

**Testimony Of**  
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**Before the Senate Committee on Commerce, Science and Transportation**  
**Subcommittee on Surface Transportation and Merchant Marine Infrastructure,**  
**Safety and Security**  
**United States Senate**  
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**“Technologies Transforming Transportation: Is the Government Keeping Up?”**

Madam Chairwoman, Members of the Committee. Thank you for the opportunity to speak before the Committee today at this important hearing.

The Port of Long Beach has long stood at the forefront of innovation in international trade and transportation. From the rise of containerization, through the growth of Pacific Rim commerce and now into the huge steps forward in ship capacity, facility modernization, and advanced technology, Long Beach has been at the epicenter of change.

As a premier, deep-water port, Long Beach strives to be a leader in goods movement safety, supply chain optimization and environmental stewardship. In service to its neighboring community, its city, its region, the State of California, and the entire United States, the Port of Long Beach has become a major economic engine. Now, together with our neighbor, the Port of Los Angeles, Long Beach is collaborating with our supply chain partners to further strengthen the ability of the ports to facilitate trade that benefits not only the region, but the entire United States.

Cargo that moves through the Port of Long Beach sustains 30,000 jobs in Long Beach, 300,000 jobs in the Southern California region and 1.4 million jobs in the United States. Cargo hauled across the docks in Long Beach touches each and every congressional district in the U.S.

At present, fast-changing economic realities in the shipping industry along with the advancement and application of technology are bringing leading seaports to the dawn of a new age of shipping. This age promises cleaner, more efficient and safer transportation of international trade, with exciting opportunities for growth and innovation. Technology is affecting all links in the trans-Pacific supply chain.

## Big Ship Era

So exactly what are the changes to the shipping industry? It begins with the formation of international ocean shipping alliances and the size of the ships they are acquiring. These are some of the most significant developments in the maritime industry in decades. Until a few short years ago, the biggest ships calling at the Port of Long Beach could carry a maximum of 8,000 container units or TEUs. TEUs are the twenty-foot equivalent unit long cargo containers. These ships were already twice as big as the vessels able to fit through the old Panama Canal, which meant that trans-Pacific trade — the rapidly growing commerce between the U.S. and East Asia — came to West Coast ports like Long Beach. In fact, 40 percent of all imported containerized cargo moves through Long Beach and Los Angeles.

But in 2012, the biggest container ship ever to call at a North American seaport came to Long Beach. That ship had a capacity of 14,000 TEUs. Ships of this size now regularly call in Long Beach and Los Angeles. These ships are already too big to pass through the expanded Panama Canal. In 2016, the expanded Panama Canal opens and will be able to handle vessels with capacities up to 13,000 TEUs. A 14,000 TEU vessel is as long as the Empire State Building is tall, and as wide as the 10-lane 405 freeway in Southern California. And we expect to see further growth in ship sizes. Vessel technologies (hull design, hull coating, engine and propulsion technologies) have advanced at break-neck speed resulting in the delivery this year of Very-Large Container Vessels that carry over 20,000 TEUs. The advent of big ships has reduced the cost, the amount of fuel used, and the air pollution created in shipping each container. The four major international ocean shipping alliances have embraced this “big ship” strategy and have now captured over 90% of the worlds ocean-going containerized cargo trade.

Larger ships, coupled with a new level of vessel-sharing dynamics created by the carrier alliances, have created congestion issues at most ports because the existing container terminals and operating practices are simply not geared to handle the discharge of containers from these vessels. To help deal with the impacts of these bigger ships and alliances, the ports of Long Beach and Los Angeles sought and received permission from the Federal Maritime Commission to create a joint Supply Chain Optimization project. Supply Chain Optimization is an effort to find and implement ways to make the supply chain run more efficiently, maximizing velocity and reliability of goods movement through the San Pedro Bay gateway. The industry — accustomed to working in “silos” with minimal communication and information sharing — has responded enthusiastically and cooperatively.

The ports’ joint effort started this March. Already, nearly a dozen meetings have been held. The list of stakeholder participants is all-inclusive across the industry, with a port executive-level steering committee, seven collaborative “Working Groups”, and a stakeholder Core Advisory Group. These teams have identified new technology and data flow as major parts of the potential short-term and long-term solutions. And, as the supply chain runs more efficiently, one would expect to see environmental and economic benefits as well as increased job creation.

The Supply Chain Optimization umbrella also includes the terminal efficiency strategies including advanced terminal operations systems and software, modernized terminal infrastructure and equipment, “peel-off” operations and on-dock rail optimization. Drayage trucking improvements include an interoperable chassis “pool of pools” and state-of-the-art traffic information systems. Other enhancements in on-dock and near-dock rail operations, including short-haul rail, will be discussed as a means of improving the velocity of cargo flow through the San Pedro Bay and within Southern California.

Supply Chain Optimization will be largely data-driven. The current highly-proprietary and “silo’ed” containerized marine cargo supply chain suffers from inadequate data sharing in terms of quantity, quality, and timeliness. The San Pedro Bay ports are examining new roles in gathering, filtering, and distributing supply chain data that will facilitate better terminal, drayage trucking, and rail operations along with greater levels of transparency. Information technologies will be key to this effort. Additionally, promising entrepreneurial software applications are already appearing and hold the potential for significant supply chain improvements. For instance, CargoMatic, an “Uber-like” application, is being used in a pilot study in the San Pedro Bay. Under their system, drayage truck drivers move imported containers from the ports to inland destinations in a highly-efficient manner much as a taxi moves passengers from an airport. Other software applications optimize the movements of empty containers and chassis by matching empty equipment with potential users of that equipment, avoiding costly and wasteful repositioning. And the U.S. Department of Transportation’s Freight Advanced Traveler Information System (FRATIS) has shown great promise in early trials in sharing critical information in real-time between marine terminal and drayage trucking operations.

### **Middle Harbor Redevelopment**

When it comes to modernization to improve competitiveness, no port in the U.S. is investing as much as the Port of Long Beach. With a \$4 billion capital improvement program this decade, the Port is making major investments in waterway, terminal, roadway, rail, security, and information technology infrastructure. For example, our \$1.3 billion Middle Harbor Terminal Redevelopment’s first phase is being completed this summer, and when terminal operator Long Beach Container Terminal (LBCT) starts moving cargo across the docks in early 2016, it will mark Long Beach’s first foray into advanced terminal technology.

Middle Harbor is the “Port of the Future” — the greenest, most sustainable container-cargo terminal in the United States. The terminal is equipped with all electric, zero-emission cranes and cargo-handling equipment. Advanced technology incorporated into the terminal boosts the Port’s competitiveness in an age when seaports around North America are trying to protect their market share from capture by Canadian and Mexican ports.

This terminal is not only big ship ready, it’s “biggest ship ready” — with a wharf, crane and cargo-moving systems that can accommodate the world’s biggest, greenest ships up to 22,000

TEUs. Middle Harbor will allow the Port to strengthen its ability to compete for the trade that sustains jobs in Southern California.

LBCT — the terminal operator — will start test operations later this year once the first phase of the project is completed, and ships will start calling at the new Middle Harbor terminal in early 2016. Ongoing construction of Middle Harbor is generating about 1,000 construction-related jobs. At full build-out in 2019, the terminal will be able to move more than 3 million TEUs of containerized cargo each year, and that trade will generate an additional 14,000 jobs in Southern California. That means that this terminal by itself would rank as the fourth-largest port in the nation. The project is the most ambitious container terminal modernization ever undertaken by any port in the nation. The new Middle Harbor terminal will boost the Port of Long Beach's capacity by over 20%, adding not only significant numbers of new terminal jobs but also creating new categories of skilled terminal labor that will operate and maintain this groundbreaking technology.

In addition to the Port's considerable capital investment, LBCT is spending another \$600 million on the equipment for this terminal. The Middle Harbor Redevelopment project is consolidating two aging terminals into one 304-acre mega-container terminal. When the entire 4,200-foot wharf is completed in 2019, the terminal will be able to simultaneously accommodate three ships as large as 22,000 TEUs.

The rail yard on the terminal is increasing from 10,000 to 75,000 linear feet of track to vastly increase the share of on-dock rail to serve the terminal. Each on-dock rail train takes hundreds of trucks off the road and speeds cargo to destinations throughout the nation in the fastest and most efficient manner possible.

All major buildings on the terminal will be Leadership in Energy and Environmental Design (LEED) or "Green Building" certified in order to reduce power and water use, reuse materials, encourage use of low-emission vehicles by staff, and reduce water runoff. The North Operations/Information Technology Building, the first building to be completed on the site, has already received its LEED Gold Certification.

Like the Very-Large Container Vessels it will service, Middle Harbor is a major leap forward in technology and Long Beach's first automated terminal. At the new terminal, a crane operator at the controls of one of the world's biggest ship-to-shore cranes — which can reach out to 180 feet — will take the cargo containers off the ship, two at a time, and place them on a platform. From there, the advanced technology places the containers on driverless electric vehicles that move the containers to the stacking cranes. These cranes automatically sort and stack the containers in highly dense rows. At the other end of the row, a person in the control room will lower the containers onto truck chassis via remote control.

In the terminal's battery exchange building, driverless vehicles will enter when directed by the terminals operating system and have their batteries replaced by robots as their batteries become depleted.

Longshore labor will operate the cranes and the vehicles that move the containers from the stacks to the on-dock rail yard, and will plug in the refrigerated boxes in the reefer stacks. Technicians are also needed to keep the machines maintained. Long Beach Container Terminal is working with the longshore labor to provide training for these new jobs. Jobs at the terminal will shift to technical occupations, and the longshore union membership will perform this work. Due to increases in terminal capacity in the modernized Middle Harbor terminal, longshore labor is expected to increase over current levels when the terminal reaches full capacity.

Of Long Beach's six container terminals, Middle Harbor is the only one that is automated. Only one of the Port of Los Angeles' eight container terminals is currently automated. By the time Middle Harbor is completed in 2019, it will have taken 15 years for planning, approvals, design and construction, and \$1.3 billion in Port of Long Beach funding.

Automation is just one way that the Port of Long Beach is working to modernize and strengthen the Port's competitiveness. For example, other terminals are raising and extending their water-side cranes, adding modern terminal equipment, upgrading operating systems, and dredging to accommodate the larger container ships. Road, bridges, and the rail system are all being modernized and expanded. With its \$4 billion capital improvement program, the Port of Long Beach will be able to continue to attract the cargo that supports jobs both in Southern California, and across the U.S., including the jobs of the workers who move the cargo on the docks.

Every element of the Port's capital program utilizes technology to the maximum extent in its design, construction, and operation. New technologies are needed to keep pace with the larger ships, and improve productivity. Technologies big and small will help improve productivity and velocity. The advanced technologies that will help improve efficiency and reduce air pollution will move away from conventional fossil-fueled equipment and will demand a great deal more electricity. For example, shore-power systems that connect ships to land-side electricity have matured and are in widespread use in California, significantly reducing emissions for vessels at berth while at the same time controlling costs. And high-speed electric stacking cranes and battery-powered container movers will also add to the demand for electricity. This advanced technology will greatly add to the Port's dependence on the grid for ample high-quality electric power.

## Energy Island

In anticipation of the increasing demand for electricity, the Port in 2013 implemented a Port Energy Policy. And just as Long Beach's 2005 Green Port Policy made it clear that environmental protection is a top priority at the Port, the new Energy Policy makes it clear that sustainable energy use is a top priority. We are committed with our customers and key stakeholders to deliver unprecedented energy conservation, operational efficiency and enterprise resiliency.

We are now working on the next step. At his inaugural State of the Port address in January, Port of Long Beach CEO Jon Slangerup unveiled our Energy Island Initiative — a comprehensive strategy for transitioning energy at the Port to resilient and sustainable, self-generation systems and renewable power sources. Along with creating the ability for the Port to operate independently from the grid in times of emergency or other need, the initiative's objectives include stabilizing power costs and increasing the competitive advantages of doing business at the Port of Long Beach.

Energy Island captures a number of measures that Long Beach has already been developing, and it creates a framework for exploring the larger universe of possibilities to advance real energy solutions.

Under the initiative, the Port has established five goals aimed at ensuring an ample supply of reliable electricity, alternative fuels and other energy sources as the Port moves toward near-zero-emissions operations.

- **Advance green power:** The Port will pursue solar, wind, geothermal and the viability of tidal energy to generate its own electricity. Solar panels that provide a clean source of electricity are already a key feature of the Middle Harbor Terminal Redevelopment project and the Port's new Maintenance Facility.
- **Use self-generated, distributed power with micro-grid connectivity:** The ability to generate power independently of the grid is crucial to business continuity in the event of an emergency. Micro-grid controls that are connected to the grid also allow the Port to contribute to the regional power supply, help lower the city's emissions, and supply power to vital services in an emergency.
- **Provide cost-effective alternative fueling options:** The Port will explore options that include liquefied natural gas (LNG) as fuel for ships and locomotives, hydrogen generation, fuel cell technology and related infrastructure. This goal builds on the existing progress the Port has made under its Clean Trucks Program and Technology Advancement Program (TAP) to support drayage trucks that run on LNG, compressed natural gas (CNG), and hydrogen fuel cell technology.

- Improve energy-related operational efficiencies: The Port will explore strategies for maximizing available energy resources, including upgrading equipment and consumption controls, offering energy-efficiency guidance and leveraging available incentives for operational efficiencies.
- Attract new businesses, incubate transportation-oriented technology, create jobs, increase revenue and reduce costs: By advancing new technology and innovation that support the maritime, transportation and energy sectors, stimulating the economy is part and parcel of the Energy Island Initiative. In the area of innovation and job creation, the effort will build upon the Port’s existing Technology Advancement Program for demonstrating promising new clean air technology, to accelerate the commercial availability of relevant and promising energy technologies.

Transforming the Port into an “island” of renewable energy technologies and self-generation systems is expected to take about 10 years. The Middle Harbor terminal, which will operate almost entirely on electricity, is on track to become the world’s greenest marine container terminal and a model for cleaner seaport operations throughout the world.

Taking a hard look at specific energy projects includes a comprehensive assessment of their feasibility. In each case, the Port will consider the potential benefits in a marine environment; capital and operational costs and benefits to the Port, the community and stakeholders; operational burdens on Port tenants; positive and negative environmental impacts; the need for additional infrastructure and related costs; and foreseeable technology improvements and obsolescence.

## **Conclusion**

Technology touches every link in the marine cargo supply chain. Our Supply Chain Optimization efforts, Middle Harbor Redevelopment and related projects, and our Energy Island Initiative, are all reliant on technology, both “hardware” and “software”, in order to meet our objectives of greater containerized cargo velocity and reliability. As local governmental agencies, the San Pedro Bay ports are shifting from our traditional “landlord” role to one of an active supply chain participant. We hope to see the Federal Government support us in this new role by setting effective goods movement policy that recognizes the value of seaports and the economic engines they represent and by creating infrastructure and energy funding that supports land and water-side improvements needed to accommodate growth in international trade.

We look forward to working with our Federal partners in this exciting venture.