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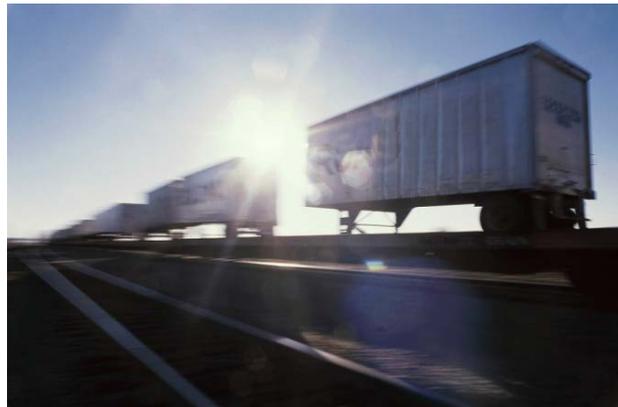


**SUSTAINABILITY STRATEGIES ADDRESSING FREIGHT
TRANSPORTATION AIR EMISSIONS**

Introduction

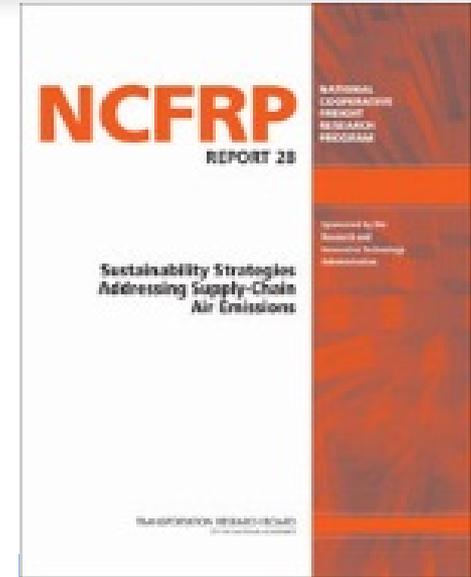
Overview of presentation

1. Research objectives, scope and methodology
2. Private sector efforts to reduce emissions
3. Public sector initiatives for emissions reductions
4. Round up and recommendations



Research objectives and scope

- Identify potential strategies for accelerating environmental improvement, enhancing performance, and promoting social responsibility of the supply chain
- Improve the understanding of decision-makers regarding the impact of environmental policies and regulations on the supply chain
- Consider the interrelationships between economic drivers and competition considerations of supply chain business and air quality and greenhouse gas (GHG) policies and regulations



Methodology

1. Undertake a literature review
2. Conduct stakeholder interviews
3. Review metrics
4. Synthesis: themes & case studies
5. Interim report
6. Analysis of case study clusters
7. Consideration of metrics
8. Final report & communications plan

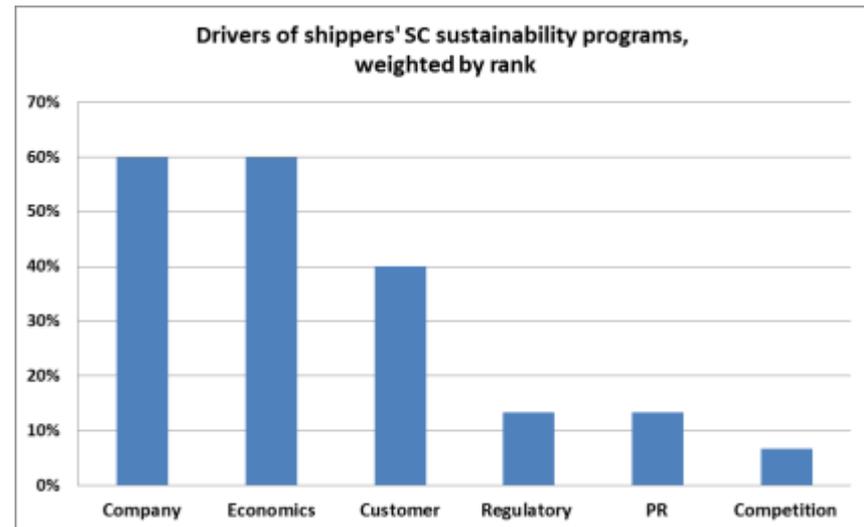


Private Sector Initiatives

What is driving corporate SC sustainability programs?

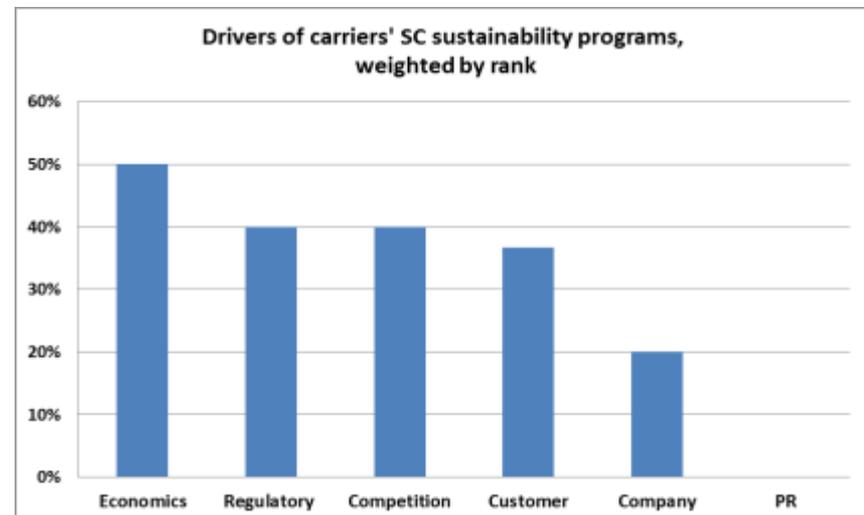
■ Shippers:

- Company policy
- Business economics



■ Carriers:

- Business economics
- Regulations
- Competition



Private sector sustainability performance metrics

	Shipper metric	Goal examples	Carrier metric	Goal examples
High	CO ₂ emissions	30% absolute by 2020	Fuel efficiency	20% increase by 2020
		5%/year, per ton deliv'd.	CO ₂ emissions	Reduce fleet CO ₂ by 37%
How common	Renewable energy	100% renewable energy	Driving MPG	Reduction over time
	Haul length	700 miles (from 1,100)	Empty miles	20% reduction
			Tractor fleet age	100% at 2008 or newer
Low			Idle time	Reduce as % total time
			CAP emissions	Reduce PM and NOx

How are companies collaborating?

■ General sustainability:

- Carbon Disclosure Project (CDP)
- Global Reporting Initiative (GRI)
- Business for Social Responsibility (BSR)
- World Business Council for Sustainable Development (WBCSD)



■ Supply chain sustainability:

- BSR's Clean Cargo Working Group (CCWG)
- CDP Supply Chain Program

Clean Cargo Working Group

■ Vertically-oriented collaboration:

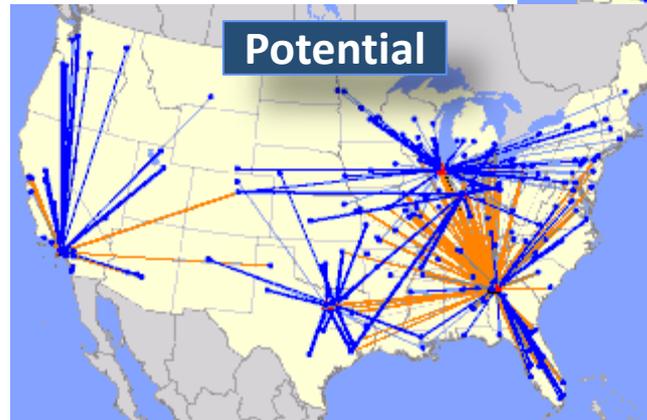
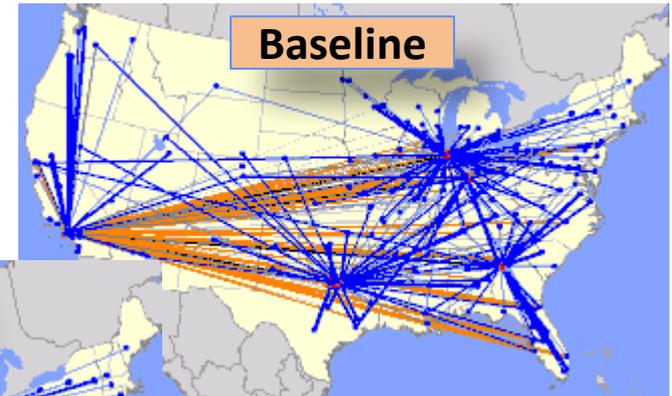
- Outdoor Industry Association (OIA)
- Sustainable Apparel Coalition (SAC)



Company-specific initiatives: Operational optimization

■ Planning:

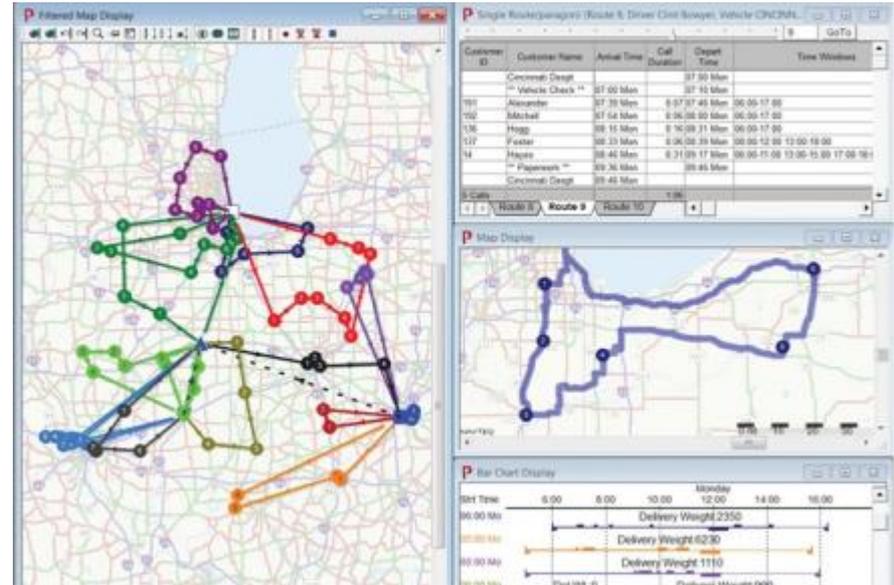
- Distribution network design
- Freight mode selection



Company-specific initiatives: Operational optimization

■ Execution:

- Routing
- Empty miles reduction
- Capacity utilization
- Speed reduction
- Driving style, idling
- Packaging



Company-specific initiatives: Equipment, technology

■ Equipment upgrades:

- **Truck:** Truck size and weight – not yet
Tractor, trailer and combined unit aerodynamics
- **Ocean:** Larger, fuel-efficient ships
IMO's EEDI
- **Rail:** Double-stack intermodal cars
Rail-based flatbeds
Anti-idling devices



Company-specific initiatives: Equipment, technology

■ Engine improvements:

- Driven by EPA, NHTSA and CARB requirements
- Trucking companies upgrading fleets to newest technology
- Exp: FedEx BlueTEC Clean Diesel Vans

■ Alternative fuels:

- Driven by EPA and California requirements
- Exp: UPS Green Fleet
- Exp: Staples/Ryder NG project with San Bernardino Assoc. Govts.
- Exp: Pacer LNG trucks in Southern California
- Exp: FedEx, UPS, Purolator piloting hybrid hydraulic delivery trucks
- Exp: Shell Oil and TravelCenters of America LNG fuel stations

Sustainability brand: Stonyfield Farm



Challenge

- Delivering on the promise of a sustainable brand
- Achieving 5% CO₂ cut/ton delivered/yr

Context

- Sustainability is a founding principle
- New Hampshire-based yogurt maker
- Focus: Milk production, product transportation, packaging, facilities

Approach

- Metrics: Network miles, mode and vehicle use
- EPA SmartWay Transport Shipper
- Measures GHG impact with EPA SmartWay FLEET model
- All motor carriers must be SmartWay certified

Results

- 36% GHG reduction from transportation while also growing the business (2006-2012)



Sustainability brand: UPS



Challenge

- Building sustainability into a multi-mode, global transportation business

Context

- Small-package modes (air, ground express) inherently challenging
- Global reach must deal with multiple regulatory regimes

Approach

- Reducing miles driven and idle time
- Routing technology
- Alternative fuel vehicles – CNG, LNG
- Cargo Cruiser electric delivery tricycle, testing in Dortmund, Germany
- Hybrid hydraulic delivery truck tests

Results

- 8% increase in MPG for package cars, for in-service US delivery, 2000-2010
- 28% reduction in fuel per ton-mile in parcel business, from miles and idle time reduction, 2006-2011
- 13% less CO₂ emissions for UPS Airlines, 2005-2013, vs 20% goal by 2020



Private sector views: concerns about regulations

■ Prescribed solutions with benefit/cost concerns

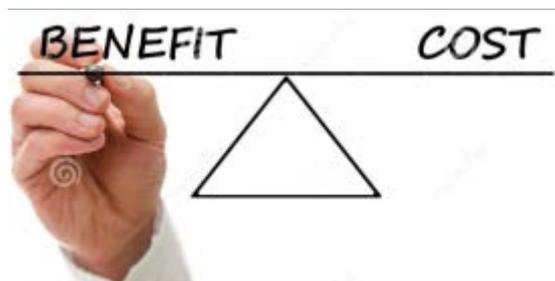
- Trailer skirt requirements
- Cold-ironing of vessels

■ Overlapping jurisdictional issues

- Trucking air emissions – state vs federal issues
- Low-sulfur marine fuel use – state, federal, international standards

■ Technology availability concerns

- EPA Tier 4 locomotive emission standards



From one state, six?

Venture capitalist Tim Draper is proposing to divide California into six new states, with most of the Bay Area, plus Santa Cruz and Monterey counties, in a new state called Silicon Valley.



Source: sixcalifornias.info, techcrunch.com

BAY AREA NEWS GROUP

Private sector views: Role for public sector

■ Level playing field

- Ocean: IMO as a model international regulator
- Ports: LA/LB PierPASS program

■ Public-private partnerships for pilot programs

- Staples/Ryder/San Bernardino/DOE/Cal Energy/SoCal Clean Cities
- FedEx/UPS/Purolator/Calstart/DOE hybrid hydraulic parcel trucks

■ Recognition of sustainability innovation

- EPA SmartWay

■ Land-use planning for efficient distribution

- Warehousing/trans-shipment locations that minimize miles, impacts

■ Outcome-based regulations

- Allow flexibility for ongoing innovation, new technologies

Public Sector Initiatives

Role of Regulation

- Air Quality standards (CAP):
 - Exposure to pollutants can result in heart and lung disease, or death
 - Components of diesel exhaust pose a greater cancer risk than any other pollutant
 - EPA establishes NAAQs to protect health
- Emissions standards (GHG and CAP):
 - Drive innovation
 - Technology “forcing” = requirement for equipment to achieve an emissions level within a specified period of time, using unspecified technology
 - California as “laboratory” for technology

Regulation - benefits

- Provides a level playing field
- May even be supported by the private sector
- Can prompt private sector to take action in other geographies



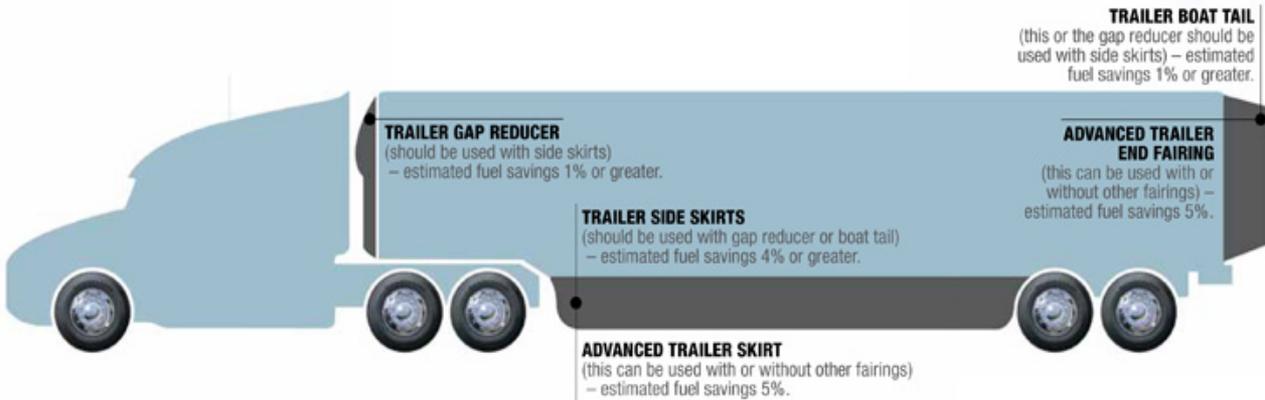
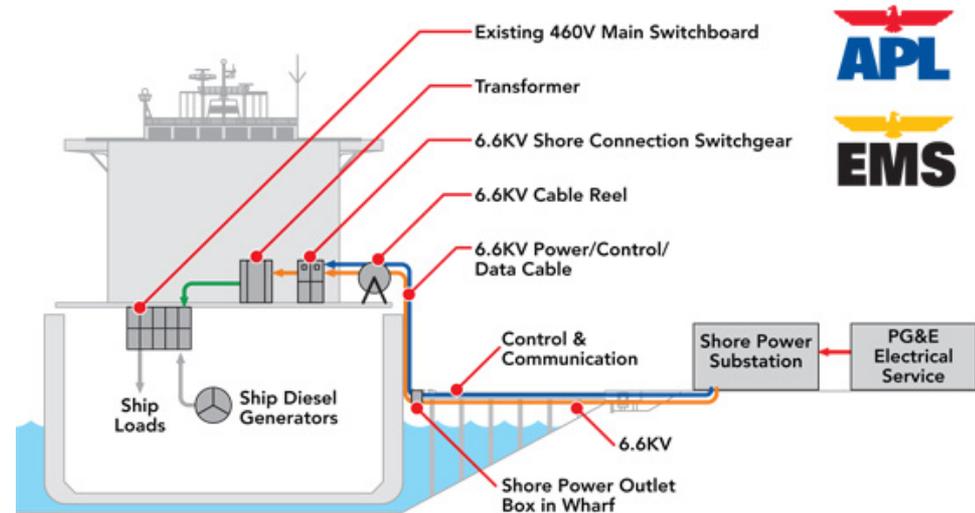
Fair Winds Charter (Hong Kong)

Technology-specific regulations can be challenging

- California At Berth Ocean Going Vessels Regulation
- California Heavy Duty Vehicle GHG reduction regulation

APL GGC Cold-Ironing Project

Berths 60–63, Oakland, CA



Well intended regulations can have unanticipated outcomes

- CAP vs GHG emissions
- Relaxing truck size and weight limits can result in mode shift away from cleaner/ greener options
- Truck time and weight restrictions can increase emissions



Mega Truck in Stockholm (Sweden)

Unanticipated outcomes (ctd.)

- European truck tolling did not result in substantial mode shift
- CA Port terminal gate appointment system = no impact on line ups, transaction times or emissions



Port trucks – Long Beach

California is unique

- Exceptional authority under federal Clean Air Act
- Health risks near ports, freeways and rail lines
- Litigation halted port expansion

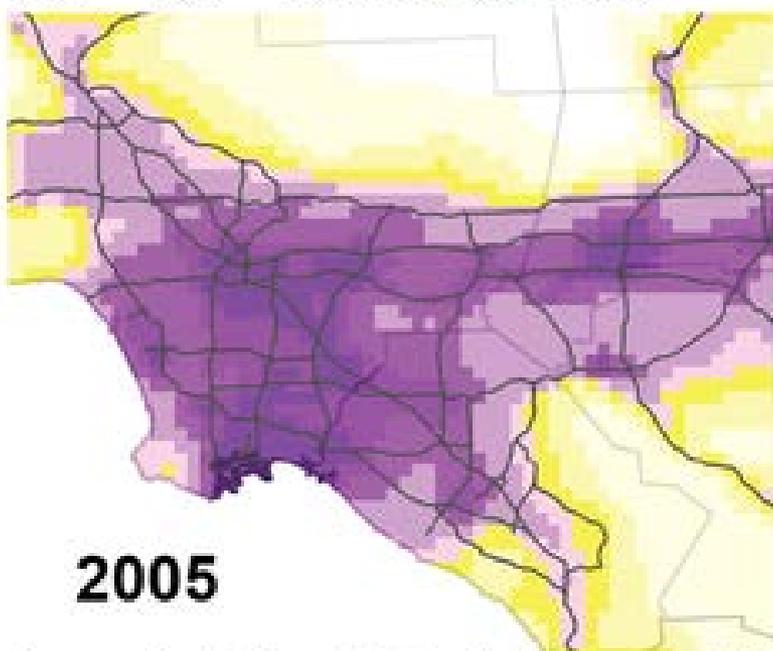


Initiatives have been effective

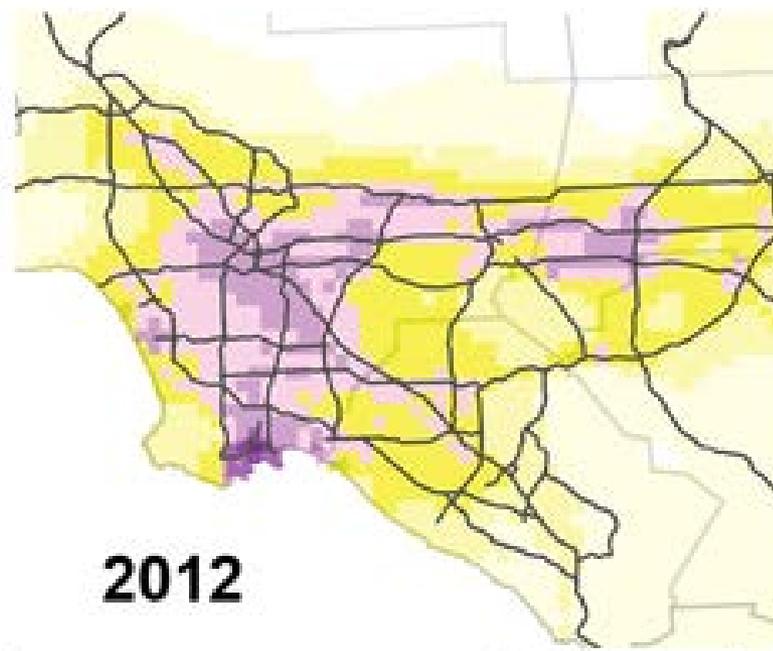
Cancer risk from air pollution

(cases per 1 million residents over 70 years)

100 300 500 800 1000 >1200



2005



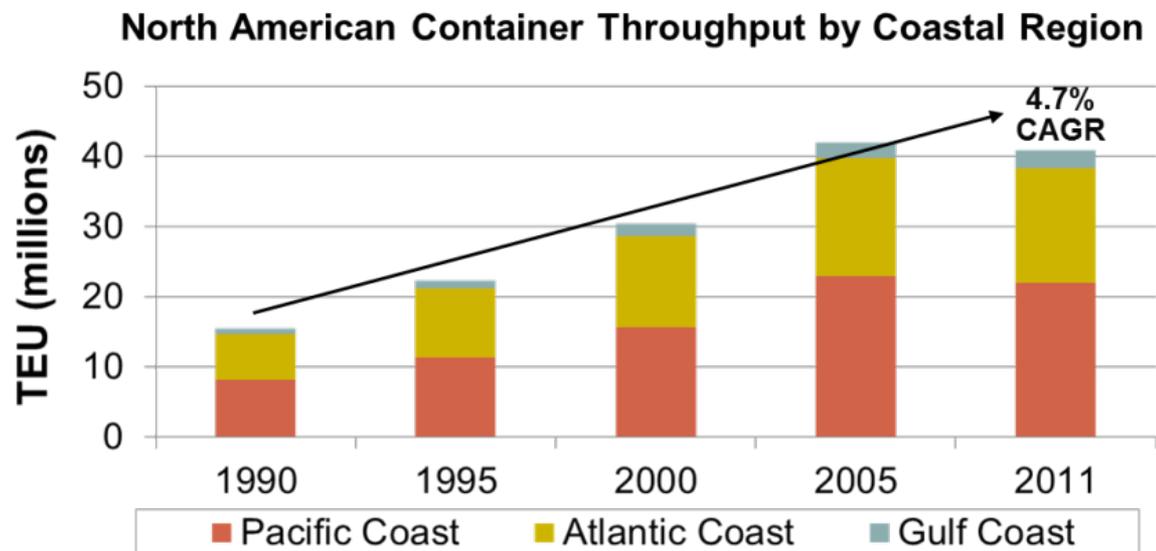
2012

Source: South Coast Air Quality Management District

@latimesgraphics

But costs have been significant

- Costs of regulatory compliance in CA is high
 - ECA = \$18/ TEU
 - Low sulfur marine fuel regulations = \$6/ TEU
 - Shore power technology cost est = \$1.5M per vessel
 - Port Clean Truck Fee = \$35/ container moved
 - Port traffic mitigation fees = \$61.50/ TEU
- But, no evidence that this has affected port traffic



Source:

<http://www.aapa-ports.org>, 2012

Working together for win-win outcomes: federal level

- US EPA “Smartway”



Working together for win-win outcomes: state / metro

- California Goods Movement Action Plan, 2007
- SCAG Regional Transportation Strategy, 2012



Working together for win-win outcomes: inland state/metro

■ Kansas City Regional Freight Outlook & C-TIP



Working together for win-win outcomes: investment in infrastructure

■ CREATE



Working together for win-win outcomes: ports

- POLA/ POLB Pier PASS
- Partnering with railroads: PHL



Working together for win-win outcomes: driving technology

- South Coast Air Quality Management District – Technology Advancement Office



Heavy-duty electric short-haul drayage truck

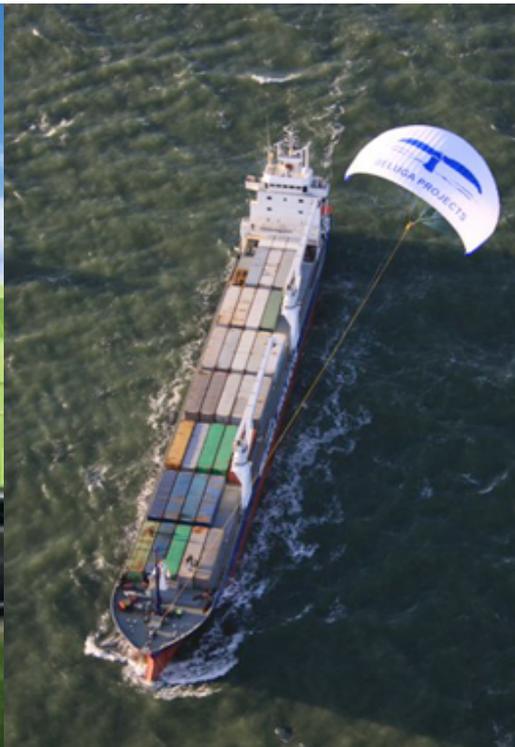
Round Up and Recommendations

9 Recommendations

1. Consult closely with stakeholders to craft win-win solutions
2. Analyze trade-offs and options
3. Coordinate across jurisdictions
4. Develop supply chain sustainability metrics
5. Adopt performance-based approach to regulation
6. Provide incentives to change
7. Push the boundaries of technology
8. Redefine operational optimization in urban areas
9. Promote sustainability branding



Questions?



<http://www.trb.org/Publications/Blurbs/170749.aspx>

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