



# Modernizing the U.S. Freight-Transportation System for Future Economic Growth

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Each day in the United States, \$39 billion of freight—58 million tons—is moved within the country and across its borders and ports. While the majority of the freight by value and tonnage goes by truck, rail is the largest mode in terms of ton-miles.

The efficient movement of freight is critical to the U.S. economy and requires a smoothly operating system of trucks and highways, trains and rails, and ships, ports, and waterways.

For years, the improved reliability and low cost of freight transportation in the United States have kept supply-chain costs low; supported new business approaches, including distributed, on-demand manufacturing and just-in-time inventory models; and boosted economic productivity.

This efficiency is threatened. Projections indicate that insufficient capacity in the system, especially in urban areas, will begin to limit freight movement within the next 15 to 25 years and that congestion may be severe after that. Inadequate transportation capacity creates delivery delays and uncertainties that necessitate additional inventory, which, in addition to leading to greater transportation costs themselves, increase the costs of manufactured and retail goods and reduce U.S. economic productivity. As a sign of this situation, from 2003 to 2007, logistics costs—primarily transportation and inventory—grew from 8.6% to 10.1% of the U.S. gross domestic product. Delays on highways have doubled in the past 20 years, and the direct cost of bottlenecks is already more than \$8 billion per year. Tighter capacity also increases the effects of disruptions. Indeed, a 10-day disruption at the ports of Los Angeles and Long Beach would cost between \$650 million and \$1.5 billion. The capacity issue must be dealt with despite a disjointed funding system and growing mandates to consider environmental effects.

RAND Corporation Supply Chain Policy Center (SCPC) researchers examined the freight-

## Abstract

The freight-transportation system is critical to the U.S. economy. To meet future needs, the system needs to grow, become more adaptable, and ensure sustained funding. At the same time, it must boost energy efficiency and reduce greenhouse-gas emissions. Planning requires whole-system modeling, engagement of all stakeholders, understanding the interdependence between local and national costs and benefits, and resourceful use of all the tools at hand—regulatory and pricing incentives, technology, operational innovations, and selective infrastructure improvements.

transportation system and identified four overlapping issues that must be addressed for the system to continue to foster economic development.

## Increasing Effective Capacity

Increasing capacity should include a mix of operational improvements that encourage better use of existing infrastructure, along with selective infrastructure investments to address bottlenecks. For example, changed labor rules that encourage 24/7 operations and incentives that increase utilization of unused capacity in off-peak periods can lead to increased productivity and efficiency of the existing system, and to reduced costs, energy use, and emissions. Infrastructure enhancements might include specialized truck lanes to ease competition with commuter traffic or investment in a freight information technology-based “infostructure” to facilitate movement of freight between modes.

## Reducing Vulnerability to Disruption

To make the freight-transportation system more flexible, responsible agencies can conduct broad,

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system-level modeling to determine key vulnerabilities and examine possible responses to disruptions from natural or human causes. Incentives and infrastructure that encourage shippers to use alternative ports, instead of relying on just the largest, should reduce the vulnerabilities, as well as mitigate congestion and expand the capacity of the system.

### Achieving Growth and Green Objectives

Projects that increase the system's overall efficiency and eliminate unnecessary trips or steer freight around congested routes reduce total emissions. Such solutions have a positive environmental impact and also decrease costs or allow for more capacity and long-term growth without additional harmful effects. Other measures that mitigate environmental impacts include cleaner fuels, improved engines, and more-efficient driving, as well as using various transportation modes to haul freight. Encouraging a shift away from the use of trucks by improving intermodal transfer times and rail and barge reliability can increase capacity and reduce energy use and other environmental impacts.

### Ensuring Sustained Funding

Funding for freight-transportation projects comes from many sources—federal, state, local, and private. Often, the costs are concentrated in the localities where the projects reside, but the benefits accrue to an entire region or even the U.S. economy. This disconnect can make it difficult to set priorities and generate local support for planning and new construction. The United States needs to do a better job of rationalizing the funding of freight-system improvements. Stakeholders need to establish priorities in the context of a broader system model that considers how the users of the system will adapt and what

kinds of enhancements provide the greatest overall economic benefit and promote flexible and efficient use of the existing and planned infrastructure. Gaining broad support will be easier if improvements have direct local and regional benefits, such as reduced traffic congestion and environmental impacts. Finally, stakeholders should recognize that the private sector is an important source of ideas for increasing productivity of the system, and public-private partnerships should be considered an important part of a solution.

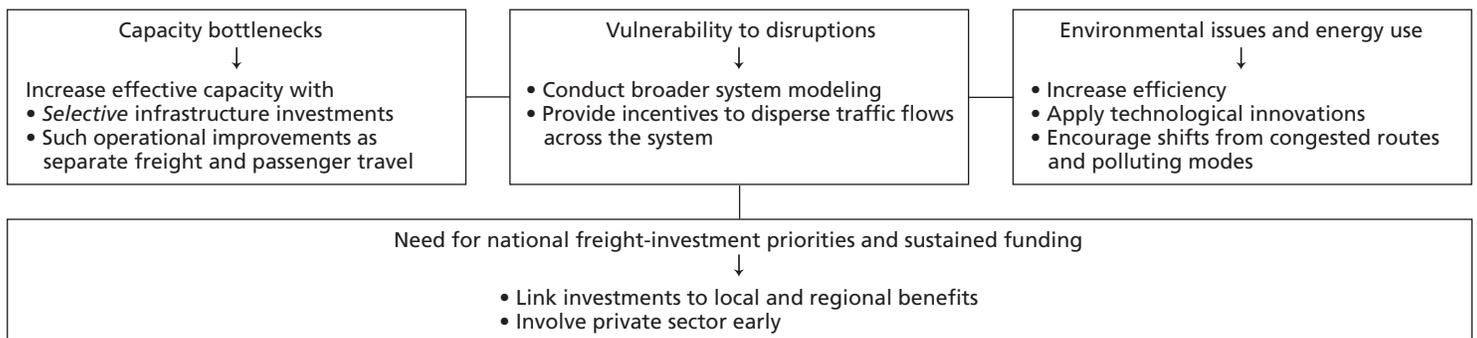
### Keys for the Freight-Transportation System to Effectively Support Economic Growth

The figure lists some potential solutions for each of the four key issues. They include reducing commuter congestion, which is likely to have public support and reduce environmental impacts. Rail and waterway enhancements that encourage users to switch modes could reduce truck traffic and related environmental and congestion problems. Selective infrastructure investments will enhance efficiency, relieve bottlenecks, and reduce vulnerabilities to disruption. All solutions will require that planners develop national freight-investment priorities and ensure sustained funding.

### Current Economic Conditions Create an Opportunity

Even long-term growth projections that have been revised to reflect today's economic recession imply a greatly increased demand for freight transportation in the future. With the pressure off to resolve capacity problems immediately, planners have an opportunity to look at the transportation system as a whole and do the additional modeling and consensus-building that will result in an adaptive, reliable, and efficient system that promotes U.S. economic growth and protects the environment. ■

### Approaches to Modernizing the U.S. Freight-Transportation System for Future Economic Growth



This research brief describes work done for the Supply Chain Policy Center (SCPC) within RAND Infrastructure, Safety, and Environment documented in *Fast-Forward: Key Issues in Modernizing the U.S. Freight-Transportation System for Future Economic Growth*, by Richard Hillestad, Ben D. Van Roo, and Keenan D. Yoho, MG-883-SCPEEC (available at <http://www.rand.org/pubs/monographs/MG883/>), 2009, 162 pp., \$39.00, ISBN: 978-0-8330-4748-9. This research brief was written by Shelley H. Wiseman. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. RAND® is a registered trademark.

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