

## **Transportation infrastructure and competitiveness (*revision July 1, 2009*)**

Report prepared for the Woodrow Wilson Center Mexico Institute and  
El Colegio de la Frontera Norte research project,  
“The U.S.-Mexico Border: A Discussion on Sub-National Policy Options”

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### **Overview**

The North American economy can best be visualized in the early 21<sup>st</sup> century as a deeply integrated continental system of supply chains structured by networks linking production centers and distribution hubs across the continent. These supply chains depend on an efficient and secure physical infrastructure of rails, roads and bridges, pipelines and wires, ports and border crossings and on a coherent and consistent system of regulations that affect individuals, machines, firms and goods.

This degree of collaboration and complementarity between countries is unprecedented. It suggests that we are not so much trade partners as partners in production. Envisioning North America as a trade bloc is not a productive way of imaging the substance of the North American economic system. What flows across our borders are not mainly finished goods. We collaborate in complex, cross-border production systems. For example, a quarter of the more than a billion and a quarter dollars of goods cross the US-Canada-Mexico borders daily is automotive. But we don't sell cars to each other. We build them together.

During the 1980s and '90s – because of excess capacity, technological advances (such as double stacking containers) and government policies of privatization and deregulation – the supply of freight transportation matched the demand.

### **The Particular Problem of Mexico**

The North American system remained incomplete, however. Partly due to Mexico's failure to develop adequate communications, transportation and education infrastructure, and partly to the new allure of Asia, many companies did not develop true “North American” strategies. Hopes that Mexico would become the major supplier for U.S. and Canadian firms—as in the auto industry—were disappointed. Moreover, Mexican industrial growth continued to cluster in the border regions, aggravating internal migration problems.

A report on transportation and logistics in Mexico concluded that “Among Mexico's overarching transportation related challenges are competitiveness, deregulation, and decentralization. If Mexican enterprises are to compete effectively and profit from open trade, particularly within NAFTA, they will increasingly require higher quality infrastructure services, particularly in

ports, highways and railroads.”<sup>1</sup> The report cites research by AT Kearney México which identified critical factors contributing to high logistics costs in Mexico:

1. High cost of inputs such as diesel, equipment and vehicle maintenance
2. Poor quality of the country’s infrastructure
3. Theft – increased insurance premiums and escort costs
4. Low penetration of technology by carriers
5. General lack of professionalism by the majority of carriers
6. Excessive bureaucracy
7. Corruption
8. Excessive customs paperwork and procedures

## **A Perfect Storm**

At the close of the 20th century, the balance between demand for transport capacity and supply had deteriorated sharply. North America’s freight transportation infrastructure faced a “perfect storm” of capacity, congestion and deterioration due to the end of excess capacity, the emergence of global-manufacturing value chains with vastly greater demand for freight-transportation capacity because of increasing imports from Asia, the continued failure to harmonize regulations and the accumulated effects of delayed maintenance

Many experts now spoke of an emerging crisis in North America’s freight-transportation system. A review of recent research on North America’s freight transport system conducted by the North American Transportation Competitiveness Research Council concluded: “The JIT-lean inventory advanced manufacturing system developed since the 1970s that enables North America to compete successfully with Asian and European manufacturers is now reaching its capacity limits. The supporting transportation infrastructure is now inadequate to handle the projected volume growth of North American supply chains’ freight flows.”<sup>2</sup> “The result, observes Professor Mary Brooks, one of Canada’s best known specialists on freight transportation, “has been to boost buffer stocks, and force just-in-time supply chain managers to re-examine their sourcing options; it is of concern to Canada that many U.S. companies will source domestically rather than within NAFTA due to border uncertainty.”

Even before 9/11, the physical infrastructure at critical Canadian and Mexican border crossings was nearly overwhelmed. Border infrastructure, even before 9/11, had fallen behind the increase in volume of goods crossing North American borders: "While trade has nearly tripled across both borders since the Canadian-U.S. Free Trade Agreement (FTA) and NAFTA were implemented, border customs facilities and crossing infrastructure have not kept pace with this increased demand. Even if 9/11 had not occurred, trade would be choked at the border."<sup>3</sup>

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<sup>1</sup> David W. Eaton, Nathan Smith, Luciano Escobedo and Roberto Cavazos, “Transportation and Logistics in Mexico: Issues and recommendations for a more competitive transportation sector” Report prepared for the American Chamber Mexico, Monterrey Division, International Trade Committee (January 2004)

<sup>2</sup> Guy Stanley, Review of Recent Reports on North American Transportation Infrastructure, North American Transportation Competitiveness Research Council, Working Paper 3 (September 2007) <http://natrc.org>

<sup>3</sup> Report of an Independent Task Force (May 2005) *Building a North American Community*, supported by the Council on Foreign Relations with the Canadian Council of Chief Executives and the Consejo Mexicano de Asuntos Internacionales, p. 9

As an example, in 2007, the California Department of Transportation estimated the U.S.-Mexican border transportation infrastructure deficit at between \$860 million and \$1.07 billion. Delays at the ports of entry have increased at some crossings even after expediting pre-cleared and pre-screened crossers.

### **Impact on the environment: GHG emissions**

Environmental concerns along the US-Mexico border since the signing of NAFTA focused mainly on water pollution, industrial waste, chemical degradation and so on. But the critical issue now is climate change. The border – border crossings and trade corridors in particular – is a major source of green house gas (GHG) emissions. Increasing pressure to mitigate GHG emissions at border crossings and trade corridors will be a major shaping factor on border policy and could become a significant force in “thinning” the border.

Trucks accounted for much the largest share of the greatly expanded flow of goods moving across North America’s internal borders in the 1980s and ‘90s. Rail traffic increased substantially as well, but the modal balance between rail and truck – 30% by rail and 70% by truck – did not change. The number of commercial trucks on US highways (most powered by diesel engines) increased by nearly 40% between 1980 and 2002.<sup>4</sup> (This is US data. The Mexican modal balance in freight transport tips even more toward trucks.)

The growth in truck transport has led to a less environmentally-friendly environment.<sup>5</sup> Road transport is a heavy user of energy and a heavy generator of emissions of nitrogen oxide (NOx) and particulate matters (PM), increasing environmental pressures already associated with combustion. Most forms of transport have a large carbon footprint as well.<sup>6</sup>

Because NAFTA truck traffic has been concentrated at border regions and along trade corridors, increasing pressure has been put on infrastructure capacity particularly at border crossings and on the environment. This has transformed some communities into “high impact locales—places where environmental pressures (have) concentrated to overwhelm the available supports”<sup>7</sup>

### **The need for the big picture**

Because of the significant congestion, bottlenecks, and infrastructure deficits throughout North America which creates enormous inefficiency in the U.S. economy and the broader North

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<sup>4</sup> AASHTO, “The Future of the Interstate Highway System”  
[www.transportation1.org/tif1report/execsummary\\_01.html](http://www.transportation1.org/tif1report/execsummary_01.html)

<sup>5</sup> Sierra Club and Shelia Holbrook-White, Texas Citizen Fund, “NAFTA Transportation Corridors: Approaches to Assessing Environmental Impacts and Alternatives,” Presented at the North American Symposium on Understanding the Linkages between Trade and Environment, Washington, DC, October 11, 2000

<sup>6</sup> See Federal Highway Administration, *Assessing the Effects of Freight Movement on Air Quality at the National and Regional Level*, Final Report (April 2005). See also Commission for Environmental Cooperation Final Analytic Framework for Assessing the Environmental Effects of NAFTA, Part II: User’s Guide to the Final Analytic Framework, (June 1999) pp.68, 77

<sup>7</sup> Commission for Environmental Cooperation (b) June 1999. *Final Analytic Framework for Assessing the Environmental Effects of NAFTA, Part II: User’s Guide to the Final Analytic Framework*, p. 77

American economy, there needs to be a significant movement towards an integrated, multimodal transportation plan and a North American infrastructure plan.

In a recent NACTS transportation issues paper, author David Randolph advises that “the first step is long-term planning at the trilateral level” followed by a “multi-year authorization bill for border stations” and, in situations where it makes sense and advances milestones, “public-private partnerships where some costs can be borne by private entities.”<sup>8</sup>

### **...but we are playing “catch-up”**

Potential organizers for this enhanced system face an uphill battle, however. The infrastructure deficit in the United States is \$1.6 trillion, according to the American Society of Civil Engineers. And NACTS’ meta-estimate of North America’s infrastructure need is alarming, but illuminating. Indeed, NACTS commissioned a number of needs studies recently to coincide with the new administration in Mexico, cyclic deadlines in Canada and the United States and new inquiries by governmental and non-governmental groups. The somewhat staggering results of this North American Transportation Infrastructure Needs Assessment (TINA) for the U.S.-Canadian and U.S.-Mexican borders are that North America needs to invest \$2.6 trillion over 10 years to see an enhanced North American transportation system through to fruition.

Investment in transborder roads and transportation systems is vastly insufficient, which arguably costs all three nations even more annually.

### **Very large potential return on investment**

We must emphasize that the large numbers above are tempered by the significant return on the investment. Infrastructure investment creates jobs; transportation experts generally agree that approximately 35,000 jobs are created per billion dollars invested in infrastructure. As former Arizona Governor Janet Napolitano mentioned to then President-elect Obama in a December 11 letter, “...Immediately creating quality, good-paying jobs while laying the foundation for long-term economic growth is one of the best investments the Federal government can make in this troubled economy.”<sup>9</sup>

President Eisenhower’s Federal Highway Aid Act of 1956, which created the highway system of the United States, provides a tangible example of the type of return on investment that can be achieved through the creation of such a highway system. Partly because of the Highway Aid Act, the U.S. economy is the most productive and envied in the world. In recent years, however, insufficient investment in the U.S. highway system has cost the country dearly. According to the Texas Transportation Institute, “Congestion on roads costs \$78 billion annually in the form of 4.2 billion lost hours and 2.9 billion gallons of wasted petrol.”<sup>10</sup>

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<sup>8</sup> David Randolph, “Preparing for the Future Mexican Land Bridge to the United States,” NACTS/NATCRC Working Paper No. 6, June 2008.

<sup>9</sup> Letter from Arizona Governor Janet Napolitano to President-elect Barack Obama, December 11, 2008.

<sup>10</sup> D.L. Schrank and T.J. Lomax, 2007 Urban Mobility Report, Texas Transportation Institute, September 2007.

According to the Department of State, NAFTA or North American transboundary commerce is estimated at \$1.7M per minute, \$2.4B per day, or \$876B per year and expected to grow. Not investing the \$2.6 trillion jeopardizes NAFTA trade and the jobs that depend on this trade. The return on the investment is significant—between 3:1 and 50:1, according to NACTS’ calculations — and would significantly stimulate demand and help to jump-start the U.S. and North American economies. Moreover, investment improves quality of life in the most basic way—it saves lives. According to a 2007 report by American Association of State Highway and Transportation Officials (AASHTO), “Today’s [U.S.] highway death toll of over 43,000 annually can be cut in half through a series of safety action investments.”<sup>11</sup>

## **Key Issues**

### ***Border congestion***

The border ports are gateways, but they also hinder trade, tourism, and transportation because of the necessary infrastructure and security activities. Unfortunately, prosperity for the nations’ interiors imposes a congestion cost at their borders. Inspections, clearance activities, and processing at land ports of entry regularize flows but are inadequately designed and staffed, creating congestion for both vehicles and people.

The tension between trade facilitation and security confounds to such a degree that the Department of Homeland Security (DHS), with its Customs and Border Protection (CBP) Administration, has become the de facto border czar for infrastructure, displacing both the Department of Transportation and the Government Services Administration that designs and builds federal public facilities.

Quantifying the cost of wait-times remains problematic; indeed, even the study of border wait-times is fraught with methodological and political difficulties. Arizona has worked with major stakeholders to upgrade its ports of entry with Mexico, though this effort has met its share of challenges. A planned \$170-million upgrade of the Nogales-Mariposa port of entry was not funded in the FY09 budget because the Department of Homeland Security chose to use those funds to help build a new headquarters for their department in Washington, D.C.

### ***Outdated cabotage laws***

Cabotage rights allow a company from one country to trade in another country. While sovereign countries have the exclusive right to regulate trade and traffic within its territory, without cabotage rights foreign airlines would not be allowed to land at our airports and foreign ships would not be able to call at our ports. One of the most important provisions of NAFTA allowed a truck from one nation to travel to and return from anywhere in other NAFTA nations to deliver freight from its country of origin. However, various interests have used concerns about security and environmental quality to delay full implementation of this provision, except for a small demonstration project. Trucks often return empty to their nation of origin after delivering a load in another nation. To avoid this wasteful practice, an entire “drayage” fleet and industry has been

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<sup>11</sup> Transportation: Invest in our Future. A New Vision for the 21<sup>st</sup> Century, American Association of State Transportation and Highway Officials, July 2007

created to unload freight near the border, warehouse it if necessary, move it a few kilometers into the next country, and reload it onto a truck of that nationality which can then move the freight freely. Drayage, of course, simply substitutes one form of waste (unnecessary transshipments and delay) for another (empty backhaul from the interior to the border). Outdated cabotage regulations thus add a layer of unnecessary complexity and inefficiency to the North American freight-transportation system.

### ***National responses to the freight transport crisis***

The three North American governments have responded to the growing crisis of capacity and congestion with recent transportation-infrastructure initiatives.

Several organizations have emerged to address the crisis—for example, the Coalition for America’s Gateways and Trade Corridors, and the recent initiative by Mayor Mike Bloomberg and Governor Arnold Schwarzenegger to create Building America’s Future, a non-partisan coalition for federal infrastructure investment.

But responses suffer from several key failings:

Most initiatives are still national in scope and lack connectivity across borders. National leaders remain reluctant to acknowledge the real nature of the North American economic system—that is, three independent nations sharing what is, in many sectors, a single, deeply integrated economic space. As a result, we lack a vision of what a North American freight-transportation system could and should look like within, say, the next two decades.

Responses tend to be driven by a single variable—that is, by linear projections of volumes of goods to be moved. There is a general failure to recognize that multiple agents drive change and to respond accordingly.

The complexity of the intertwined issues of transportation, infrastructure, trade, jobs, national security, immigration, and environmental protection—all of which span across three sovereign countries that are each, in their own right, federal systems consisting of 50 U.S. states, 13 Canadian provinces, and 31 Mexican states—is a major challenge in solving these problems. Coordination among the three nations and between different levels of governance in the three nations on freight-transportation infrastructure remains minimal and little has been done to improve this situation.

### **The Beginnings of Solutions**

A broad number of potential solutions may be seen in the development of new capacity, novel regional and local alignments and initiatives, and the changes brought about by economic and environmental crises. We have outlined a few of what we consider to be the most promising of these developments below.

### ***Potential New Capacity at Punta Colonet***

Until the recent economic downturn, the Mexican government planned a new seaport planned at Punta Colonet, located 150 miles south of the Tijuana-San Diego border in Baja California. A new rail line is proposed from Punta Colonet to the United States, perhaps through Yuma. This rail line has the potential to bring an enormous amount of Asian container traffic through Arizona. A recent working paper notes the possibility of 55 daily train crossings when the port is up and running at capacity. The U.S. government has been slow to consider the policy and congestion implications of this megaport.

### ***Opportunities with the Economic Recovery Act***

The Expansion at Mariposa. On March 31, 2009 it was announced that the Nogales-Mariposa port of entry would receive \$200 million from the Recovery Act for a complete reconfiguration of the port of entry. Although Arizona ports are much smaller than major ports in California and Texas, they do have significant strategic value in the North American economic system: over 40% of all winter fruits and vegetables pass through the Nogales-Mariposa port of entry.

### ***Transportation Corridors***

#### ***CANAMEX***

The 1995 National Highway Systems Designation Act defined CANAMEX as a “High Priority” trade corridor. CANAMEX is a collaborative project of Arizona, Nevada, Idaho, Utah, and Montana “with the goals of stimulating investment and economic growth in the region and enhancing safety and efficiency within the corridor.” The Canadian province of Alberta and the Mexican state of Sonora are also partners. The Corridor Plan calls for developing a continuous four-lane roadway, and also includes communication (“smart corridor”) and commerce elements. Arizona is the lead state.

#### ***Green trade corridors***

GHG emissions from road transport can be reduced in many ways ranging from installing new engines and creating new fuels to much less expensive streamlining of truck bodies and maintaining approach tire pressures. (A 20% reduction in drag will produce a 10% gain in fuel efficiency.) Better management – ensuring full loads, for example, and improving driver training – would contribute to emission reduction.

Improving transportation infrastructure will be in itself a major contributor to reducing GHG emissions. Congestion – at border crossings and at choke points along trade corridors – contributes heavily to GHG emissions and improving traffic flow (for example, by pre-clearing more trucks before they cross the border) would be a major step in reducing emissions.

NACTS proposes moving the U.S.-Mexican and U.S.-Canadian borders (and their processing costs) away from the (actual) borders to the factories and farms from which trade goods originate. This would primarily be accomplished through three components: pre-certified carriers

and crew; pre-cleared cargo; and continuing to push forward with environmentally efficient truck engines, fuels and routes. These three components can be combined to create dedicated Green<sup>3</sup> (Green Cubed) lanes at the U.S.-Mexico and U.S.-Canada ports of entry. North American governments can provide incentives to trucking companies and private vehicles to modernize and retrofit their fleets, fuels, and routes.

### ***Experimental modeling for border truck appointment system***

Recent research by NACTS visiting Fulbright professor Michael Haughton, based on a waiting line model of the Detroit-Windsor border truck crossing, highlights the significant efficiency benefits of a truck appointment system. The experimental model confirms that such a system can provide efficiency benefits for both truckers and relevant authorities involved in processing trucks bringing freight to the United States (e.g., CBP). The experimental modeling study found the following benefits:

- Less uncertainty about the wait time (which translates to more reliable planning of freight delivery activities that come after crossing the border)
- Less truck congestion at border crossings (this can lead to improved security since there is less temptation to rush through inspection procedures to clear the congestion, and can also reduce environmental impacts caused by idling trucks)
- Fewer resources (e.g., primary customs booths) required to process trucks

### ***Regional and local actors***

State and local governments are often actively planning for infrastructure improvements. Corridors and border crossing communities are by definition the most congested parts of the transportation system and thus are the most likely source of coalition partners. In North America's decentralized political systems, trade corridor and border community leaders must be engaged as key players in any major infrastructure-environmental effort. These are the people who can best see the impact of delay, congestion and environmental degradation in urban centers on North America's borders and on the corridors and, as well, the people who understand best the power of efficient transportation in creating jobs and building competitiveness.

Efforts to deal with GHG emissions may provide a useful example.

Policymakers at the state and local levels are increasingly searching for ways to reduce GHG emissions. States have taken a key role in climate change policy. The authors of a paper presented at the 2008 TRB conference observe that "in the evolving field of policy on climate change, state governments are some of the most important players."

The latest development in state policy on climate change is the development of state climate action plans. In the transportation policy area, stakeholder groups in different states tend to adopt similar policies. Some policies are more popular than others because of ease of implementation, high estimated reductions in GHGs, and availability of examples elsewhere. Some of the most



popular policies among the six states examined are GHG emissions standards for light-duty vehicles, smart growth measures, clean car purchase incentives for consumers, provision/promotion of transit and alternative modes, Pay as You Drive Insurance and alternative fuels/low carbon fuel standards.<sup>12</sup>

State initiatives dealing with climate change are in large measure a response to the failure of the US Congress to take a leadership role (at least up until the June 26, 2009 passage of the American Clean Energy and Security Act, co-sponsored by Rep. Henry Waxman of California and Rep. Ed Markey of Massachusetts). Writing in 2007, one expert underscores since 1990, when Congress enacted its amendments to the Clean Air Act, the legislature “has offered remarkably few formal utterances on climate change, essentially delegating the lead role in American climate policy development to the Bush Administration and to state-level officials from Sacramento to Concord.”

He continues, “American legislatures are not inherently incapable of enacting climate change legislation or providing oversight and resources to guide implementation. However, such legislatures operate in state capitals rather than Washington D.C.”<sup>13</sup> Many states have completed, or are developing, climate action plans to analyze steps they can take to reduce their contribution to climate change.

Cities are also key players. As of June 2007, more than 500 US mayors had signed the US Conference of Mayors Climate Protection Agreement, which commits to reducing emissions in their cities to seven percent below 1990 levels by 2012 by promoting alternative modes of transportation to single occupant vehicles reducing sprawl, increasing energy efficiency, increasing recycling rates, and planting trees.<sup>14</sup> Action at the state and local level has the potential to effect substantial change, by reducing emissions, and by moving forward national and even global climate policy.

Arizona and Sonora are suggesting collecting fees for frequent crossers as a mechanism to finance additional lanes and staff to speed those frequent crossers. Several states have adopted enhanced drivers’ licenses in an effort to facilitate travel for their citizens. A number of entities have proposed a variety of mechanisms that attempt to balance security and trade facilitation; the Border Legislative Conferences Secure Manufacturing Zone concept is an example.<sup>15</sup> The federal government (specifically, the Government Services Administration and the Department of Homeland Security) should continue to partner with these local initiatives and continue to actively seek community input in the design, construction and operation of the facilities.

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<sup>12</sup> Frank Gallivan, Jeffrey Ang-Olson, William Schroeer, “Innovations in State-led Action to Reduce Greenhouse Gas Emissions from Transportation: The State Climate Action Plan”, TRB 2008 Annual Meeting

<sup>13</sup> Barry Rabe, “Can Congress Govern the Climate”, Research Brief – Number 3, John Brademas Center for the study of Congress, Robert Wagner Graduate School of Public Service

<sup>14</sup> Frank Gallivan, Jeffrey Ang-Olson, William Schroeer, and Frank Mongioi, Jr., “The Role of TDM and Other Transportation Strategies in State Climate Action Plans,” ICF International TDM Review (Issue 2, 2007)

<sup>15</sup> “Adopted Recommendations for The Development of The Border 2020 – Secure, Fast, Smart Strategy,” Border Legislative Conference 14<sup>th</sup> Legislative Forum, December 7-9, 2006.

What is just beneath the surface is a growing view that to achieve change in border, corridor and environmental policy, attention cannot be directed only to the national level. These issues remain profoundly divisive among political core constituencies whose voices are loudest in Washington. Attention must be shifted away from national leadership and international agreements, toward local and regional entities where action can be more direct.

Our conclusion is that even efforts undertaken at the national level depend in the final measure on strong coalitions of business and communities leaders who are prepared to push for these policies in national, regional and local legislative arenas.

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