

# The Future is Front and Center: The Impacts of Economic Change on Freight Transportation

December 2, 2011

A Summary Report

The U.S. transportation system stands at the center of virtually all economic activity in the country today. Effects of a lengthy global recession are radically and rapidly reshaping transportation priorities and needs. Now more than ever, freight transportation, logistics, and manufacturing industries must critically analyze the driving forces behind these high-impact changes, future freight patterns, and critical dependencies to shape appropriate freight policy and system investment priorities. During the 15th Annual Freight and Logistics Symposium, representatives from the business, academic, and public sectors gathered to discuss trends and the effects of these economic changes on freight and logistics providers.

Gina Baas (CTS assistant director) served as overall moderator. Laurie McGinnis (CTS director), Brad Emch (Council of Supply Chain Management Professionals president), and Ron Have (Minnesota Freight Advisory Committee president) provided the opening remarks.

## Presenters:

### Future Freight Flows

Christopher Caplice, Executive Director, Center for Transportation and Logistics, Massachusetts Institute of Technology (MIT)

### Implications to Minnesota: Panel Discussion

Wil Kratz, Vice President of Operations, Logistics Planning Service

Judy Mitchell, Director, Passenger Rail Strategic Initiatives, Canadian Pacific Railway

Todd Feltes, Transportation Manager, Malt-O-Meal

Chip Smith, COO, Bay and Bay Transportation

### Intersection of Transportation and Economic Development

Steve Elmer, Planning Analyst, Metropolitan Council

Dan Dorman, Executive Director, Albert Lea Economic Development Agency

Vann Cunningham, Assistant Vice President of Economic Development, Burlington Northern Santa Fe

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# Future Freight Flows

## Presentation

Christopher Caplice, Executive Director, Center for Transportation and Logistics, MIT



Christopher Caplice

**“We want to build the skill of preparing, not predicting...instead of forecasting each specific event, scenario planning prepares for effects.”**

—Christopher Caplice

The future rarely moves in incremental, expected ways. Forecasting is especially difficult when planning for freight transportation infrastructure projects that may take decades from start to finish. In his keynote presentation, Christopher Caplice discussed his work on the Future Freight Flows (FFF) project. This initiative was launched as part of the National Cooperative Highway Research Program (NCHRP) Project 20-83(01) and is primarily concerned with improving the way freight infrastructure investments are made.

While there are many well-established forecasting methods for short-term planning, Caplice said, these are not adequate for long-term planning as required by many transportation-related projects. Scenario planning, however, is one technique that overcomes the challenges associated with long-term planning of complex projects involving many stakeholders. Rather than trying to predict the state of the world 30 or more years into the future, scenario planning allows planners to prepare for a range of plausible, alternative futures and compare strategies and investments across a variety of possible outcomes.

The scenarios themselves do not have to be accurate, Caplice explained, since trying to predict actual events is not the goal. “We want to build the skill of preparing, not predicting. Many different events could have the same effect, so instead of forecasting each specific event, scenario planning prepares for effects,” he said. “With regard to freight flows, this means planning for impacts to sourcing patterns, flow destination, routing, flow volume, and value density.”

One of the FFF project goals was to create a set of tools and procedures that enables DOTs and other organizations to use the scenario planning technique. Over the course of a year, the research team developed four separate future scenarios for the date November 2, 2037. They used a series of focused expert

panel sessions, practitioner acid testing, and industry-wide surveys to identify the key driving forces and critical uncertainties to form the basis of each of the scenarios. The FFF team then conducted six workshops across the country, each involving a diverse set of stakeholders from the private and public sectors, to test the scenario planning process using each of the four future scenarios.

During each workshop, the large group was divided into four smaller groups representing each of the four scenarios. The participants were then immersed in their future worlds through the use of charts, fliers, and other materials including four fictional video newscasts for the 2037 date. “We want the participants to believe they really are in that world at that time,” Caplice explained. Participants were asked to consider a set of strategic options or alternatives for their assigned future world and determine what they should invest in today to be successful in 2037, then discuss the options and come up with a consensus.

Overall, the Future Freight Flows initiative is changing the way organizations think about long-term planning, Caplice said. Specifically, the scenario planning workshops have demonstrated how divergent and convergent thinking can be used within the infrastructure investment planning process. They also have enabled closer and more meaningful discussions across the various stakeholders involved in freight transportation. “We have found that who is invited to participate [in the workshops] is the most critical element,” he said. “If the group is not diverse, this derails the discussion. Group facilitation also is critical.”

Caplice noted that the scenarios can be employed for a wide variety of different planning purposes. “When thinking about the future, paying attention to effects rather than events makes better planners and forecasters no matter what industry.”

More information on this initiative is at <http://ctl.mit.edu/research/futurefreightflows>.

# Implications to Minnesota: Panel Discussion

## A Panel Discussion

Moderator: **Mark Berndt**, Vice President, Wilbur Smith Associates

Panelists: **Wil Kratz**, Vice President of Operations, Logistics Planning Service  
**Judy Mitchell**, Director, Passenger Rail Strategic Initiatives, Canadian Pacific Railway  
**Todd Feltes**, Transportation Manager, Malt-O-Meal  
**Chip Smith**, COO, Bay and Bay Transportation

The first panel discussion featured participants from various freight transportation modes who had participated in the February Future Freight Flows scenario planning workshop described on page 2. Moderator Mark Berndt framed the discussion by asking the panel members to comment on four questions.

### Question 1

*Within your industry sector, what technology changes do you see coming down the road in the next 10 to 15 years that are likely to substantially change how you do business?*

### Responses

“Everyone wants visibility to their products,” Wil Kratz began. “Whether they are shipping across town or globally, shippers want to see where their products are and know they are safe. RFID (radio-frequency identification) tracking systems can facilitate this, but they cost money. As technology evolves and costs come down, I foresee RFID, and other related technologies, providing increased product visibility to shippers.” In addition, Kratz sees evolving technology enabling shipping customers to price their freight globally. “Being able to do so in a seamless environment, be it on a dimensional pricing basis or a straight per pound charge, is also something I think will continue to evolve and be provided to shippers.”

“As a food manufacturer, traceability is important,” Todd Feltes agreed. “It’s one thing if you think there’s a contaminant in a trailer load of shirts or laptops. But what if that [contaminant] is in your food?” Shippers may not care to trace every product, he said, “but we want that ability.” He also pointed out that EDI (electronic data interchange) technology is not used 100 percent. “We still call to book a load, we talk to people face to face...we are still in a people business,” he said. But the world of supply chains is

**“Think about automated warehousing. What was once done by a person is now done by computerized equipment.”**

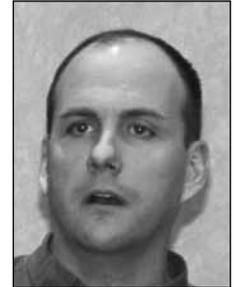
—Todd Feltes

changing: “Think about automated warehousing. What was once done by a person is now done by computerized equipment. This costs billions of dollars of investments over time. How we automate activities will keep evolving, as will consumer requirements.”

Next, Judy Mitchell discussed some of the latest technology Canadian Pacific (CP) Railroad is deploying. “In addition to positive train control, which is one high-tech initiative under way in the railroad industry, we are emphasizing our operating information technology systems and real-time information to enable us to manage our assets better, manage our service, and better interface with our customers,” she said. CP is also using new technology for equipment health monitoring and automated track inspection.

“Information flow is the driving force in every aspect of transportation,” Chip Smith added. “For us, the material factors are not just driver dynamics and driver metrics, but real-time availability of where a load is.” In 30 or 40 years, he added, “I don’t think there will be a signed bill of lading any more; there will be electronic acknowledgements and triggers that will speed up the billing process; it will be a real-time information exchange...not just in trucking, but across all modes.”

As far as other technology changes, Smith pointed to equipment interchangeability. “Today some of the largest motor carriers run fluidly over the rail networks...in a perfect world, we’d have standard equipment sizes and types that are interchangeable, and it would just be a matter of who owns it and how does it get onto the major rail or highway arteries.”



Todd Feltes



Chip Smith

### Question 2

*In 2003, it was announced that the Panama Canal would lengthen its locks. With the reopening not far off, how do you see this affecting your business and markets in the Midwest? Are there any other events in the next few years that will have equal or greater impacts on trade patterns and transportation networks in the Midwest?*

“There is no regulation that will change profit motive. Private industry goes where there is a profit-making opportunity, where [it] can operate with efficiency and effectiveness.”

—Chip Smith

### Responses

What previously flowed from West Coast to East Coast may take a different route, Kratz said. “But from what I understand, cargo container ship companies are less willing to allow their containers to come inland; they want the containers to be unloaded at the ports to maintain visibility. I don’t see this trend changing, even if there is a transition to a more easterly route for container ships,” he said. “What I do see with regard to the Midwest

has more to do with the proposed hours-of-service changes and proposed capacity limits for vehicles. Those issues will significantly impact the Midwest as far as the flow and distribution of products goes, being that we are more landlocked.”

Mitchell said CP, which operates in more northerly markets, doesn’t expect any material direct impact on its business from the canal expansion. “We do think that the concern about climate change will start to affect some decisions on mode and other distribution aspects and may trigger big shifts in distribution patterns,” she added.

“Malt-O-Meal is mostly a domestic, North American supplier, so directly it may not seem that the Panama Canal affects us much,” Feltes said. The reopening of the canal, however, could make Minnesota-to-Georgia a more desirable shipping lane.

According to Smith, the Panama Canal expansion will create economic reasons for shipping to go through the Gulf ports and the southeastern United States. “Already if you go into North Carolina, there are tons of distribution points for imports coming in

for all the major Big Box companies,” he explained. “This has created an acute equipment shortage...the more imports that come through the Southeast, the more that will drain domestic [rail and truck] equipment supplies.” On the other hand, Smith continued, “there will be all kinds of other economic benefits to shippers, probably within a year or two of the canal opening.”

### Question 3

*What changes have you seen in how the private sector and government work together on freight-related issues, and how do you see the public and private sectors working together in a perfect world? If there was one change you could make in how the public and private sectors approach freight-related infrastructure issues, what would it be?*

### Responses

“I’ve seen a lot of change in the way we work as an industry with government,” Mitchell reported. “Today, we work more collaboratively to plan infrastructure investments such as intermodal terminals and road/rail grade separations.” One recent example involves CP and the Ramsey County Regional Railroad Authority (RCRRA). “We’re looking at a scenario that suggests there will be significantly more freight and passenger trains moving through the east metro [St. Paul] in the coming years, and today we don’t have the infrastructure necessary to fluidly handle all that business. The RCRRA and CP are working together to plan for this need,” she said.

Next, Feltes referred to the recent announcement by the U.S. Department of Transportation that commercial motor vehicle drivers can no longer use handheld cell phones while on the job. “We hear a lot of trucking companies saying this is a good thing safety-wise,” he explained. “But 10 or 15 years ago these companies would have said, ‘Here’s one more thing the government is doing to us.’” One major obstacle to public/private partnerships, he added, is that government often moves too slowly.

Kratz described a current public/private initiative in which the state of Indiana has

leased its major east-west toll road to a Spanish and Australian firm for \$3.8 billion. This initial revenue has funded more than 200 transportation projects. The firm, however, will recover its investment in only 15 years. “In the last 60 years of the lease, the [Spanish/Australian firm] will be making pure profit on that highway,” he said. “When the lease was introduced in 2006, it cost a car \$4.65 to drive across the state and a tractor trailer about \$18. Today, the rates are \$9 and \$36.20, respectively. So while it was a short-term gain for the state, it poses a long-term potential drawback.”

This sort of situation can arise when government makes decisions in a vacuum without input from industry, Smith said. Public policy plays just as big a part as the infrastructure itself does in determining the private sector’s competitive options, he said, pointing to current issues around labor laws, equipment size, and weight regulations. “There is no regulation that will change profit motive,” he explained. “Private industry goes where there is a profit-making opportunity, where [it] can operate with efficiency and effectiveness.”

**Question 4**

*How does fuel price volatility affect your business, and as we come out of the recession, what is capacity looking like?*

**Responses**

“The biggest issue I see with regard to capacity is driver recruitment,” Kratz said. “The October 17 issue of the *Journal of Commerce* reported that a trucking company can expect to pay up to \$5,000 to recruit one driver.” New regulations have narrowed the pool of available drivers, and other industries, like the booming oil business in western North Dakota, are attracting drivers, he said.

Smith agreed, adding, “There aren’t enough new, younger people entering the field. They don’t want a lifestyle that involves being away from home for two weeks at a time. We’re not changing the

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—Wil Kratz

company uses various recruitment methods including social networking avenues like Twitter and Facebook. “We’ve even gone to banging on cab doors at truck stops,” he said.

Mitchell reported that throughout the recession, the freight railroad industry has continued making investments. “In 2011, CP invested about a billion dollars in capital improvements. We’re hiring people, we’re adding locomotives, we’re preparing, not predicting, for the time when business comes back.” She noted that railroads haul a ton of freight 457 miles on one gallon of fuel, and each intermodal train replaces approximately 280 semi-trailers. “So as fuel prices and road congestion increase,” she predicted, “we’ll see the fuel efficiency of railroads and [their] lower carbon footprint attracting more and more business to rail.”

“I think capacity will be there,” Feltes added. “It just may not be there the day we want it. ... Carriers are trying to be very smart about their business; they are asking ‘Who are the shippers and receivers we want to do business with and where are those lanes?’”

“I think motor carriers will be reluctant to increase fleet supply,” Smith countered. “Instead, capacity will be found by smarter matching of capacity with opportunity.” More elasticity is needed on both the carrier side and shipper side, he said, and longer term, carriers need a great 3PL (third-party logistics provider) backup. “I think a lot of volume will shift to intermodal, high-density long-haul lanes,” he said. “Even on some of the short-haul lanes, intermodal is a viable solution for carriers who don’t want to send their trucks out with no freight to haul back.”

attractiveness of this field, and that has a negative effect on capacity.” His



Wil Kratz



Judy Mitchell

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—Judy Mitchell

# Intersection of Transportation and Economic Development

## A Panel Discussion

Moderator: **Matt Shands**, Transportation Economic Development Coordinator, Office of Policy, Analysis, Research, and Innovation, Minnesota Department of Transportation

Panelists: **Steve Elmer**, Planning Analyst, Metropolitan Council  
**Dan Dorman**, Executive Director, Albert Lea Economic Development Agency  
**Vann Cunningham**, Assistant Vice President of Economic Development, Burlington Northern Santa Fe



Steve Elmer

**“A strong freight transportation system distinguishes our metropolitan area as an economically vital region that can continue to offer family-wage jobs and a high quality of life.”**

—Steve Elmer

First up in the second panel was Steve Elmer, who described the Minneapolis-St. Paul metropolitan freight system and its relationship to the regional economy. Specifically, Elmer described the work of the Metropolitan Area Freight Study, a joint effort between the Metropolitan Council and MnDOT that was started as a fact-finding mission to discover existing and future freight issues affecting the metropolitan system. “Our goal is to better understand metro freight movements and how best to reflect that knowledge in future plans and programmed improvements,” he said. “One of the main reasons we’re conducting this study now is that the metro region is...at the center of many freight issues that have statewide significance.”

The freight transportation system has helped develop the Twin Cities as the vibrant region it is today, Elmer said. “Minneapolis/St. Paul developed on the river to take advantage of transportation for heavy goods like timber and other agricultural products. Today we have three river ports operating 32 active port terminals that move about 15 million tons of freight per day—that is, 6 percent by weight of all the freight in the region but less than 1 percent of regional freight by value.”

The area’s expanded rail system also helped the metro region develop its industrial and commercial base, Elmer continued. Many businesses have grown into international corporations as a result of this good access. “Overall, our metro railroads moved about 23 million tons of bulk freight in 2009, representing about 8 percent of the region’s total freight tonnage.”

About two-thirds of the region’s freight by weight and value is carried by truck, Elmer said. The Twin Cities metropolitan highway system is a highly structured and redundant freeway grid compared to other regions. For

Greater Minnesota shippers, however, the Twin Cities can be a bottleneck on both the rail and highway systems, he said.

The metro-area air freight system, which is served primarily through the MSP airport, handles about 200,000 tons of freight annually, or less than 1 percent of the region’s total freight by tonnage. “Even though this is a small fraction of the total freight,” Elmer explained, “it is still a critical component for a vital segment of our economy—for example, the biotech and high-tech industries that ship high-value, time-critical components daily.”

The freight transportation system offers significant benefits to the metro economy by way of jobs, Elmer pointed out. In 2009, about 20 percent of all jobs in the region—about 300,000—were related to manufacturing, transportation, and warehousing industries with direct freight ties, he said. “Overall, a strong freight transportation system distinguishes our metropolitan area as an economically vital region that can continue to offer family-wage jobs and a high quality of life.”

One metro trend affecting the transportation system is the gentrification of industrial land that limits opportunities to either collocate or expand manufacturing and warehousing in the metro area. “In the Minneapolis Warehouse District and Lowertown in St. Paul, warehousing uses have been converted to residential lofts and other mixed uses over the last 20 years,” Elmer explained.

In addition, central manufacturing sites in the Twin Cities are changing in their makeup and intensity. He cited two cases, both in St. Paul. One, the Ford truck plant site, has 135 acres for potential redevelopment that may or may not retain manufacturing and freight rail access to the site. The other case is the 3M main campus redevelopment being led by the St. Paul Port Authority. “Overall, these changes to lighter industrial manufacturing will result in changes in demand to

the metro transportation system, perhaps being less rail dependent than when the large manufacturing plants like 3M and Ford were fully operational.”

Although the freight study is ongoing, Elmer noted that the work has already provided some critical insights, such as a lack of sufficient truck data. Next steps involve prioritizing a long list of freight issues for both the short and long term and developing a joint MnDOT/Met Council work plan to address those issues. “We also want to reach out to city and county planners and engineers as well as to private-sector shippers and carriers to get some feedback, specifically looking at local issues in cities, what might be affecting freight, and potential data collection efforts as well as what potential solutions would work where,” he concluded.

Next, Dan Dorman discussed what communities need to do to succeed in economic development. “The first thing [communities] need to understand is transportation’s role. It’s one of the most important things companies look at when determining where to locate a plant or transportation hub,” he explained. “Specifically, a company wants to know if a particular location will drive costs down, enable the company to be more efficient, and provide the company access to its markets... They want to know if it makes sense to be there.”

These communities also need to develop long-term economic development strategies that recognize their inherent weaknesses and strengths, Dorman said. “These decisions don’t happen overnight—it’s a process that needs to be considered now.”

Dorman listed other key decision points companies may consider when choosing a location, including the availability of qualified, properly trained people; land-use policies and zoning regulations; and the total long-term operating cost of setting up shop. Additionally, the tax environment—particularly property taxes—is an important consideration. “Historically, as property tax values increased, they tended to drive some businesses out of a particular corridor,” he said.

Another consideration, though not always important in the first round of decision mak-

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—Dan Dorman



Dan Dorman

ing, is the availability of public assistance in the form of low-interest loans and financing. “An incentive package is certainly important in the final selection,” Dorman said. “But it doesn’t help a community make the short list. Getting considered initially has more to do with a community’s infrastructure, labor force, and access to markets. If a particular company requires that a location has rail access, and a community is pitching a site without rail access, you can put all the incentives on the table you want—it won’t offset the fact that a critical component is not available. If a company can’t build an economic model that will make them successful, drive their costs down, make them more efficient, it won’t locate there.”

There’s also an important education component that goes along with this, Dorman added. “If elected officials don’t talk to the citizens and educate them on their community’s strengths as well as its weaknesses, the citizens won’t understand why their city could not attract a particular company... The more everyone is on the same page, from the citizens to the companies, the more successful the community will be.”

The final speaker in this session, Vann Cunningham, said the Twin Cities is an important hub for BNSF. The company operates in 28 states, serves two Canadian provinces as well as Mexico, and employs 40,000 people system-wide—1,800 of them in Minnesota. It primarily hauls goods from four commodity groups—consumer products, industrial products, coal, and agricultural products—via three major corridors: the TransCon from Long Beach to Chicago, the Great Northern from the Pacific Northwest to Chicago, and the Mid Continental (MidCon) from Lake Superior to Houston, Texas. The Great Northern and the MidCon corridors cross in Minnesota. “Our



Vann Cunningham

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focus for future planning is to invest in what makes these corridors faster, more reliable, and able to carry larger amounts of goods,” he said.

“The Twin Cities is a major gateway for moving the increasing amounts of Bakken Shale crude oil coming out of North Dakota as well as moving taconite, paper, and corn,” Cunningham said. “We are having a massive buildout. We completed 150 rail projects through the end of October 2011...In the past, 50 or 60 projects a year was typical. This tremendous growth is very quickly creating demand for the Twin Cities.”

The 2012 Bakken Crude Oil Forecast, predicting a threefold increase in production from 2011 to 2012, “is a huge game changer,” he said. “We have already proven that railroads can compete with pipelines [to move the oil]... because we have unit train facilities, the origins and destinations are highly efficient, and we can move this product cost-effectively. We also have a much lower upfront capital cost because we are adapting existing infrastructure and technologies originally

developed for the agricultural industry.”

Taconite is another important commodity due to the growing worldwide steel demand that exists even within the global recession, Cunningham explained. “Minnesota’s six taconite mines fulfill 80 percent of U.S. iron ore needs. We believe in [the taconite] business...We are buying 360 taconite cars this quarter and maybe 240 more next year.”

As income increases throughout Asia—and in China in particular—the amount of protein from animal sources consumed increases, Cunningham continued. “This means a whole lot of corn and soybeans are being grown [and shipped]; demand for U.S. corn, for example, is expected to triple next year.”

In closing, Cunningham said BNSF is excited about the opportunities in this region. “We want to grow our business here because we believe [Minnesota is] underdeveloped and underserved.”

CENTER FOR TRANSPORTATION STUDIES, 200 Transportation and Safety Building  
511 Washington Avenue S.E., Minneapolis, MN 55455-0375  
Phone: 612-626-1077 E-mail: cts@umn.edu Web: www.cts.umn.edu

WRITER: Nancy Strege PHOTOGRAPHER: Matt Miranda EDITOR: Pamela Snopl DESIGNER: Karen Melton

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