track and coordinate what trucks and chassis are used to pick up containers. Facility software systems can also improve drayage and the efficient transfer of cargo by providing dispatchers with information of container availability, delay times at terminal entrances, and off-port traffic conditions. In terminals that handle millions of containers a year this leads to substantial time savings and greater efficiency.<sup>128</sup>

As fuel prices rise and intermodal connectivity continues as a key source of profitability for the cluster, rail moves will likely continue to increase. To meet the anticipated upsurge in both intermodal containers and bulk moves being shipped by rail, innovations will allow longer and heavier trains to operate. For example, electronically-controlled pneumatic (ECP) brakes coupled with distributed power will allow railroads to run trains with more containers.<sup>129</sup> Traditional braking systems apply the brakes sequentially from car to car in the train, leading to a gap of up to two minutes between the initial braking in the lead locomotive and the application of the brakes in the last cars of larger freight trains. ECP activates all the brakes throughout the train at the same time, allowing better train control, reducing derailment risk, and increasing operating speed by lowering stopping distances. ECP brakes reduce the interval between maintenance tests, saving companies time and money.

In addition, the adoption of ECP can complement distributed power systems. Distributed power divides the locomotives of heavy runs throughout the train, reducing derailment risk, improving fuel efficiency, and increasing line haul. For example, in early 2010 Union Pacific

### Telematics

Digital sensors store, receive and send information about the state of the vehicle, reducing maintenance and improving operations.

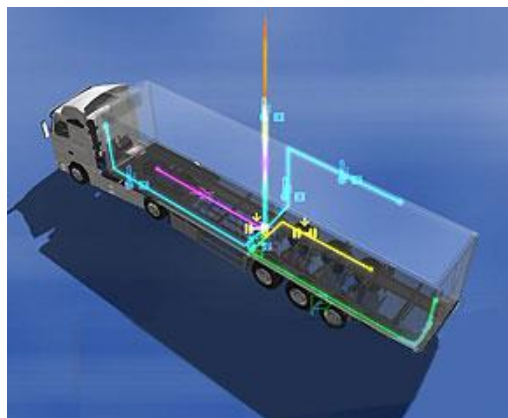


Image from cargobull.com.

<sup>128</sup> John Maley, "Can Technology Propel Transportation Industry?" *Industry Week*, June 13, 2011; "Intelligent Transportation Systems 2011 Update," p. 179.

<sup>129</sup> CMAP "Regional Freight System Planning Recommendations Study," p. 7-7.



tested a new distributed power configuration on a run from Dallas to Long Beach. The train was the longest UP ever ran—over 3.5 miles in length—and carried 15,500 tons, five times the conventional load average.<sup>130</sup> ECP wiring can be used to control the distributed power locomotives spread throughout the train to improve efficiency. In late 2007 Norfolk Southern operated the first revenue service freight train equipped with ECP brakes. Since then, railroads have begun incorporating ECP into their fleets.

Railroad companies are also experimenting with digital sensors that can gather data on wheel wear, heat, and railcar brakes to identify problems before they result in breakdowns or derailments.<sup>131</sup> Examples include Union Pacific's Bailey Yard in Nebraska—the world's largest classification yard—that employs an innovative ultrasound detector to identify wheel defects before they result in derailments.<sup>132</sup> Technology that transmits information about a vehicle's performance, often called telematics, is not limited to the rail industry. UPS for example has been an industry leader in telematics. About 40 percent of their ground fleet is equipped with sophisticated sensors, wireless communications, and GPS tracking. Combined, these innovations help identify maintenance issues before they result in breakdowns, reduce fuel usage, and maximize high-efficiency delivery routes. For 2010, telematics systems eliminated more than 39 million minutes of idling time in UPS' fleet and saved 1.8 million miles of driving.<sup>133</sup>

### ***Impacts and Outcomes of Innovations in Terminal and Carrier Operations***

Innovations in terminal and carrier operations could signify opportunities for the regional freight cluster to grow. First, more efficient terminals could allow terminals with the same footprint to lift more containers more quickly than before. This could bring new terminal investments back to where freight infrastructure is concentrated but available land is relatively scarce, such as the south side of Chicago and the south suburbs. Currently the trend in siting terminals has been to develop mega greenfield sites, with CenterPoint's Joliet facility serving as a prime example. An issue with siting terminals on the edge of the region is that it requires the construction of new expensive infrastructure, spreads freight's negative externalities to more parts of the region, and creates a jobs/housing imbalance with the freight workforce. While investment in the periphery of the region will continue to play an important role both to release pressure and serve as a staging ground for the central concentration of freight infrastructure, revitalizing established freight centers can make the most of existing assets including

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<sup>130</sup> Stephen Joiner, "Is Bigger Better? 'Monster' Trains vs. Freight Trains," *Popular Mechanics*, February 11, 2010.

<sup>131</sup> Maley, 2011.

<sup>132</sup> Wes Lujan (Director, Public Affairs Union Pacific Illinois and Metra Commuter Relations) and Mike Payette (Assistant Vice President, Union Pacific) in an interview with CMAP staff, April 30, 2012.

<sup>133</sup> UPS, "Sustainability at UPS," 2010. See <http://bit.ly/OBOFPT>.



infrastructure and a ready workforce. Strategies to inform future freight investment toward existing concentrations, such as the Center for Neighborhood Technology's work around cargo-oriented development, are explored more in depth in chapter four of this report.

Another emerging effect of innovation in the cluster is the increasing competitiveness of rail as a preferred mode of freight. As fuel prices continue to rise, truck shipments are coming under increasing cost pressure. Additional challenges for trucking come from more vocal environmental concerns as well as labor retention issues. While trucking indubitably will continue to serve as a major freight mode, cost and environmental pressures work to the advantage of rail. As referenced at the beginning of this innovation section, technological advances in rail have enabled the industry in the past 30 years to triple productivity, double value, and cut average rates in half. These innovations mean rail carriers are poised to realize more of the increase in freight demand. While in the past freight moves often needed to be at least 500 miles for rail to be price competitive with trucking, this number will likely decrease in the future.<sup>134</sup>

*Technological adoptions and environmental pressures mean rail carriers are poised to capitalize on increased demand. While in the past rail moves often needed to be at least 500 miles to be price competitive with trucking, this number will decrease in the future.*

As rail increases in competitiveness, access to rail infrastructure will be imperative. This is a key opportunity to maintain metropolitan Chicago's position as the nation's rail hub. The region is not only a center of rail carriers but also of rail suppliers. Illinois has the most rail supply companies and the second most rail supply employees of any state in the nation. Of the 19,600 rail supply employees in the state, 15,425 are in the metropolitan region.<sup>135</sup> Because of this concentration of rail suppliers, the region is further poised to take advantage of emerging rail innovations.

While the region is well positioned to benefit from emerging innovations in freight, a number of significant barriers challenge the spread of innovation. Most notable is the slow market penetration of new technologies for the trucking industry. Unlike rail, which is dominated by a few large carriers, trucking is much more dispersed and contains numerous small carriers who are less likely or able to invest in new equipment. While some relatively inexpensive

<sup>134</sup> Lujan and Payette, interview; "Logistics for the Public Sector Training Course," National Center for Freight & Infrastructure Research & Education (CFIRE). See <http://tinyurl.com/7aetewk>.

<sup>135</sup> Rail Supply Institute, "Summary of Top Railway Supply States." Metropolitan region is defined as Illinois Congressional Districts 1 through 11, 14, and 16.



technologies such as improved self-steering axles to increase payload capacity may be incorporated more quickly, overall it may be more difficult for the industry to adopt innovations.<sup>136</sup> Another challenge will be the tension around where to site new freight terminals. While terminals are now more efficient due to the advances discussed above, innovation also is enabling trains and trucks to be longer and heavier, which in turn would dictate larger terminal footprint requirements. Navigating this tension to create the most efficient regional freight network is a challenge for the cluster moving forward.

## “Greening” the Freight Cluster

The cost of petroleum is a primary factor in the profitability of freight. Rising costs and fuel price fluctuations are driving demand for more fuel efficient vehicles. Freight is also a prominent source of pollution: greenhouse gas emissions from freight have increased 58 percent nationally since 1990, twice as fast as passenger vehicle emissions have increased (27 percent).<sup>137</sup> Freight’s contribution to emissions means the sector is increasingly coming under the purview of regulators while firms also are under pressure to reduce emissions from both a cost savings and a public relations perspective. Taken together, the need to reduce emissions and realize better fuel efficiency is leading to innovation in the cluster.

According to Cambridge Systematics’ review of freight in the region, “the primary focus of equipment manufacturers is currently on fuel efficiency and fuel economy systems.”<sup>138</sup> New innovations to increase fuel efficiency in freight are emerging nationally which may impact the competitiveness of metropolitan Chicago’s cluster. While hybrid passenger vehicles have garnered considerable attention recently, some hybrid freight vehicles have emerged as well. The Port of Norfolk, for example, now employs a battery-dominant hybrid yard switcher that has fuel savings of 40 to 60 percent per year while train manufacturers are exploring battery hybrid locomotives. Diesel-electric hybrids trucks have the potential to realize huge fuel

### GenSet Engines

GenSet switching engines reduce greenhouse gas emissions by up to 37 percent, oxides of nitrogen by 80 percent, and particulate matter by 90 percent.



Image from Union Pacific.

<sup>136</sup> CMAP “Regional Freight System Planning Recommendations Study,” p. 7-2.

<sup>137</sup> Denning, and Kustin, 2010.

<sup>138</sup> CMAP “Regional Freight System Planning Recommendations Study,” p. 7-2.



savings, especially for intercity moves. Companies like FedEx and UPS are incorporating hybrids into their fleets, though progress is limited: of UPS's ground fleet of nearly 100,000 vehicles, only 1914 were alternative fuel vehicles in the year 2010.<sup>139</sup> Increasing fuel efficiency in trucking through hybrid engines is a huge market; companies that can offer this service in a cost effective manner are positioned to realize rapid growth. In addition to hybrid engines, freight firms are also looking into alternative fuels—Norfolk Southern Railway's testing of a blended biodiesel fuel for their locomotives is just one example among many.<sup>140</sup>

Innovation in fuel economy is also being driven by mandated fuel standards or other regulations targeted at reducing freight emissions. For example, the U.S. Environmental Protection Agency regulates national emissions standards for rail locomotives. Emissions are regulated based on a tier system, where a higher tier means more stringent emission reduction requirements. Tier 3 emissions standards for locomotives were introduced in January 2012, with the stricter Tier 4 standards due to come into force in 2015. Heavy-duty vehicles such as semi and delivery trucks also must comply with national emission standards, with more stringent requirements beginning in 2007. On a more local level, the Ports of Los Angeles and Long Beach have passed a Clean Air Action Plan that both requires and incentivizes the goods movement industry to use cleaner technologies and operation systems to realize a 45 percent reduction in three criteria pollutants.<sup>141</sup> In 2011 the City of Chicago released a Sustainable Airport Manual that, among other priorities, incentivizes emission reduction at O'Hare and Midway.<sup>142</sup>

### ***Impacts and Outcomes of Greening the Freight Cluster***

Capturing a share of fuel efficiency and other “green” innovations is an opportunity for the regional freight cluster to grow and be competitive into the future. The region has already played an important role in developing the first generation of energy efficient technologies. National Railroad Equipment Co., which was founded in Dixmoor, Illinois, makes Gen-Set energy efficient engines, the first major innovation to the single engine prime mover model developed in the 1950s. Gen-Set engines have fuel savings of 35 to 70 percent, reduce emissions by 85 to 90 percent, as well as reduce noise levels by 85 percent. The Gen-Set was the first locomotive recognized as Ultra Low Emitting by the California Air Resources Board and meets all the criteria of EPA Tier 3 regulations.<sup>143</sup> Another regional company that is leading the way in energy efficiency in freight is Mi-Jack, headquartered in Hazel Crest, Illinois. Mi-Jack made the

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<sup>139</sup> UPS, “Sustainability at UPS,” 2010.

<sup>140</sup> Denning, and Kustin, 2010.

<sup>141</sup> San Pedro Bay Ports, “Clean Air Action Plan.” See <http://www.cleanairactionplan.org/programs/tap/default.asp>.

<sup>142</sup> Chicago Department of Aviation, “Sustainable Airport Manual.” City of Chicago, 2011, version 2.1.

<sup>143</sup> National Railway Equipment Co, “N-VitoMotive: The Green, Fuel Efficient Locomotive for Passenger, Mainline Freight and Yard Operations,” 2012. See <http://www.nationalrailway.com/nviro.asp>.





world's first hybrid intermodal crane that uses a third the energy of a typical crane. They also have developed a quilt for refrigerated cargo that cuts energy use in half and offer modules to monitor equipment and terminal operations.<sup>144</sup>

Companies that both show emissions of freight movements as well as offer mitigating options are poised to respond to increasing consumer demand for more environmentally sensitive ways to move goods. While emission standards will continue to force innovations in the cluster, customers too are emerging as a force propelling innovation. Opportunities to meet this increased consumer demand include offering carbon neutral services and allowing shippers to make choices not only about efficiency but also the environment. As explained previously, the region's status as a nexus of rail movement bodes well for the cluster as more firms look to mitigate their emissions through more fuel efficient modes.

Freight centers that incentivize green innovations are poised to capture an increasing share of an emerging market. The Chicago region has made strides in addressing freight emission. For example, the Congestion Mitigation and Air Quality Improvement (CMAQ) program devotes a considerable amount of dollars towards diesel retrofits.<sup>145</sup> Yet even with these investments, the region seems to be somewhat behind the curve compared to other freight centers in incentivizing or requiring reduced emissions in freight. The Southern California freight cluster is pushing the frontier in reducing freight's impact on the environment, evidenced by the Clean Air Action Plan of the Ports of Los Angeles and Long Beach referenced above or the stringent emission standards set by the California Air Resources Board. Indeed, much of the impetus for Chicago-area companies to develop more environmentally sensitive products has been access to the California market. To a lesser extent, the east coast port of Norfolk also serves as an example of a freight cluster prioritizing greening efforts. The Green Operators program of the Virginia Port Authority, among other activities, gives rebates to retrofit older vehicles with more efficient engines.<sup>146</sup> The Port of Norfolk's innovative battery yard switcher was financed through an innovative public-private partnership: U.S. EPA provided \$750,000, the Virginia Port Authority provided another \$2 million, and the operator (Virginia International Terminals) put up \$850,000.<sup>147</sup>

Making energy efficient innovations price competitive with standard models is a further challenge that may hinder growth in the cluster. This barrier is not unique to the Chicago

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<sup>144</sup> "CargoQuilts" Q Sales & Leasing an affiliated company of Mi-Jack. See: <http://www.qsales.com/Products.htm>.

<sup>145</sup> CMAP, "Congestion Mitigation and Air Quality (CMAQ)," See <http://www.cmap.illinois.gov/congestion-mitigation-and-air-quality>.

<sup>146</sup> The Port of Virginia, "Green Operators Program," 2012. <http://portofvirginia.com/corporate/environment/go-program.aspx>.

<sup>147</sup> Denning and Kustin, 2010.





region, though the cluster gap analysis earlier in this report identified access to capital and financing as an area where freight firms rely more heavily on external support. The technology for hybrid trucks is readily available, and is especially useful for intercity carriers since the electric motor recharges whenever the vehicle breaks. Market penetration, however, has been slow for hybrid trucks as engine/motor hybrids currently cost up to twice that of a standard internal combustion engine. With rising fuel costs the hybrid engine has a greater return in the long run, but the payoff is years away.<sup>148</sup> During the recent recession, companies often were loath to make significant upfront investments. As the economy rebounds, a focus on the long term benefits of fuel efficiency innovations could help spur more adoption of environmental improvements and help promote growth in the cluster.

## Workforce

The cluster employs about 200,000 workers regionally, an increase of over 14,000 from a decade ago.<sup>149</sup> As freight flows continue to increase, so too will jobs in the cluster. While the lower range of freight jobs are often minimum wage, seasonal positions, these can also serve as valuable career entry points for those with less formal education or work experience. Indeed, many industries in the cluster routinely promote from within; at firms such as UPS many senior executives started out sorting packages or driving trucks. Less well known are freight jobs like chief logistics officers in major corporations, fleet managers, and supply chain programmers that exemplify the spectrum of high-skilled, well-compensated freight occupations.

The cluster has also innovated over time, and today computer literacy skills are a requirement of even the most basic freight job. This trend is only expected to accelerate, as new systems and programs are adopted on an ongoing basis. While this innovation creates a tremendous opportunity to grow the cluster, it also creates a “skills mismatch” that affects both the low and high ends of the skills spectrum. This mismatch is occurring at a time when demand for freight is growing. In order to thrive, the cluster will demand workers with science, technology, engineering, and math skills. It will also need to grow an entry-level workforce that is capable of implementing the innovations in the field.

## Occupational Analysis

A 2011 study conducted by the Chicago Workforce Investment Council (CWIC)<sup>150</sup> in partnership with CMAP provides an in-depth examination of the occupations within the regional freight cluster. The analysis describes education and training needs, demographic

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<sup>148</sup> CMAP “Regional Freight System Planning Recommendations Study,” p. 7-2.

<sup>149</sup> EMSI Complete Employment- 2011, p.4.

<sup>150</sup> Chicago Workforce Investment Council (CWIC) merged into the Chicago-Cook Workforce Partnership in 2012.



information, average earnings, and growth projections for the top 20 occupations in freight. As the below table illustrates, the largest occupations within the freight cluster generally train workers on-the-job. Even entry-level workers in many industries can seek out additional training to advance.

**Table 7. Largest occupations in regional freight cluster**

Occupation	2008 Jobs	2011 Median Hourly Earnings	Education Level
Truck drivers, heavy and tractor-trailer	23,322	\$19.96	Moderate-term on-the-job training
Laborers and freight, stock, and material movers, hand	18,716	\$10.96	Short-term on-the-job training
Industrial truck and tractor operators	5,815	\$14.45	Short-term on-the-job training
Packers and packagers, hand	5,465	\$9.44	Short-term on-the-job training
Truck drivers, light or delivery services	5,301	\$15.55	Short-term on-the-job training
Cargo and freight agents	4,719	\$18.53	Moderate-term on-the-job training

*Taken from "Freight Cluster Drill-Down Regional Workforce Analysis," CWIC, 2011*

The CWIC regional workforce analysis chiefly uses data from the year 2008—corresponding to the year the recession that had a particularly large impact on freight— and thus portrays a less robust picture of occupational growth opportunities within the cluster. Nonetheless, the report serves as an excellent resource for those interested in the occupational dynamics of the freight cluster; instead of repeating the findings of the occupational analysis here, interested readers are encouraged to access the CWIC report, which is available online.<sup>151</sup>

## Employment Growth and Contraction

### **Growth**

Much of the job growth in the freight cluster in the past decade has been due to a few fast-growing industries. Wholesale trade has enjoyed the most growth of cluster industry, a reflection of the worldwide expansion of the industry increased trade volumes.<sup>152</sup> Long-distance trucking, both truckload and less-than-truckload, added over 7,500 jobs in the past decade. Freight transportation arrangement and specialized warehousing round out the top five fastest growing industries, reflecting demand for logistics services and the storage needed to facilitate those moves.

<sup>151</sup> Chicago Workforce Investment Council, "Freight Cluster Drill-Down Regional Workforce Analysis - 2011." See <http://www.cwic.org/Portals/0/Resources/FreightClusterAnalysisWorkforceDrillDownFinal.pdf>.

<sup>152</sup> Singapore Ministry of Trade, "Economic Survey of Singapore First Quarter 2011." See <http://sg.sg/L5CsUa>.



**Table 8. Top five employment growth by industry**

Industry	Jobs Gained	% Change
Wholesale Trade Agents and Brokers	17,821	109%
General Freight Trucking, Long-Distance, Truckload	6,276	32%
Freight Transportation Arrangement	1,898	14%
Other Warehousing and Storage	1,739	168%
General Freight Trucking, Long-Distance, Less Than Truckload	1,309	19%

### **Contraction**

The majority of industries in the cluster have not yet reached their pre-recession employment levels. For example, rail transportation employment fell sharply between 2008 and 2010, but saw an increase in 2011 as the economy recovered. While rail makes the top five of contracting industries in the past decade, accelerated demand for rail will drive growth. Moreover, between half and a third of the current rail workforce is approaching retirement and firms will have to fill those positions.<sup>154</sup>

**Table 9. Top five employment contraction by industry**

Top 5 Employment Decreases by Industry	Jobs Lost	% Change
Scheduled Freight Air Transportation	2,636	83%
Couriers and Express Delivery Services	2,252	15%
Mail-Order Houses	1,859	25%
Corrugated and Solid Fiber Box Manufacturing	1,437	19%
Rail transportation	1,306	11%

### **Challenges**

While freight is a cornerstone of the regional economy, the cluster is experiencing serious workforce challenges ranging from attracting workers with the right skills to retaining workers in a field that is often physically demanding and intense. Employers continue to have a difficult time finding workers that have basic jobs skills such as punctuality or the ability to read or write well. Workforce challenges are compounded by technology demanding new skills for all workers.

<sup>154</sup> Ray LaHood, "Rail Industry Plans Growth in 2012," United States Department of Transportation, January 30, 2012. See <http://bit.ly/MNujnH>; CWIC, "Freight Cluster Drill-Down Regional Workforce Analysis - 2011," 2011, p. 17.

## **Attracting Workers**

One of the primary workforce challenges facing the region may seem somewhat paradoxical: Despite job openings in freight that require little more than basic communication and problem solving skills, employers reported difficulties filling positions even during the recession. As CWIC recounts in their occupational analysis, “one of the largest challenges reported by employers was the ability to find and retain qualified employees to fill vacant and newly created positions, even though many of the jobs require only a high school diploma, English proficiency, timeliness, and the ability to remain drug free and follow company procedures.”<sup>155</sup> The difficulty of filling entry-level positions requiring only basic job skills represents a gap in the existing workforce system.

Concurrently, as technologies become more and more integral to freight workforce, workers must be competent. This is an acute challenge in high-skilled fields. For example, as telematics systems are installed in trucks and trains to monitor their equipment’s performance, drivers and engineers must be able to use that technology. Mechanic’s jobs have changed; many now use telematics to replace parts before they break.<sup>156</sup> As computers become integral to freight operations, more technicians and even software engineers are needed to maintain, upgrade and innovate technologies. According to World Business Chicago’s *Plan for Economic Growth and Jobs*, demand for workers with highly specialized and technological skills currently exceeds supply in the region.<sup>157</sup> Firms sometimes have to fill these high-skilled positions, like software engineers, by hiring from outside the region.

## **Retaining Workers**

Many industries in the cluster face high employee turnover.

Trucking is a prime example of this challenge. Long-distance truckers spend successive days on the road, and can be on call 24 hours a day while at home. The initially low

compensation and difficult lifestyle contribute to volatility in the industry—the American Trucking Association reported a

90 percent turnover for truckers in large interstate fleets and 70 percent for truckers in small fleets in the first quarter of 2012.<sup>158</sup> Average wages for truckers have not increased in the past 30 years. In 1982, the going rate was \$0.32 per mile; in 2011 it was \$0.28 per mile.<sup>159</sup> And while owner-operators earn more, it is increasingly difficult for a trucker to buy his or her own truck;

### *Trucker’s average pay*

1982: \$0.32 per mile  
2011: \$0.28 per mile

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<sup>155</sup> CWIC, “Freight Cluster Drill-Down Regional Workforce Analysis - 2011,” p. 41.

<sup>156</sup> Image of technician from California Air Resources Board, <http://tinyurl.com/7sobro5>.

<sup>157</sup> WBC, “Plan for Economic Growth and Jobs,” 2012, p. 27.

<sup>158</sup> Ronald White, “Truckers Job Turnover Rates Climb, and its Actually Good News,” LA Times, June 13, 2012.

<sup>159</sup> Jay Thomas (Vice President of Risk Management, Freight Exchange of North America), interview with CMAP and CWIC staff, August 4, 2011.



unable to secure financing, many young drivers work for large companies which pay lower wages.<sup>160</sup> In the region, turnover has exceeded 100 percent in recent years.<sup>161</sup>

The warehousing industry also faces challenges in retaining workers. Entry-level warehouse jobs are typically low-wage and employment is often seasonal, centered on a spike around the holidays with subsequent contraction.<sup>162</sup> A 2008 study of warehouse workers found that over half occupy low compensation (\$9.00 per hour) temporary positions with no benefits. Nearly a quarter of warehouse workers rely on government assistance to make ends meet and almost 40 percent of current workers work a second job.<sup>163</sup> According to the International Warehouse Logistics Association, warehouses struggle to find employees who show up to work consistently and can pass drug tests.<sup>164</sup> Unfortunately, this means workers do not stay long enough to move up toward better paid freight jobs. (Incidentally, early attrition is not uncommon in the cluster, rail firms report that between 35 and 40 percent of new employees drop out after the initial training session.<sup>165</sup>) While these challenges are not unique to the Chicago region, they are more prominent because of the high concentration of freight in the region.

#### RFIDs: Radio Frequency Tags

Special locks on containers moving through Hong Kong can only be opened using an RFID reader, reducing inspection time from two hours to five minutes since custom officials can now be assured that the container has not been opened.



Image from Rfid Journal, May 4, 2012

## Opportunities

### ***On-the-job Training***

In-house training provides career ladders for individuals with lower levels of education. In particular, the railroad, trucking, and warehousing industries have high percentages of

<sup>160</sup> Jack Nickerson and Brian Silverman, "Why Aren't All Truck Drivers Owner-Operators? Asset Ownership and the Employment Relation in Interstate For-Hire Trucking," Harvard Business School, September 1999, 2. See <http://www.hbs.edu/research/facpubs/workingpapers/papers2/9900/00-015.pdf>.

<sup>161</sup> Matt Hart (Executive Director, Illinois Trucking Association) and Randy Thomas (Associate Director), in an interview with CMAP and CWIC staff, July 11, 2011.

<sup>162</sup> Joel Anderson, (President and CEO, International Warehousing and Logistics Association), in an interview with CMAP and CWIC staff, August 19, 2011.

<sup>163</sup> Warehouse Workers for Justice, "Bad Jobs in Good Movement," 2010. See: <http://www.warehouseworker.org/badjobsgoodsmovement.pdf>.

<sup>164</sup> Anderson, interview.

<sup>165</sup> CWIC, "Freight Cluster Drill-Down Regional Workforce Analysis – 2011."



employees with only a high school diploma or GED.<sup>166</sup> Secondary and postsecondary training are often either paid for by the employer or heavily subsidized.

Employers have to make significant investments to create their own on-site training. This means that people with few formal skills can enter a firm in the freight cluster and gain the training and certification necessary to become eligible for promotions or even career transitions. The freight sector stands out because of its proclivity to promote from within. Large companies like UPS have particularly well defined career ladders. These industries often promote from within because an important part of their model is cultivating institutional memory and practices. UPS for example boasts a 92 percent retention rate and has been successful in cultivating senior executives from its entry-level workforce.<sup>167</sup>

Firms with a culture of ongoing training are better positioned to adopt new technologies and improve practices. Oftentimes innovations in freight are industry or even company specific. Larger firms in the freight cluster typically have the capacity to provide training themselves.<sup>168</sup> However, this type of self-sufficiency is typically out of reach for mid-sized to smaller firms.

### **Public Sector Training**

The public sector has helped fill the training gap for smaller firms unable to develop their own training program. In the region today, a number of promising efforts are underway that link employer needs to curriculum development. The most notable example is the development of the Transportation, Distribution and Logistics Center at Olive-Harvey

#### **A Transportation, Distribution and Logistics Center at Olive-Harvey College**

As part of the “Colleges to Careers” initiative, Chicago and state officials are developing an innovative program that links Chicago City Colleges to regional industry clusters. Olive-Harvey on the south side of Chicago will be the state’s first school to train people for jobs in transportation, freight, and logistics. A 200,000-square-foot training facility will anchor the program and prepare workers for various fields in freight such as repairing heavy equipment, forklift operation, warehousing technology, and avionics technician. The program is an example of the public-private collaboration, as the curriculum that is being developed receives input from private freight firms such as American Airlines, Canadian National Railway, and Coyote Logistics.



Image: Logistics practitioners visit Olive-Harvey’s freight program. “College to Careers,” City Colleges of Chicago Olive-Harvey,” <http://www.ccc.edu/colleges/olive-harvey/menu/pages/college-to-careers.aspx>.

<sup>166</sup> Ibid

<sup>167</sup> UPS, “Sustainability at UPS 2010.”; CMAP Interview with UPS; CMAP phone interview with Yossi Sheffi (Director, Center for Transportation Logistics) MIT. April 19, 2012.

<sup>168</sup> Tim Bend (Site Manager, UPS) and Lee Weir (Training Leader, UPS) in a phone interview with CMAP staff, April 13, 2012.





College (see sidebar). These efforts, which are explored in the **Moving Forward: Strategies to Strengthen the Cluster** section of this report, represent an opportunity for future workers in freight to meet the workforce needs of a changing cluster.

### ***Retirement and Replacing Workers***

While industries such as trucking or warehousing face challenges in retaining workers, employees in rail that progress through initial training tend to stay in that industry for the length of their careers. The rail workforce is aging and is expected to replace half of the workforce in the coming decade. This turnover will occur at precisely the same time that the industry is expected to expand. In some cases, retirement in the rail industry is approaching a crisis: CN for example, has forecasted that it will lose 50 percent of its workforce between 2010 and 2014.<sup>169</sup> In particular, the graying of the rail workforce presents an opportunity for lower-skilled workers in the Chicago region to begin a career pathway. Like other freight industries mentioned above, rail provides on-the-job training for nearly every job including operators, conductors, mechanics, and engineers. As metropolitan Chicago is the nation's rail capital, retirements in the rail industry will mean well-paying openings for workers in the region.

## **Summary**

The regional workforce is integral to the success of the freight cluster. Currently, metropolitan Chicago faces critical workforce challenges: Employers have difficulty attracting freight workers with basic skills, and many employees need to be retrained to meet the changing technology requirements of the cluster. Similarly, retaining freight workers in key industries such as trucking or warehousing remains a challenge. While these workforce challenges are not unique to northeastern Illinois, metropolitan Chicago's status as a freight hub makes them more pronounced.

The public sector has an opportunity to address these gaps. While on-the-job industry training remains a great opportunity for career entry and advancement for workers with less education or experience, firms require sufficient resources to provide it. Public training programs such as Olive-Harvey's Transportation, Distribution, and Logistics curriculum can overcome the gap between larger firms that conduct in-house initial training and smaller firms that lack the resources to prepare workers for positions in freight. GO TO 2040 recommends that the private sector should be involved in shaping the curriculum of training programs, and Olive-Harvey is collaborating with private sector firms to match industry need with curriculum development.<sup>170</sup> Another opportunity for openings in the regional freight workforce will emerge as rail retirements increase. Overall, employment opportunities in freight can be expected to increase

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<sup>169</sup> Todd Taylor (Senior HR Manager, CN), in an interview with CMAP and CWIC staff, August 25, 2011.

<sup>170</sup> CMAP, GO TO 2040, 2010, p. 176.



as demand across the globe continues to soar. The region must be ready to deal with its workforce challenges if it is expected to grow.



# Cluster Support Strategies

Metropolitan Chicago's freight cluster is composed of a diverse mix of private firms and supporting public entities ranging in size, scope, and objective. For example, many companies in the cluster are small in scale, with few employees and a limited area of business. In contrast, the region is also home to firms with operations across the nation and the globe. These multinational firms decide what role greater Chicago will play in their overall business strategy, and therefore their decisions have deep impacts on the region's freight cluster. Public and nonprofit stakeholders follow a similar distribution, representing local, regional, state, multi-state, and national levels. These divergent priorities are often driven by geography and/or industry sector. For example, local community groups often focus on freight's externalities, such as congestion, noise, and pollution. At the same time, municipal, county, and state economic development departments seek to use freight as a path towards local economic growth and tax revenues.

Freight's relevance to a broad spectrum of participants means that there are varied and often conflicting ideas about how to improve freight operations and development. In the past, this wide array of individual viewpoints often led to disagreements that hindered support activities. However, new institutional arrangements for freight are being developed across the nation that bridge public agency and private business interests.<sup>171</sup> Best practices from these emerging support frameworks include:

- Integrating freight into transportation policy, planning, and programming functions.
- Prioritizing projects that improve the operational efficiency of the freight network.
- Educating a broad audience on the benefits of freight.
- Leveraging new funding structures such as public-private funding opportunities.

The Chicago region is home to many current efforts to promote and support the development of the freight cluster. These efforts are carried out by a diverse set of stakeholders ranging from industry leaders to local governments to nonprofits concerned with sustainable development. The previous chapter identified key challenges and opportunities in the region centered on three themes: infrastructure, innovation, and workforce. Through a series of case studies this chapter surveys major existing cluster support strategies and analyzes how those strategies address the infrastructure, innovation, and workforce issues raised previously. Many of the case

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<sup>171</sup> Transportation Research Board, "Institutional Arrangements for Freight Transportation Systems," National Cooperative Freight Research Program Report #2, December 2009.



studies are government-focused. However, as local governments can often serve to bring together a variety of stakeholders around a common purpose, oftentimes these strategies also involve a variety of nonprofit and private partners.

## Case Studies of Existing Cluster Support Strategies

### City of Chicago

Historically, freight activities in the region have concentrated in the south side of the City of Chicago, spreading south and southwest along the regional waterway and rail corridors. While some recent freight development has moved to the periphery of the region, the City of Chicago's status as the cornerstone of the regional economy means that freight movements continue to be concentrated in and near the city. As such, stakeholders including the City, various nonprofits, and private firms have undertaken a series of initiatives focused on freight movement and development.

#### **Infrastructure**

A number of City of Chicago programs and initiatives have focused on the infrastructure and land use challenges of freight. Through the Planned Manufacturing District (PMD) zoning designation, which began on Goose Island in 1990, the City has supported freight growth by preserving land with access to freight rail, switching yards, intermodal terminals, and highways for industrial and freight development. By protecting existing industrial and freight land from alternative development, this tool helps attract expanding freight enterprises as well as plan for future growth in the cluster. Today the City is home to 15 PMDs, which help provide space for freight firms to grow.<sup>172</sup> For example, C.H. Robinson (one of the world's largest third-party logistics firms,) utilized PMDs when expanding its Chicago business operations. According to Michael Foley, the project team leader at C.H. Robinson, "one of the obstacles the company had while growing was the need of more space. The company ran out of room at their previous location... and was able to find room for growth in the former U.S. Sample building located in the Clybourn Corridor PMD."<sup>173</sup> Since moving to the Clybourn PMD in 2005, C.H. Robinson has nearly doubled its Chicago employees from 400 to 760.<sup>174</sup>

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<sup>172</sup> Center for Neighborhood Technology, "Prospering in Place: Linking Jobs, Development, and Transit to Spur Chicago's Economy," February 2012.

<sup>173</sup> Local Economic and Employment Development Council, "LEED Council Focuses on a Member: C.H. Robinson," March 2008. See <http://www.leedcouncil.org/newsletter/ch1.pdf>.

<sup>174</sup> Local Economic and Employment Development Council, "PMDs- Growing Chicago Business for 20 Years," February 2010. See <http://www.leedcouncil.org/newsletter/pmds.pdf>.



More recently, the Chicago Infrastructure Trust passed the Chicago City Council in April of 2012. The Infrastructure Trust is the first city-based infrastructure bank in the U.S. and includes freight elements such as surface roadways, ports and airports, and rail. In addition, the City has initiated a series of studies and plans that address the freight infrastructure challenges in the region. The Chicago Rail Economic Opportunities Plan (CREOP) for example, is a multiparty effort led by the City of Chicago to leverage the city's hub status to foster rail-oriented economic development. The plan identified five industrial corridors in the city with the most rail-development potential and then made recommendations on ways to preserve freight use in the area. In the future, this framework will be expanded to all the city's industrial corridors to tie freight with economic development.<sup>175</sup> Finally, the City has developed strategies for addressing freight congestion and safety issues in its *Chicago Downtown Freight Study* that proposes infrastructure improvements, policy changes, and technology enhancements.

Access to the region's rivers and Lake Michigan remain important features of the region's shipping infrastructure. The Port of Chicago, operated by the Illinois International Port District, moves more short tons of goods than any other Great Lakes port, except Duluth-Superior.<sup>176</sup> The Port has been the topic of some recent calls for reform. In 2008, the Civic Federation called for its dissolution and restructuring, observing that the Port's principal mission, port operations, is not being adequately carried out. Over half of the Port's revenues come from managing the Harborside International Golf Center, a function which the Civic Federation asserts the Port is ill suited.<sup>177</sup> Mayor Emanuel has taken some steps to reform the Port, appointing a new chairman of the board and commissioning a long-range strategic plan.<sup>178</sup> In June 2012, the port authority announced the completion of a study by BMO Capital Markets that outlined alternative structures for the port authority.<sup>179</sup> Perhaps illustrative of the Port's many challenges to be resolved, the Federation notes that the port has had no major dockside improvements in 30 years.<sup>180</sup> The new chairman has also taken strides to improve transparency in the port's operations. In the future, targeted development of the Port could expand the region's freight capacity.

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<sup>175</sup> Chicago Department of Transportation, "The Chicago Rail Economic Opportunities Plan (CREOP) Final Report," Presentation to Chicago Metropolitan Agency for Planning Freight Committee, December 1, 2010. See <http://bit.ly/LA5PxQ>.

<sup>176</sup> U.S. Army Corps of Engineers, "Great Lakes Waterborne Commerce Profile," data up to 2008.

<sup>177</sup> Civic Federation, "A Call for the Dissolution and Restructuring of the Illinois International Port District," June 30, 2008.

<sup>178</sup> Paul Merrion, "Chicago Hopes to Turn Long-Neglected Port into a Contender," *Crain's Chicago Business*, January 9, 2012.

<sup>179</sup> Paul Merrion, "Private firm could anchor renewal at moribund Port of Chicago," *Crain's Chicago Business*, June 28, 2012.

<sup>180</sup> Civic Federation, 2008.



## **Workforce**

In response to changing workforce needs, the City Colleges of Chicago has launched an innovative program termed “College to Careers.” This program establishes partnerships between City Colleges, corporations, and non-profits to design and deliver curricula that equip students with skills to succeed in growing fields. The freight, transportation, and logistics cluster was chosen along with healthcare as one of the first fields of curriculum development. Olive-Harvey College on the Southside of Chicago will house a new \$42.2 million Transportation, Distribution and Logistics (TDL) center. Proponents of the new program anticipate that “College to Careers” will help address the skills gap brought about by the changing nature of the freight cluster and keep Chicago’s workforce—and the cluster—competitive.<sup>181</sup>

The increasing importance of workers acquiring technology competencies for a 21<sup>st</sup> Century economy is being supported by local initiative such as Chicago Career Tech, a not-for-profit corporation that retrains workers for in-demand technology-based careers. By closing the workforce skills gap engendered by innovation, the job-retraining initiative aims to create a new group of professionals that can use technology as a path for new career opportunities. As freight is a concentration of the region, the program could benefit from a freight-specific track.

Lastly, another development affecting workforce support strategies in Chicago is the reconfiguration of the three federally mandated workforce investment boards in Cook County into an integrated, county-wide workforce system. Though the reconfiguration is still underway, this consolidation has the potential to streamline resources for freight workforce development as well as provide a unified workforce development strategy. The new integrated workforce system will likely take a sector-based approach to workforce development; advancing a strategy for freight as a key sector in the region is an opportunity to address the changing workforce needs of freight.

## **Innovation**

While Chicago has numerous strategies for alleviating infrastructure and workforce challenges in the freight cluster, less work has been done to identify and address barriers to innovation in the cluster. Among the few efforts to support innovation in the freight cluster is the one being carried out by the City’s economic development arm, World Business Chicago (WBC). In 2012, WBC released a draft *Plan for Economic Growth* to identify strategies that increase efficiency and productivity in Chicago’s economy. Supporting the freight and logistics cluster is one of ten strategies advocated in the plan. While stressing the importance of infrastructure and planning in the long term health of the cluster, the plan also makes an appeal to “support the firms and

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<sup>181</sup> Fran Spielman, “Big Expansion Planned at Olive-Harvey College,” *Chicago Sun-Times*, March 13, 2012.





industries that are poised to capture future innovations in the sector.”<sup>182</sup> To implement the strategies outlined in the plan WBC will likely form a freight taskforce to deal with infrastructure and innovation in the cluster.

World Business Chicago also supports innovation through the Illinois Innovation Index,<sup>183</sup> a partnership between WBC, the Chicagoland Chamber of Commerce, the Illinois Science and Technology Coalition (ISTC), and CMAP. The index is a monthly publication providing innovation metrics for the region and the state. Both the Chicagoland Chamber of Commerce and ISTC devote considerable further resources towards innovation. The Chamber has an innovation program that launched initiatives such as Innovate Illinois as well as a technology program that helps businesses adopt to new advances.<sup>184</sup> ISTC is an organization that cultivates innovation as a form of economic-development and specializes in fostering public-private collaboration.<sup>185</sup> While neither focuses on freight in particular, each has well-developed innovation support structures.

## South Suburban Support Strategies

### ***Green TIME Zone: Demonstrating Transit Oriented Development and Cargo Oriented Development***

Prompted in part by CN railroad’s expansion of its intermodal terminal near Harvey,<sup>186</sup> the Southland Green TIME (Transit, Intermodal, Manufacturing, Environment) Zone effort now serves as a prime example of how collaboration can help sustain the region’s freight cluster. The effort, led by elected officials via the South Suburban Mayors and Managers Association (SSMMA), incorporates a wide variety of partners from the Chicago Southland Housing and Community Development Collaborative and Economic Development Corporation, to the Center for Neighborhood Technology (CNT), the Delta Institute, and the Metropolitan Planning Council (MPC). Each of these stakeholders lends some expertise to the three-pronged comprehensive redevelopment approach: Transit-Oriented Development (TOD) and Housing; Cargo-Oriented Development (COD); and Green Manufacturing.



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<sup>182</sup> World Business Chicago, “A Plan for Economic Growth and Jobs,” March 2012, p. 11-12.

<sup>183</sup> Which can be accessed at <http://www.illinoisinnovation.com/innovationindex/>.

<sup>184</sup> Chicagoland Chamber of Commerce, “Why Innovation?” See <http://www.chicagolandchamber.org>.

<sup>185</sup> Illinois Science and Technology Coalition, “About ISTC.” See <http://istcoalition.org/about-istc/>.

<sup>186</sup> CNT “Prospering in Place,” 2012, p. 26.



The Green TIME Zone strategy aims to develop the southern suburbs by making the most of existing freight infrastructure. Of the three redevelopment approaches, cargo-oriented development most directly supports the freight cluster while TOD and green manufacturing strategies provide ancillary support to freight. Strategies around cargo-oriented development are anchored in CN's Gateway terminal as well as the neighboring Union Pacific intermodal terminal. To take advantage of the existing freight infrastructure the Green TIME Zone strategy has identified Logistics Park Calumet, a dense concentration of over 1,400 acres of underutilized or vacant land within four miles of the CN and UP intermodal terminals that should be the focus of future freight development.

Redeveloping these sites is central for the Green TIME Zone strategy and help address the land use challenges raised in the previous chapter. Prime freight land in the south suburbs is often under pressure to be converted to other uses. To counteract the trend, the Green TIME Zone includes a series of solutions including land banking that assembles fragmented parcels to make them more attractive to freight

investment. The strategy also includes infrastructure recommendations including intermodal connector road improvements. The coordinated efforts of the Green TIME Zone have a key ingredient at play: county and municipal participation. Communities impacted by the proposed developments are engaged in informing future projects. One of the challenges to metropolitan Chicago's freight cluster is lack of coordination amongst its governing bodies. The Green TIME Zone work with neighboring municipalities demonstrates how collaboration, rather than competition, can yield economic benefits.<sup>187</sup>

### ***Blue Island: Local Cluster Support Strategies***

Blue Island, bordering on the southwest corner of the City of Chicago, is a south suburban community using freight as an economic development strategy. Historically, Blue Island developed as a transportation and industrial center, and the city is well served by highways, five freight railroads, an intermodal terminal, and the Calumet Sag Channel. Despite this strong

#### **Green TIME Zone**

Canadian National's Gateway Intermodal Terminal in Harvey, IL is the anchor for the Green TIME Zone strategy.



Image: Center for Neighborhood Technology, <http://goo.gl/XJPMZ>.

<sup>187</sup> "Chicago Southland's Green TIME Zone," Center for Neighborhood Technology, 2010. See <http://www.cnt.org/repository/GTZ.pdf>.



freight and industrial base, the city has struggled with business closures as manufacturing has declined.<sup>188</sup> Blue Island is involved with the inter-jurisdictional Green TIME Zone effort but also developed local strategies that support freight in the area.

Local strategies include plans to clean up industrial brownfields, making them more attractive for private freight investment. The City has a dedicated staff position titled Brownfields Coordinator, and applied for U.S. EPA grants to begin remediation on two parcels. The City prioritizes land assembly efforts around key freight corridors and infrastructure improvements around the intermodal facility. Finally, local planners in Blue Island stress that freight-related redevelopment will require inter-jurisdictional collaboration, such as an effort to co-market the area as a freight center. Through its Local Technical Assistance program, CMAP has partnered with Blue Island to use long-range planning to support these goals.

## **Will County**

Will County is home to an increasing number of intermodal facilities, distribution centers, warehouses, and other industries driving the freight cluster. Several coordinated economic development efforts in the county have sought to capitalize on the county's existing freight assets. Because of Will County's concentration and activity in freight, its efforts will serve as an example of cluster support strategies at the county level.

### **Workforce**

The Will County Center for Economic Development (CED) works to attract and expand freight industries. The Center offers business location assistance, information on incentives, details on current major infrastructure investments, and in-depth information about workforce demographics in Will County.<sup>189</sup> The CED provides important workforce support to the cluster by helping link employers with local workforce training. In addition to the CED, the Workforce Investment Board of Will County helps support freight by sharing information on the opportunities in the county as well as information on available training programs. Freight related curriculum at University of St. Francis and Lewis University, Governors' State University, and Joliet Junior College also provide workforce support to the cluster.

### **Infrastructure**

In 2006, Will County crafted a model container ordinance to serve as a uniform guideline for municipalities in the county to use when addressing freight development. Drafting the container ordinance was a cooperative endeavor among businesses, municipalities, and the

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<sup>188</sup> CMAP, Blue Island Comprehensive Plan Draft Report, March 2012.

<sup>189</sup> "Global Transportation," Will County Center for Economic Development. See <http://bit.ly/LUhpRE>.



County for an issue with widespread effects. The container ordinance helps support growth in the freight cluster by:

- Minimizing conflicts with other land uses.
- Anticipating demand for future space in freight.
- Increasing efficiency by siting container yards in close proximity to intermodal terminals.

Complementing the ordinance, the Will County CED issued an Inland Port Study in 2010. One key finding of this study is that, unlike for coastal ports, there is no single oversight authority dealing with freight in the region. To address this deficiency, the CED is in the process of creating an Inland Port Advisory Council to set priorities around freight development in Will County. Membership on the council is slated to include representatives from all the transportation modes as well as both the public and private sectors.<sup>190</sup>

## Regional Efforts

### ***Public-Private Partnerships: CREATE***

In addition to more traditional cluster support approaches by governmental and economic development organizations, the region has adopted an innovative public-private partnership to fund rail infrastructure improvement. The Chicago Region Environmental and Transportation Efficiency (CREATE) program formed in 2003 is a first-of-its-kind partnership between U.S. DOT, the State of Illinois, City of Chicago, Metra, Amtrak, and the nation's freight railroads. The goal of the program is to address urban rail congestion by implementing a series of approximately 70 projects to improve the regional rail system. CREATE represents the first time that the public sector has partnered with the private rail industry on such a large scale: the initial cost of all CREATE projects was estimated at \$1.5 billion in 2003, which has more than doubled since the program has been updated.<sup>191</sup>

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<sup>190</sup> Will County Center for Economic Development, "Will County Inland Port." See <http://www.willcountyced.com/MidwestEmpire/>.

<sup>191</sup> Jeff Stagl, "More projects, more funding still on CREATE's slate, UP's Payette says," *Progressive Railroading*. November 8, 2010.



## Alameda Corridor

The Alameda Corridor is a 20-mile grade separated rail corridor running from the Ports of Los Angeles and Long Beach to the railroad mainlines near downtown Los Angeles. Its completion allows trains to bypass nearly 100 miles of branch lines and avoid more than 200 at-grade crossings, greatly increasing the speed and flow of goods from the ports while reducing congestion on the Long Beach Freeway.

Railroads using the Alameda Corridor pay a user fee that helps pay off the construction of the corridor. The user fee is based on the type of railcar traversing the corridor—initially \$15 for a loaded TEU, \$4 for an empty container, and \$8 for other loaded rail cars, though prices have risen with inflation. Overall the Alameda Corridor stands out as a hugely successful freight support effort that is increasing flows while reducing congestion on shared infrastructure.



Image: Alameda Corridor Transportation Authority, <http://www.acta.org/index.asp>.

While focused on rail, completed CREATE projects will also reduce congestion on roadways, especially those establishing rail/road grade separation. CREATE reflects some of the benefits of industry clustering. First, the region has the concentration of firms that makes CREATE feasible. Second, despite the intense competition between Class I railroads, CREATE also exhibits the level of collaboration often seen in clusters.

Dedicated funding for CREATE has proven to be a challenge. In 2005, the program received only \$100 million of the \$900 million Federal funding it requested in the authorization of SAFETEA-LU. In response to this setback regional stakeholders have increased their commitment to CREATE, which is a priority recommendation of the GO TO 2040 plan. For example, fifteen CREATE projects will receive \$211 million from the *Illinois Jobs Now!* capital plan while recently private freight railroads agreed to increase their commitment by an additional \$155 million. The federal TIGER program has awarded over \$225 million to CREATE projects, including a \$10 million grant in June of 2012. This ability to draw on a variety of sources to overcome a funding setback even in a difficult fiscal environment shows the promise of public-private partnerships. To date, 14 CREATE projects have been completed.<sup>192</sup>

## Regional Planning: CMAP

In addition to providing local technical assistance to freight-oriented communities like Blue Island and supporting the CREATE project, CMAP is participating and leading several efforts to support the region's freight cluster. CMAP's GO TO 2040 comprehensive plan identified

<sup>192</sup> Illinois Government News Network, "Governor Quinn and Senator Durbin Announce \$10.4 Million TIGER Grant for Rail Improvements." June 19, 2012.





regional mobility as one of the region's core priorities. Indeed, the plan identifies several strategies to improve the region's movement of goods:

- Complete CREATE.
- Implement a national vision for freight.
- Improve the truck system.
- Establish a Regional Freight Authority.

To realize these goals, CMAP is convening stakeholders, providing data, and articulating these policies to local and national decision makers. Through its Freight Mobility Program, CMAP is devoting resources toward meeting the above freight priorities. The freight community has been included in official transportation planning activities for years, showing the region is ahead of the curve on what is now emerging as a national best practice. For example, the agency's freight committee meets to discuss policy and developments in the regional freight cluster on an ongoing basis. The committee comprises industry organizations, private railroads, trucking companies, consultants, researchers, planners as well as representatives of federal, state, and local government.

## State Efforts

Several statewide agencies influence freight in Illinois, and their actions directly affect what is occurring in the Chicago region. This report touches on some of the major efforts underway at the state level. The Illinois Department of Transportation (IDOT) has a Bureau of Railroads that provides capital assistance to projects that contribute to statewide economic development and every year produces a five year program of projects to be funded. Additionally, IDOT is undergoing a comprehensive planning effort for the state's nearly 10,000 miles of passenger and freight railroad tracks. The plan will fulfill a new federal requirement for state rail plans but its objectives also include identifying a means to improve mobility, increasing efficiency, and developing a framework for implementing rail initiatives.<sup>193</sup> IDOT anticipates completing the plan by the fall of 2012 after several months of stakeholder engagement and corridor analysis.

In addition to rail, IDOT impacts freight movements through its management of both the truck route system as well as the highway system. Indeed, the majority of freight moves through Illinois via the highway system though often the focus of this system is passenger travel. The Illinois State Toll Highway Authority (ISTHA) is responsible for toll roads in the state while the Illinois International Port District operates the Port of Chicago. Funding for these freight programs comes from a variety of sources including the State Rail Freight Loan Repayment

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<sup>193</sup> "Purpose of the Plan," Illinois State Rail Plan, Illinois Department of Transportation, 2012. See <http://bit.ly/M3LxID>.





Fund for rail; motor vehicle registration, motor fuel tax, and tolls for highways; and the Port District Loan Program for waterways and inland intermodal terminals.<sup>194</sup>

The Illinois Commerce Commission (ICC) also plays a significant role in freight. For-hire trucking companies moving household property must obtain a certificate from ICC as well as publish and file a list of their services and prices. For rail ICC has an even greater role. The Commercial Transportation Law gives ICC the jurisdiction to administer and enforce general safety requirements for rail track and facilities with the state. Activities to meet this responsibility include:

- Oversight of safety improvements to public highway/rail crossing.
- Inspection of railroad track for defects.
- Oversight of all hazardous material shipped through the state via rail.<sup>195</sup>

Despite the significant resources devoted to freight, a primary tenet of Metropolis Strategies' review of statewide freight policy is that there is neither a cohesive strategy nor single organization at the state level that plans for freight and state freight funding is often mode-specific.<sup>196</sup> Both CMAP and Metropolis Strategies have called for a freight authority to provide a more cohesive freight strategy.

### ***Tax Incentives***

Financial incentives are one of the more common tools that governments use to support desired outcomes. Some firms in the freight cluster are supported by state and local tax incentives. At the local level, municipalities and counties can use financial incentives like tax increment financing (TIF) or structure property tax relief to attract, retain, and entice businesses to grow. The incentive most commonly employed by counties is property tax abatement.<sup>197</sup> While this is a less visible method of subsidizing business development than providing a grant or cash incentive, the monetary value for businesses can be substantial.

The state too has a variety of incentives which it can use to encourage business growth. Enterprise Zones, for example, target "economically blighted"<sup>198</sup> areas for development. Created in 1988, Enterprise Zones were extended by 25 years in 2012. Likewise,

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<sup>194</sup> Christopher Lindsey, Jim LaBelle, Sheena Freve, and Frank Beal, "Developing Sound Freight Policies to Build the Illinois Economy," Metropolis Strategies, May 2011.

<sup>195</sup> Illinois Commerce Commission, "Transportation Programs," <http://www.icc.illinois.gov/transportation/>.

<sup>196</sup> Lindsey et al, 2011.

<sup>197</sup> Luke Middleton, "Literature Review: Tax Abatements and Economic Development Incentives," University of Kansas Center for Economic and Business Analysis, Report No. 49, January 2011.

<sup>198</sup> Illinois Department of Commerce and Economic Development, "Enterprise Zone Program." See <http://bit.ly/LK0uoy>.



some businesses in the freight cluster could be supported by the high impact business (HIB) incentive that is designed to encourage large-scale economic development activities to companies making a substantial capital investment in operations which will create a certain number of jobs. The Economic Development for a Growing Economy Tax Credit Program (EDGE) is designed to offer special tax incentives when a company is considering locating in a competing state.

Incentives can provide some support to the freight cluster, but they are not a panacea. The OECD Territorial Review notes that inter-state competition in the tri-state region shuffles firms from one part of the mega-region to another but does little to generate any new economic activity. The same types of activities happen between municipalities and counties. Luring firms already in the region across political boundaries does little or nothing for the mega-region's economy with metropolitan Chicago's freight cluster competing with areas like Memphis and Kansas City.

## **Gaps in Current Cluster Support Strategies**

Metropolitan Chicago is one of the nation's leading freight centers. Freight creates jobs for the region, and the efficient movement of goods is tied to the overall health of the regional economy. At the same time, freight carriers and facilities can create more congestion as well as ancillary impacts like noise, safety, and pollution. Because of freight's centrality, there are many regional efforts to help grow the cluster while minimizing the negative aspects of freight. As the case studies in this chapter illustrate, existing cluster support strategies range in scale, scope, and objective.

Though stakeholders currently devote significant resources to support the regional freight cluster, not all of these efforts align with the challenges and opportunities identified in the previous chapter of this report. Infrastructure improvements are at the heart of most cluster support strategies. The most serious gap in existing infrastructure strategies is that many focus solely on modal investments, when today's freight system benefits most from intermodal connectivity. Other strategies are centered primarily on increasing flow or protecting land in specific locations instead of coordinating across the regional freight system. Finally, regional infrastructure strategies have yet to resolve serious financing barriers.

Future growth in the freight cluster is contingent not only on infrastructure improvements but also workforce and innovation support. While support strategies to improve the freight infrastructure system abound, much less is being done to train the next generation of freight workers or foster new innovations which make the regional cluster more competitive. Employers express difficulty finding freight workers who possess basic job skills, an issue not



fully addressed in current workforce strategies. Other conventional issues such as worker retention or turnover are compounded by a skills mismatch engendered by an evolving cluster. Olive-Harvey's curriculum is certainly a step in the right direction in matching industry need with workforce training. A support strategy not as well developed in the region is how to increase retention in key freight industries such as trucking or warehousing so workers can begin to realize career advancement opportunities. A final gap in current workforce strategies is that few articulate the role freight can play as a viable career path; the cluster doesn't receive the same attention as other growth areas so it is not as widely pursued by jobseekers.

Strategies to overcome barriers to innovation are scarcely represented in existing cluster support efforts. This is partly to be expected, as innovation is generated by the private sector while many cluster support strategies are driven by the public sector. However, both public and private stakeholders can help spur innovation by supporting ideas, institutions, and relationships to enhance the regional culture around innovation. World Business Chicago's economic plan to support firms and industries poised to capture future innovation in freight is one of only a few strategies under the innovation theme. ISTC and the Chicagoland Chamber of Commerce have well developed innovation programs, but less freight specificity. The major gap in existing cluster support activities is how additional stakeholders such as civic groups, economic development practitioners, or business leaders can use innovation as a cluster growth strategy.



# Moving Forward: Strategies to Strengthen the Cluster

While often overlooked, freight is a major strength of the regional economy. Freight provides a broad spectrum of jobs that are particularly resistant to offshoring and outsourcing. Innovations in freight allow regional firms to be exporters, gaining access to distant markets. The regional freight cluster exhibits many of the characteristics touted in economic development literature including specialization, above-average growth, and strong multiplier effects. Many emerging trends in freight, including increased intermodalism, global infrastructure investments, and supply chain management will funnel future freight to metropolitan Chicago, capitalizing on the strategic advantages of the region. Indeed, freight demand is expected to double in the next 20 years, representing enormous potential for regional economic growth.

Despite the region's competitive advantages, this report raises numerous challenges that may arrest freight's impressive growth potential. Congestion on the region's shared transportation system already costs firms time and money. Disjointed land use leads to a less efficient system, and prime freight land is being redeveloped for residential and commercial uses. Technological adoption is key to future cluster competitiveness, but few support strategies even recognize, let alone provide resources towards supporting innovation. And as the freight cluster has changed and continues to change, so too have the demand for workforce skills. Moving forward, metropolitan Chicago cannot solely rely on its current status as the nation's freight hub but instead must actively build on its regional specialization. Inaction will exacerbate the already considerable challenges facing the cluster and cause stagnation instead of realizing anticipated growth.

Economic growth and innovation are largely generated by the private sector. Indeed, most of the data and analysis in this report focuses on measuring the size and scale of private firms and workers within the freight cluster. Ultimately, the region's business leaders will be responsible for making many of the strategic decisions that create new breakthroughs and fuel metropolitan growth. However, the public sector and civic organizations (some of which bring together the region's business leaders around a common purpose) can play a vital role in providing support, services, and most importantly, in making investment decisions.

The concluding section of this report reviews a series of implementation action areas for growing the freight cluster. The creation of new **strategic partnerships between private and public entities** emerges as a key theme throughout the following sets of strategies. The public sector has a large and rather obvious role to play in making infrastructure investment decisions, training our workforce, and planning for future land use. But across all of these policy areas, harnessing the expertise of the private sector will be essential to addressing some of the most



intractable challenges facing the freight cluster. Similarly, government can work to rationalize and prioritize sets of widely dispersed, yet shared, problems faced by private entities. Lastly, many civic organizations can help to articulate a common regional direction, and speak with one voice for many of the businesses and residents they represent.

## Infrastructure Implementation Action Areas

Congestion on the region's shared transportation system remains the primary challenge facing the freight cluster. Not only does congestion lead to lost time and money, it also makes it harder for firms to operate under just-in-time processes. This regional issue has been well studied and there have been important attempts, such as the CREATE program, to mitigate congestion's serious impact. Despite the important efforts already underway, this report concludes that traditional ways of planning and financing freight infrastructure are not adequate to meet the needs of a growing cluster.

While the rail industry makes significant private investments, the public sector funds the vast majority of transportation infrastructure. Freight also remains a regional issue, broader and more complex than a simple accumulation of the 284 municipal and seven county governments' individual interests. Freight improvements are intended to produce a mix of public and private benefits, but the greatest obstacles to implementing improvements are institutional barriers (such as the challenges presented by coordinating a number of different private freight carriers within a competitive industry) and financial hurdles. Because of these institutional and financing challenges, many of the following infrastructure priority areas focus on the role of the public sector in making investment and land use decisions, though crucial partnerships with private entities are also highlighted.

### System Coordination

Currently there is no unified voice for freight in the region, with limited collaboration between different modes, stakeholders, and levels of government. GO TO 2040 recommends that a freight authority be explored to address the institutional and funding barriers of all freight modes. A similar recommendation was also included in Metropolis Strategies' report *Developing Sound Freight Policies to Build the Illinois Economy*.<sup>199</sup> While the purpose of a freight authority is to provide the needed governance structure to guide freight system investments, its exact responsibilities are still open to examination and careful deliberation.

In partnership with industry and civic leaders as well as state and local government officials, CMAP intends to lead an inclusive effort exploring institutional responses to freight system

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<sup>199</sup> Christopher Lindsey, Jim LaBelle, Sheena Freve, and Frank Beal, "Developing Sound Freight Policies to Build the Illinois Economy," Metropolis Strategies, May 2011.



coordination. The first step in the process will be for the CMAP Board to form a task force to analyze these complex issues and issue recommendations on next steps.

**Next Step:** Evaluate the feasibility of a Regional Freight Authority.

**Lead Implementer:** CMAP

## **Innovative Financing and Project Prioritization**

Traditional means of financing infrastructure projects across the country have proved inadequate to maintain, modernize, and expand the transportation system. The rising cost of construction and operations has significantly undercut the purchasing power of federal and state motor fuel tax receipts, which have fallen in real terms over the last 20 years. Furthermore, capital investment decisions across all transportation modes remain largely formula based rather than performance driven.

New ways of funding freight investments are emerging that could be replicated in the Chicago region. Targeted user fees, such as the Alameda Corridor in California, have successfully funded freight infrastructure while vehicle-miles traveled (VMT) fees have been implemented for trucks in Germany. American metropolitan areas as diverse as Atlanta, Denver, Minneapolis, San Diego, and Seattle have implemented or are beginning congestion pricing through high-occupancy toll or express lanes.<sup>200</sup> Public-private partnerships such as CREATE combine financing from a variety of sources and are thus less vulnerable when a single funding source fails to materialize. Finally, existing transportation funding decisions based on formulas can be replaced with performance based evaluation criteria that identifies goals and targets to make more efficient use of scarce transportation dollars. As part of the process scoping out the feasibility of a freight authority, CMAP will explore the viability of more targeted user fees and other innovative financing measures to fund freight infrastructure improvement.

The region has conducted a wealth of freight planning, including prioritizing a series of infrastructure projects addressing freight mobility. Focusing on the implementation of existing infrastructure projects in GO TO 2040 and CREATE should be near-term actionable items. Broad stakeholder support is needed to accelerate some of these key priorities, establish new partnerships among public and private interests, and assemble funding from both traditional and more innovative sources to move projects to completion. To build on regional strength, future investments in freight infrastructure should have a multimodal focus.

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<sup>200</sup> Government Accountability Office, "Traffic Congestion: Road Pricing Can Help Reduce Congestion but Equity Concerns May Grow." GAO-12-119, 2012.





**Next Steps:** Explore the viability of more targeted user fees.

Prioritize existing projects based on a freight mobility criterion.

**Lead Implementers:** Public-private partnership of freight carriers (truck, rail, water, and air), public agencies (State of Illinois, CMAP, counties, municipalities), and civic organizations

## **Coordinated Land Use**

While freight is extremely land intensive, region-wide land use planning has not kept pace with the designation of other uses. Land currently best suited for freight activities needs to be preserved along key corridors so that the cluster can expand in the future. Local governments throughout the region must lead this effort. The Green TIME Zone strategy serves as an example of multi-jurisdictional coordination and resources such as CMAP's Local Technical Assistance program can also help target resources and address land use challenges.

**Next Steps:** Preserve freight designation along key corridors.

Establish freight coordination between municipalities.

**Lead Implementers:** Municipal governments

## **Innovation Implementation Action Areas**

Innovation will drive the productivity gains that fuel future growth in freight. Promoting and facilitating innovation within the freight cluster is a winning strategy for the region, which is already heavily specialized in many of the freight activities predicted to experience substantial growth.

Despite innovation's central role in building on existing freight assets, little is being done in the region to advance freight-specific innovation strategies. As innovation is generated by the private sector, the strategic decisions that generate new breakthroughs will primarily come from regional firms. However, the public sector and other organizations such as foundations or economic development agencies can help spur innovation by supporting ideas, institutions, and relationships that are essential to innovation but are unlikely to be provided by private business. The following set of priority areas are meant to bolster the region's commitment to freight innovation, drawing particular attention to areas where public or nonprofit support can enhance private innovation efforts.



## Maintain Comparative Advantages, Promote Innovative Industries, and Attract Underperforming Sectors of the Cluster

Metropolitan Chicago is specialized in key freight activities that seem primed to benefit from new innovations. Capturing those innovations within the region would fuel future growth in the cluster. Innovative trends in the cluster include:

- Supply chain management
- Intelligent transportation systems
- Fuel efficiency and alternative fuels
- Backhaul utilization
- Modal transferability
- Intermodal facility operations
- Carrier improvements

Capturing these innovations will build on the region's comparative advantages in logistics and intermodal moves. The cluster can also be strengthened by bolstering underperforming and attracting underrepresented industries including couriers, specialized freight, and water freight. Addressing industry gaps in the freight cluster can return upwards of \$2 billion a year to the regional economy.

Targeting these efforts by the use of financial incentives and other means often falls under the purview of state and local economic development practitioners who commonly use taxpayer dollars to attract and retain private investment. Such incentives should be used extremely carefully to achieve a net increase in regional activity, rather than shift activity from one part of the region to another.

**Next Steps:**                   Align current economic development strategies to build on regional strengths.

                                          Target effective economic development resources to innovative industries; showcase the innovative strengths of the region to early stage financing firms.

                                          Bridge current cluster gaps by bolstering underperforming and attracting underrepresented industries.

**Lead Implementers:** Governor's Office, Illinois Department of Commerce and Economic Opportunity (DCEO), local economic development practitioners



## University Research that Leads to Commercialization

According to a leading expert on cluster development, “one of the most important characteristics and success factors for any cluster is the availability of knowledge creating and education facilities.”<sup>201</sup> While the Chicago region is well-served by world class research institutions, it is underperforming relative to other metro areas in terms of its success at commercializing technology.<sup>202</sup> Regional universities can take on a greater role in supporting freight innovation by conducting research that is aligned with industry needs and has a clear path toward commercialization. Other major freight centers such as Singapore or the Spanish logistics hub of Zaragoza have invested heavily in cutting edge freight research and specialized knowledge creation to support their freight clusters. Domestically, the University of Memphis’s Center for Intermodal Freight Studies and the Intermodal Freight Transportation Institute conducts specialized research and the Logistics and Supply Chain Management program provides training based on local business needs.

Cluster support strategies can help facilitate the transition from general research to applied innovations. While most major universities have technology transfer offices, greater synchronization is needed at the beginning of the research process to match university expertise with industry need. Guiding research to address current industry challenges will in turn increase the commercialization rates of technology transfer programs. One way to incentivize targeted research is to develop a program that requires initial university-industry collaboration as a prerequisite for research dollars. The Illinois Science and Technology Coalition (ISTC), an organization which supports public-private collaboration in research projects, may be well suited to lead this endeavor in conjunction with regional universities such as Northwestern University, the University of Chicago, the University of Illinois at Chicago, Illinois Institute of Technology, and Northern Illinois University.

**Next Steps:**                    Incentivize models that match university research with industry need.  
                                          Advocate freight-specific R&D initiatives.

**Lead Implementers:** Regional universities, Illinois Science & Technology Coalition

## Expound the Region’s Innovative Status

Showcasing metropolitan Chicago as a center of freight inventiveness will help create a culture of innovation and concentrate future resources in the area. The Chicago region could benefit by

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<sup>201</sup> Yossi Sheffi, “Logistics-Intensive Clusters: Global Competitiveness and Regional Growth,” Regional Science Association Annual Conference, Denver, CO, November 11, 2010, p. 17.

<sup>202</sup> CMAP, GO TO 2040, p. 181.



drawing attention to its competitive advantages in freight beyond its already well-known infrastructure assets.

KC SmartPort, a non-profit economic development organization for the 18-county Kansas City region may be a model institutional arrangement in achieving that goal. KC SmartPort is the leading authority on logistics and freight for the region, and its purpose is to promote the greater Kansas City freight/logistics cluster. In addition to attracting businesses to the region, KC SmartPort serves as a leading voice highlighting the benefits of concentrating freight in the region. Many regional organizations, such as the Chicagoland Chamber of Commerce, can help advance that model here. The Chamber is particularly well suited for the effort because of its metropolitan scope and voice at local, state, and national levels. In addition, the Chamber specializes in enhancing economic development opportunities, and could use its existing technology program to highlight business opportunities from freight innovation.

**Next Step:** Highlight innovations within the cluster.

**Lead Implementers:** Civic organizations

## **Workforce Implementation Action Areas**

Ensuring that the workforce has the necessary skills and competencies demanded by employers is integral to future prosperity. While the region has a capable workforce today, better coordination and more targeted investments are needed. In particular, increased private sector engagement can better inform training and preparation at all levels, especially for occupations experiencing rapid changes in skill requirements due to innovation and technology. Other specific concerns, such as an aging workforce, present challenges but also opportunities for attracting a new generation of workers. Priority areas include increasing coordination among employers, the public workforce sector, higher education, and vocational training to enable the freight cluster to grow and innovate.

### **Foster Public-Private Collaborations with Freight Cluster Industries and Education and Workforce Training Providers**

Businesses within the freight cluster should collaborate with educators and training providers to reduce the skills mismatch that has emerged as innovations change workforce needs. Partnerships like the City Colleges' College to Career initiative and the State of Illinois' Learning Exchanges exemplify these types of collaborations between industry and the workforce development system. The outcomes of these collaborations should be monitored to identify successes and gaps. The organizations leading these partnerships should communicate



the outcomes and non-profit, advocacy organizations, and research institutions are well-suited to perform evaluations and recommend specific strategies to strengthen these collaborations.

The City Colleges of Chicago recent transformation to industry-focused training programs resulted from close collaboration with the cluster. In this example, industry experts will serve as teacher-practitioners and private firms will provide students with access to their facilities for training purposes, internships, and job interviews.<sup>203</sup> The programs' curricula will be designed in partnership with industry experts to ensure that students are developing the skills needed to keep up with innovations in the field. Ongoing and intensive engagement on the part of the region's employers will be critical to the sustainability of this effort. Lessons learned for scaling up the program in the region could be applied to suburban community colleges.

Creating a more systemic linkage between industry and education and training providers will allow for real-time information exchange. Just as the community colleges are partnering with the private sector, Workforce Investment Boards (WIBs) are also well poised to address some of the cluster's workforce training needs. WIBs primary function is to direct workforce development funding from local, state, and federal sources to the organizations providing training and connecting job seekers to employment. WIBs can develop more robust working relationships with employers to identify workforce gaps and develop strategies to implement appropriate training.

The skills mismatch must also be addressed in the preschool through college education systems. To prepare for the future, the public-private education partnership Illinois Pathways Initiative will collaborate with industry to develop enriched and relevant science, technology, engineering, and mathematics curricula. This initiative will coordinate curricula and programs for all ages and grade levels, identifying opportunities for training and recruiting the future freight workforce.

- Next Steps:**
- Evaluate data, monitor outcomes, and expand freight cluster training programs to other community colleges in the region as needed.
  - Develop strategies for workforce investment boards (WIBs) in the region to target freight cluster workforce needs.
  - Implement Illinois Pathways learning exchanges around transportation, distribution, and logistics.

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<sup>203</sup> Coyote Logistics, "Mayor Emmanuel and Governor Quinn Announce New Transportation, Distribution, and Logistics Center at Olive-Harvey College," March 13, 2012. See <http://bit.ly/OC0Tbh>.



**Lead Implementers:** Freight industries, community colleges, WIBs, Illinois Pathways partners, advocacy and policy organizations, and universities

## **Address “Soft-Skills” Training Needs**

Public funding is well suited for remedial education and soft-skills development, a major ongoing challenge for employers in the freight cluster. Bridge programs are an effective method for workers to gain skills relevant to a specific occupation. Workforce Investment Act funds and other public funding for workforce development should be targeted towards soft-skill and basic-skill attainment. A recent scan of metropolitan Chicago’s bridge programs, completed by the Chicago Workforce Investment Council, found no bridge programs for occupations in the freight cluster.

For an employee to succeed in the workplace, basic skills like problem-solving, communication (including English as a second language instruction), following directions, and professionalism are critical. Many industries in the cluster have minimal education prerequisites for entry-level employees. Freight jobs are often highly team-oriented, which can also be a challenge for individuals with unstable or limited employment experience. The region’s workforce investment boards, training providers, and employers should work collaboratively to develop bridge programs that attract more low-skilled adults into the workforce. Like the Olive-Harvey training program, new programs should emphasize development of direct connections between the trainee and future employment. Areas like Will and Cook Counties are well positioned to develop bridge programs to reach sizable numbers of low-skilled and under-employed adults.

**Next Steps:** Build collaborations to deliver soft-skills training that is relevant to the freight cluster

**Lead Implementers:** Freight industries, community colleges, universities, community-based training providers, and WIBs

## **Retrain the Workforce**

As technology rapidly transforms workplaces in the freight cluster, many workers and job seekers need to upgrade their skills and/or acquire new credentials. Employers and training providers should work together to craft programs that align with changes resulting from innovation. Public funding, like the State of Illinois’ Employer Training Investment Program and the City of Chicago’s TIFWorks, can be utilized to offset some of the costs. Larger firms, like UPS, also have the capacity to develop and implement these sorts of trainings within the company. Mid-sized and smaller firms may have to partner with training providers and institutions of higher education. There is significant room for industry leadership in this area but public-private-partnerships could be useful to develop retraining programs.





At the same time, many currently unemployed workers formerly had freight jobs and would like to reenter the workforce, or they have skills transferable to freight. In the wake of the recent recession the region still has many skilled workers who could be retrained to meet the needs of the innovating freight cluster. To access the unemployed, employers in the cluster could work with the many existing institutions like WIBs and Chicago Career Tech to build pathways to careers in the freight cluster.

**Next Steps:** Develop retraining programs to upgrade skills of existing and potential workforce with private sector leadership.

**Lead Implementers:** Freight industries, community colleges, universities, community-based training providers, and WIBs

### **Use and Refine Data Systems to Inform Freight Workforce Support**

Data on employment growth and related training opportunities can help education providers and economic development organizations plan strategically to help meet the cluster's workforce needs. Several current initiatives are underway to meet many data and information gaps. Data providers should continue to implement and improve upon the data they disseminate about the freight cluster's workforce and research, and advocacy organizations should use this data to inform policy and decision making.

With the help of other workforce data providers and stakeholders CMAP has built a data portal, MetroPulse Jobs, which will work to address these data gaps. This site will grow in conjunction to CMAP's development of drill-down reports. More robust data on the state's educational system outcomes, such as that collected and synthesized by the the Illinois Statewide Longitudinal Data Systems, can help inform future education and workforce preparation decisions. The data systems will capture students' data from pre-school through college and beyond. Finally, the CWICstats quarterly dashboard provides a snapshot of key workforce and economic indicators. Each of these resources will provide critical insight for industry leaders and policy makers to provide support to the cluster.

**Next Steps:** Launch MetroPulse Jobs data portal with qualitative and quantitative data on freight cluster occupations and employment.

Promote use of Statewide Longitudinal Data Systems to evaluate the outcomes and impact of training programs.

Use CWICstats workforce research and data initiative to inform implementation of training programs.

**Lead Implementers:** CMAP, Chicago-Cook Workforce Partnership, Chapin-Hall, and State data providers



# Conclusion

This freight drill-down report stems from GO TO 2040's call to strategically organize the region around its existing and emerging clusters of specialization. Freight is a key specialization of the region, though competing regions are channeling significant resources to build their freight functions and capture future growth. To maintain its preeminent position, the Chicago region must overcome the internal infrastructure, innovation, and workforce challenges raised in this report.

CMAP will widely disseminate the report, posting it on the agency website, providing policy blog updates, and presenting on data and strategic findings. CMAP will reach out to partners across the region to gain their help in publicizing the report as well continue to develop an information data portal around the freight cluster. Building on the foundation of the freight report, CMAP will continue to develop a series of cluster analyses, such as advanced manufacturing and biotech/biomed, drawing attention to the interconnectivity of regional industries as well as ways to bolster regional competitive advantages.

Implementation of the freight drill-down priority areas falls to a variety of public, private, and nonprofit entities. CMAP will work closely with partners who have actionable next steps as well as engage more regional stakeholders to be involved in freight. As the implementation action areas provide a framework to capitalize on the recent momentum around freight, organizing the region around these areas is the main task moving forward to help position the cluster for sustained growth.



# APPENDIX: Freight Cluster Composition

Cluster Component (Listed in order of firm size.)	NAICS Code	Description	2011 Jobs	2001 Jobs	Total Change	% Change
Customer	425120	Wholesale Trade Agents and Brokers	34,145	16,324	17,821	109%
Core	484121	General Freight Trucking, Long-Distance, Truckload	26,084	19,808	6,276	32%
Direct Supply/ Input	493110	General Warehousing and Storage	25,115	26,327	(1,212)	(5%)
Core	484110	General Freight Trucking, Local	18,709	18,887	(178)	(1%)
Customer	488510	Freight Transportation Arrangement	15,387	13,489	1,898	14%
Customer	492110	Couriers and Express Delivery Services	12,983	15,235	(2,252)	(15%)
Core	482110	Rail transportation	10,164	11,470	(1,306)	(11%)
Core	484122	General Freight Trucking, Long-Distance, Less Than Truckload	8,074	6,765	1,309	19%
Direct Supply	322211	Corrugated and Solid Fiber Box Manufacturing	6,290	7,727	(1,437)	(19%)
Customer	454113	Mail-Order Houses	5,550	7,409	(1,859)	(25%)
Indirect Support	237310	Highway, Street, and Bridge Construction	5,216	6,145	(929)	(15%)
Direct Supply/ Input	541614	Process, Physical Distribution, and Logistics Consulting Services	4,440	3,313	1,127	34%
Core	484220	Specialized Freight (except Used Goods) Trucking, Local	3,961	5,169	(1,208)	(23%)
Indirect Support	561910	Packaging and Labeling Services	3,350	4,009	(659)	(16%)
Core	484210	Used Household and Office Goods Moving	2,820	3,399	(579)	(17%)
Direct Supply/ Input	493190	Other Warehousing and Storage	2,777	1,038	1,739	168%
Direct Supply/ Input	322212	Folding Paperboard Box Manufacturing	2,549	3,830	(1,281)	(33%)
Indirect Support	488190	Other Support Activities for Air Transportation	1,920	1,261	659	52%
Indirect Support	488119	Other Airport Operations	1,853	1,399	454	32%
Indirect Support	488210	Support Activities for Rail Transportation	1,827	1,401	426	30%
Core	484230	Specialized Freight (except Used Goods) Trucking, Long-Distance	1,481	1,968	(487)	(25%)
Indirect Support	488490	Other Support Activities for Road Transportation	1,269	1,351	(82)	(6%)
Direct Supply/ Input	321920	Wood Container and Pallet Manufacturing	1,229	1,511	(282)	(19%)
Direct Supply/ Input	493120	Refrigerated Warehousing and Storage	821	1,301	(480)	(37%)
Direct Supply/ Input	488991	Packing and Crating	819	1,108	(289)	(26%)
Direct Supply/ Input	532411	Commercial Air, Rail, and Water Transportation Equipment Rental and Leasing	812	726	86	12%
Direct Supply/ Input	333924	Industrial Truck, Tractor, Trailer, and Stacker Machinery Manufacturing	763	1,209	(446)	(37%)
Core	483111	Deep Sea Freight Transportation	684	620	64	10%
Core	481112	Scheduled Freight Air Transportation	524	3,160	(2,636)	(83%)
Direct Supply/ Input	322214	Fiber Can, Tube, Drum, and Similar Products Manufacturing	408	671	(263)	(39%)
Core	481212	Nonscheduled Chartered Freight Air Transportation	384	204	180	88%
Direct Supply/ Input	493130	Farm Product Warehousing and Storage	365	124	241	194%
Direct Supply/ Input	326212	Tire Retreading	311	172	139	81%
Direct Supply/ Input	322213	Setup Paperboard Box Manufacturing	298	355	(57)	(16%)
Core	483211	Inland Water Freight Transportation	246	491	(245)	(50%)
Indirect Support	488330	Navigational Services to Shipping	194	250	(56)	(22%)
Indirect Support	488390	Other Support Activities for Water Transportation	158	226	(68)	(30%)
Core	483113	Coastal and Great Lakes Freight Transportation	148	179	(31)	(17%)
Indirect Support	488320	Marine Cargo Handling	139	179	(40)	(22%)
Indirect Support	488310	Port and Harbor Operations	84	44	40	91%
Indirect Support	488111	Air Traffic Control <sup>204</sup>	0	71	(71)	(100%)
		<b>Total</b>	<b>204,350</b>	<b>190,326</b>	<b>14,024</b>	<b>7%</b>

<sup>204</sup> The air traffic control firms were reclassified between 2001 and 2011.





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