Port of Los Angeles
Green Port Programs

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Green Port Building Blocks

- Environmental responsibility and economic growth are not always mutually exclusive

- Green growth has:
  - Enabled overall Port growth by allowing expansion projects to move forward as environmental impacts decline
  - Allowed cargo owners to market green logistics
  - Helped to push science of environmental source controls further along

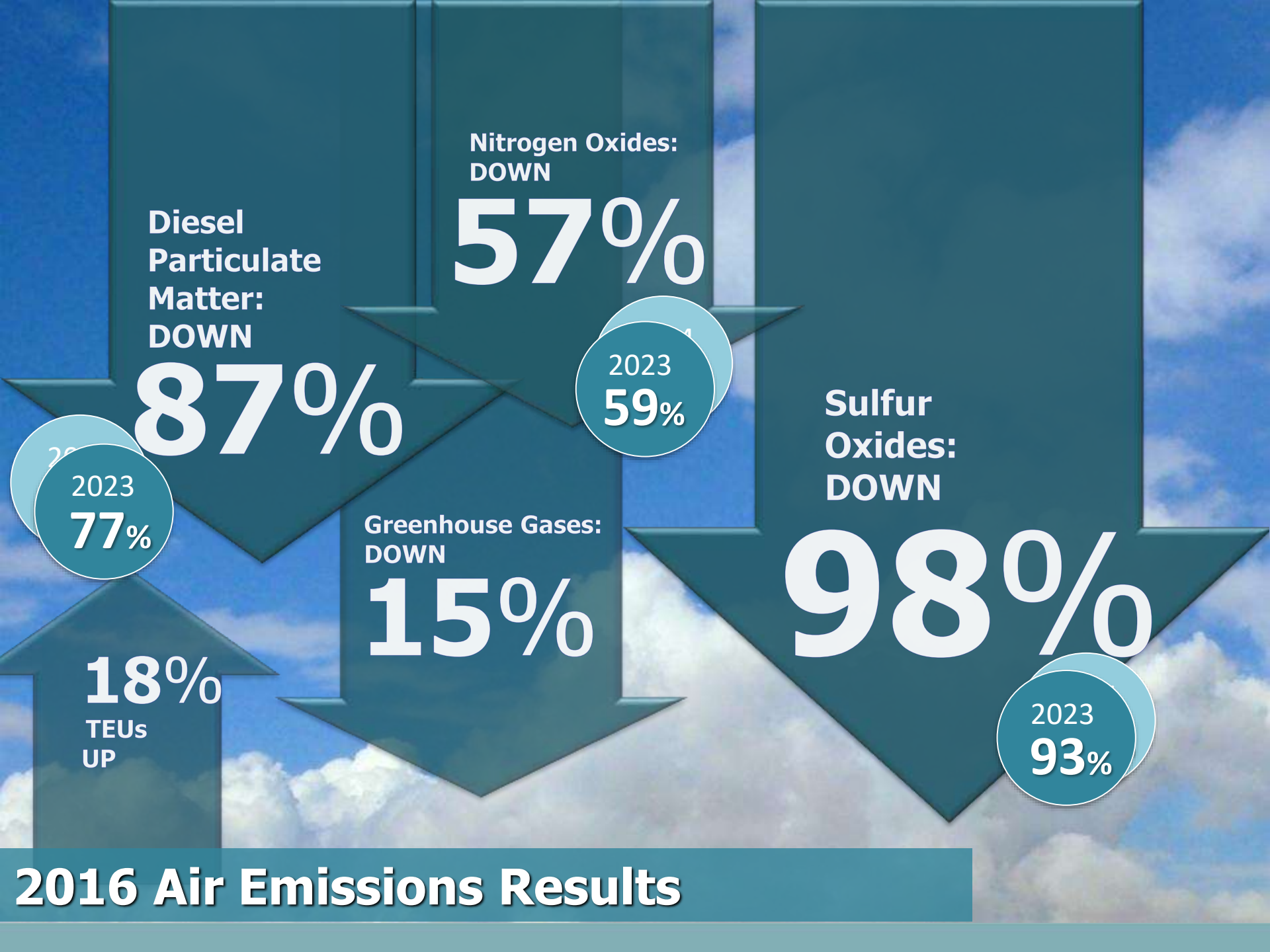
- Community Investment important part of being environmentally responsible (indirect impacts hard to measure, but cannot be ignored)

Green Port Building Blocks

- For Air Quality, Green Port Policy has lead to:
  - Significant reduction of Criteria Pollutant Emissions (NOx, SOx, PM, CO, VOCs) and Health Risk
  - Fair share contribution to regional air quality attainment goals
  - Carbon footprint reduction co-benefits to meet Climate Change targets set by local, state and federal government
- Clean Air Action Plan (CAAP) is primary comprehensive air quality control program to accomplish these objectives
  - Emissions Inventory is a key CAAP planning tool

Clean Air Action Plan

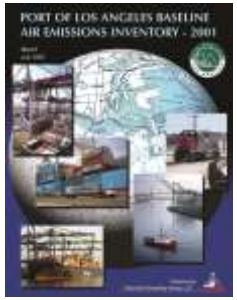
- 2006 – First Comprehensive Port-Based Plan
  - Set consistent source-specific standards (Ships, Trucks, CHE, Trains, Harbor Craft)
  - Set reduction Health Risk targets from Port Operations
  - Set reduction targets “fair share” to reducing regional mass emissions
  - Enable Port development & optimization
- Updated - 2010
  - Health Risk Reduction Standard
    - 85% by 2020 (compared to 2005 baseline)
  - Emission Reductions Standard
    - NOx 22% by 2014 and 59% by 2023
    - SOx 93% by 2014 (and 2023)
    - DPM 72% by 2014 and 77% by 2023



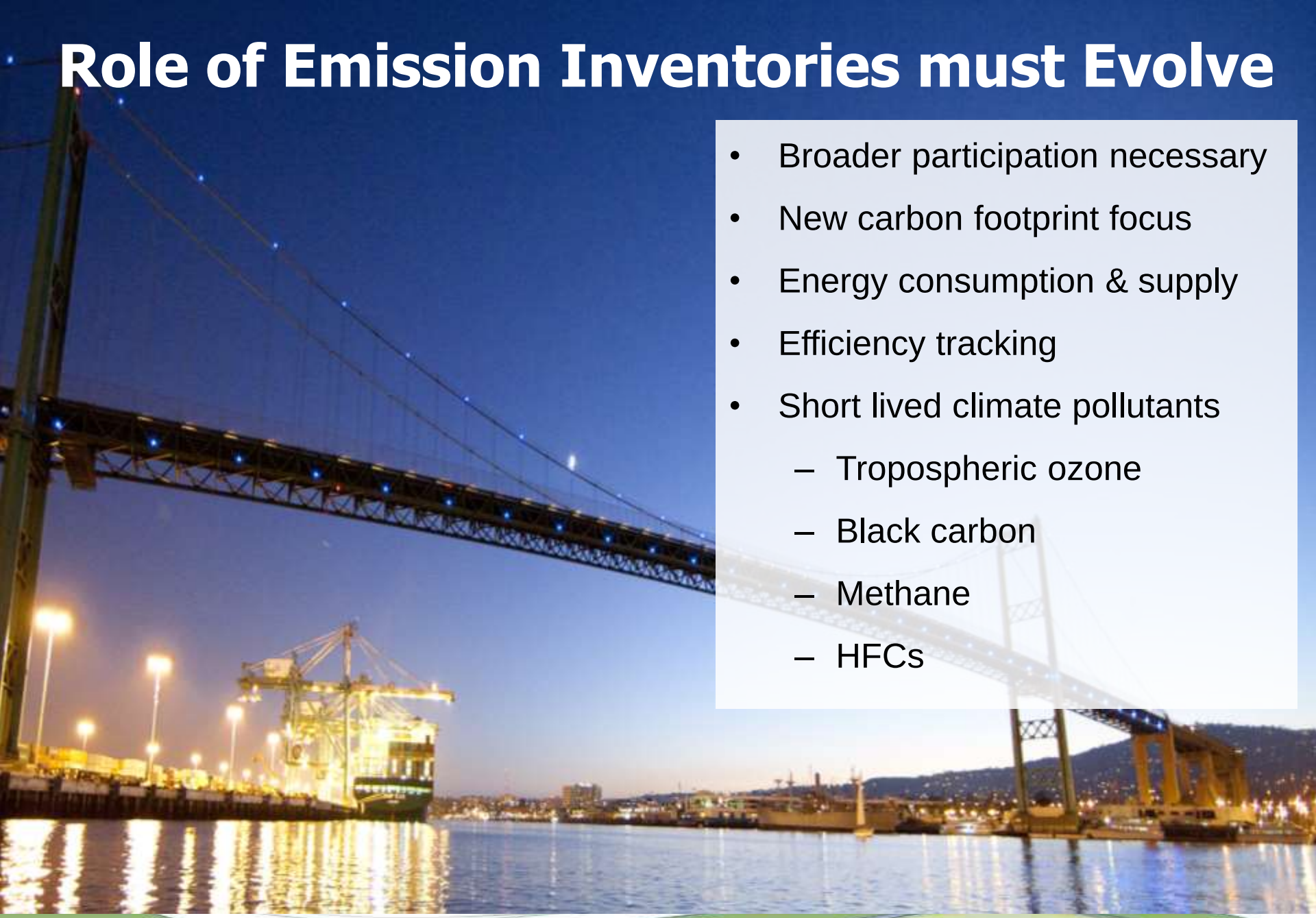
2016 Air Emissions Results

POLA Annual Emissions Inventories

- Annual Activity-based
  - ✓ 2001, 2005 – 2016
- Source categories
  - ✓ Ships, harbor craft, cargo handling equipment, trucks, locomotives
- Pollutants
  - ✓ PM • PM_{10} • $PM_{2.5}$ • DPM • NO_x • SO_x • HC • CO
- Greenhouse gases
  - ✓ CO_2 • CH_4 • N_2O • CO_2e
- Coordinated w/CARB, SCAQMD, & EPA



Role of Emission Inventories must Evolve



- Broader participation necessary
- New carbon footprint focus
- Energy consumption & supply
- Efficiency tracking
- Short lived climate pollutants
  - Tropospheric ozone
  - Black carbon
  - Methane
  - HFCs

2017 CAAP Update

- Build on Successes and plan for future
- Balance environmental stewardship with jobs and competitiveness
- Continue to reduce pollutants and health risk
- New danger from climate change
  - Zero emissions goal important for GHG

OCEAN-GOING VESSELS

- Capture up to 100% of vessel at-berth emissions by 2030
- Modify Vessel Speed Reduction Program to maximize participation to 40 nm
- Incentivize energy-efficiency improvements and use of cleaner technologies
- Consider potential differential rate system to incentivize newer, cleaner vessels

CAAP: HEAVY-DUTY TRUCKS

- Transition trucks to near zero in short term and ultimately zero emissions by 2035
  - Feasibility assessments start in 2018
  - Truck rate starts in 2020
  - SMOG check pilot program
- Implement truck reservations system

CAAP: CARGO-HANDLING EQUIPMENT

Transition to zero emissions by 2030

- Also subject to feasibility assessments
- Near-zero may be a transition technology for certain source categories

Zero Emission Challenges

- Technology still in infancy stage for heavy duty equipment
  - Range limitations
  - High Cost
- Infrastructure is costly and will require long range planning
- Near zero emissions reasonable alternative?
  - Hybrid engines have very low emissions
  - Cheaper
  - Alternative fuel can be zero emissions equivalent
- Air agencies need near-term progress
- Zero emissions NEEDED to solve GHG crisis

Zero Emissions Program
Drayage Trucks – Cargo Handling Equipment

"Harbor Department staff believes that short-haul drayage and on-terminal container handling equipment are the two areas of maritime goods movement operations where zero and near-zero emission solutions are most likely to develop in the near-term."

- **Zero Emissions White Paper (2014)**
- **Harbor Department Role:**
  - Facilitate expanded testing and deployment
  - Establish clear test guidelines and procedures
  - Plan and Develop Port Infrastructure (battery charging standardization)
  - Work with regional stakeholders on testing and development
- **Demonstrate broad commercial availability and cost**
  - OEMs must see opportunity and develop commercially available ZE units, servicing
  - Increased production volume will reduce cost
- **Demonstrate operational reliability**
  - Show that they work full marine duty cycles and have long-term dependability
  - Port of Los Angeles has committed to test as many zero emissions vehicles as possible

Green Ports Initiative
Drayage Trucks – Cargo Handling Equipment

- **Market maker strategy to increase volume of equipment that can be purchased/tested**
  - CAAP commits to 100 on-road truck demonstration (each port already has other ZE projects)
  - Green Ports initiative idea goes beyond the Ports of Los Angeles and Long Beach
- **Green Ports Initiative will focus on equipment in areas where zero emissions will emerge**
  - More than just ports
  - Local/neighborhood delivery vehicles
  - Waste haulers
  - Port terminal equipment
  - Short haul on-road drayage
- **Climate Mayors will help establish a coalition of Cities and Ports**
  - Not limited to US partners
- **Request for Information (RFI) from OEMs will be released in Spring 2018**

San Pedro Bay's Changing Role

- Transitioning from "Landlord Port" to "Partnering Port" model
- Deeper Collaboration is Necessary
- Broader Dialogue with Supply Chain Stakeholders
- Balancing critical environmental needs with economic imperatives

Data Solutions Portal Concept
Spring Pilot Project

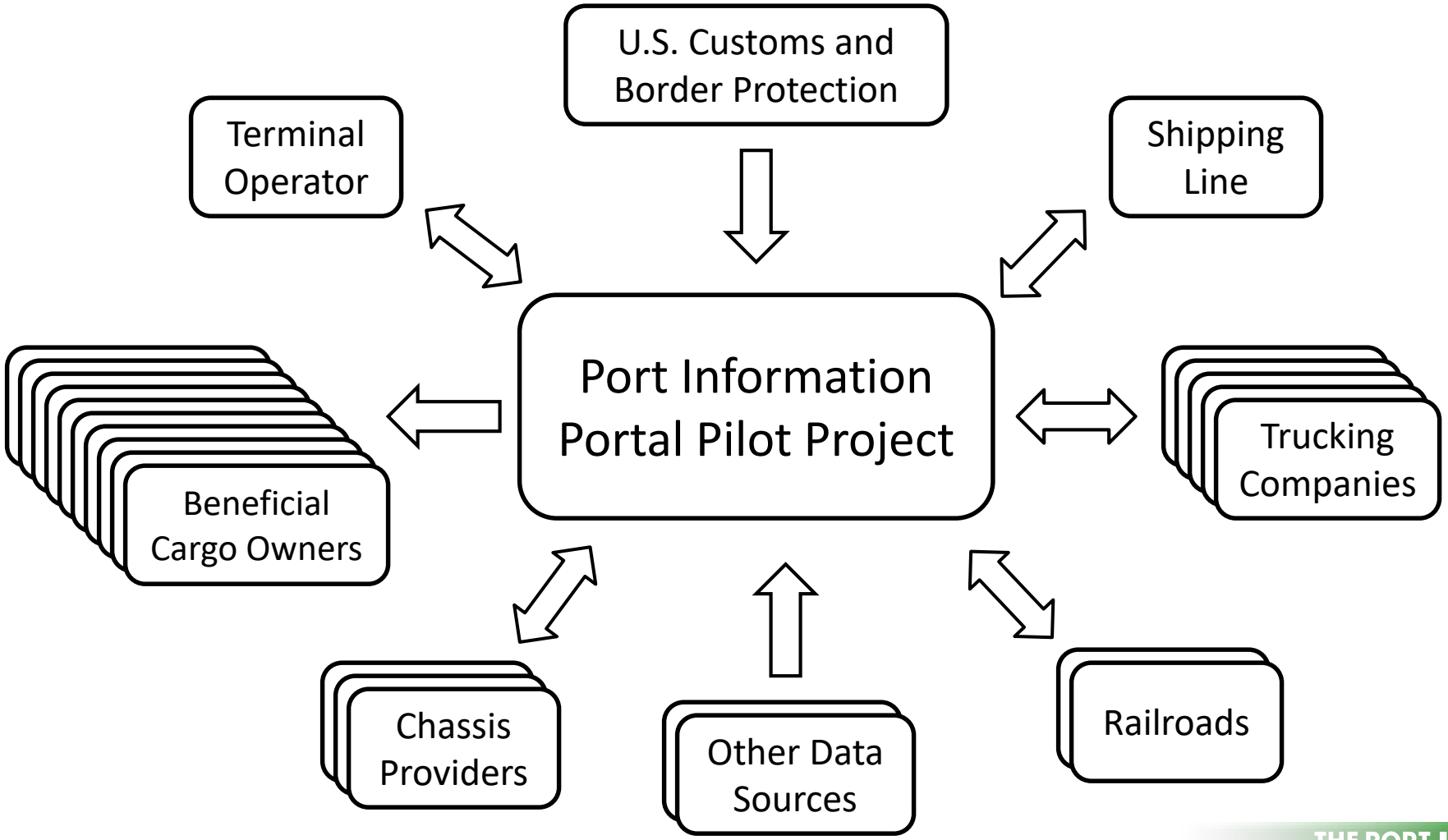
To conquer the complexity, the Port of Los Angeles and GE Transportation are partnering to launch a

VISIONARY DIGITAL SOLUTION

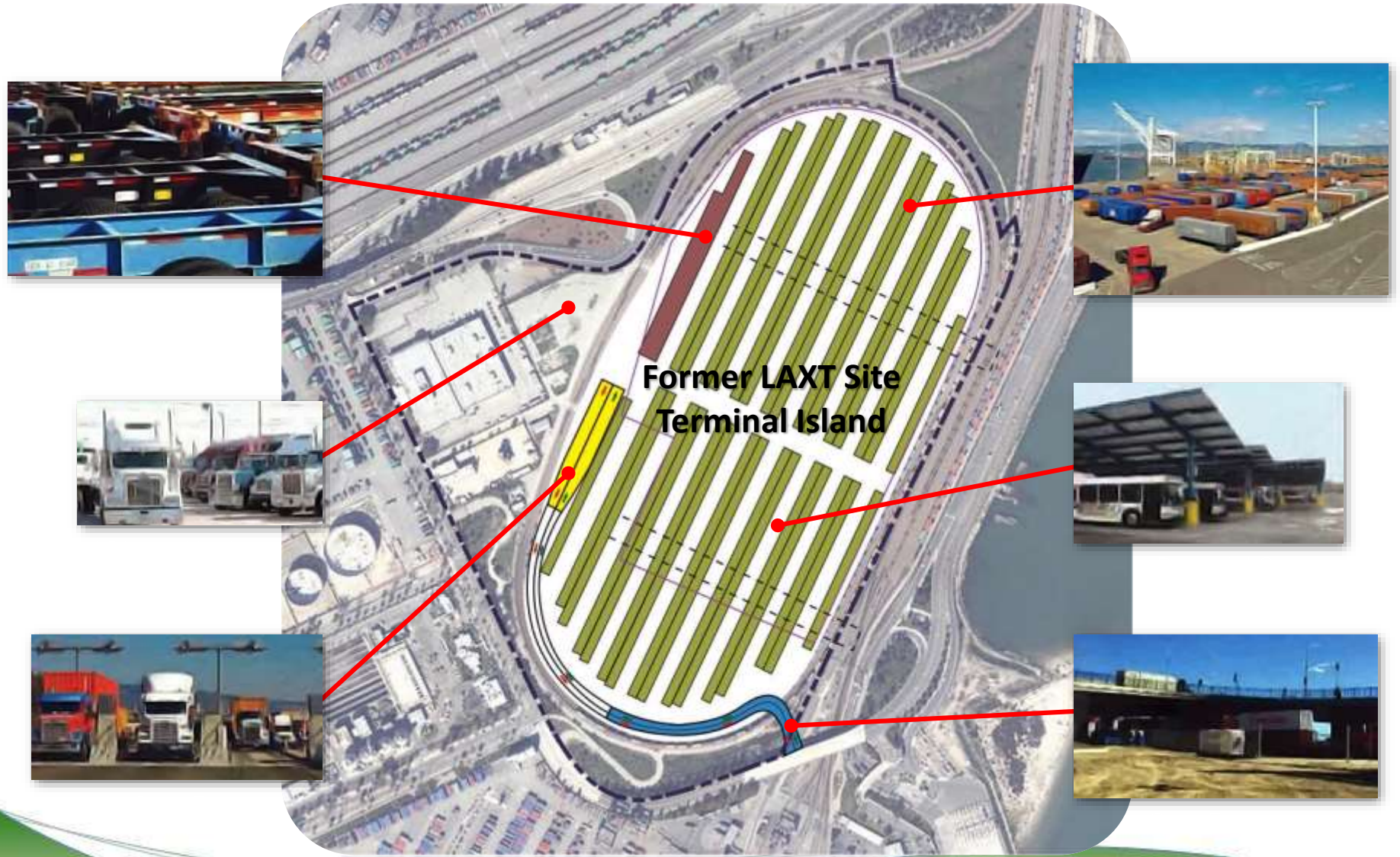
- **Partnership with GE Transportation**
- **One terminal, two steamship lines, and one string of ships**
- **Channeled, secure access to data that supply chain stakeholders need**
- **Benefits supply chain efficiency, predictability, and reliability**
- **Keeps the supply chain flowing**

GE Transportation | THE PORT OF LOS ANGELES LA

Digital Portal Concept



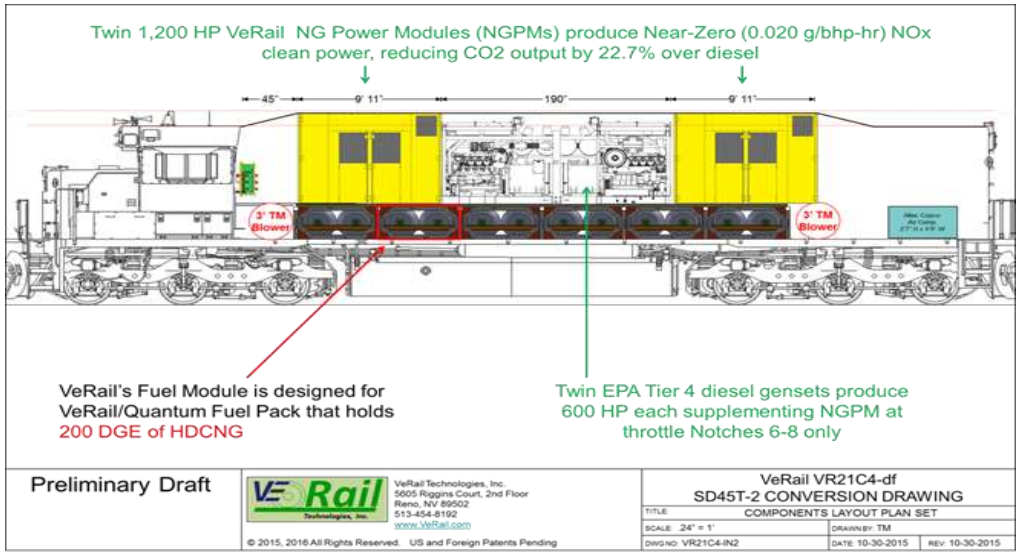
Container Terminal Support Facility Concept



THE PORT OF LOS ANGELES

VeRail Near-Zero Emissions Locomotive Demonstration

- Development and Demonstration of a Near-Zero emissions, 2,100Hp Switcher Locomotive, powered by Compressed Natural Gas



- Much cleaner than the current highest EPA Locomotive Standard (Tier 4):
  - 90% reduction in PM
  - 90% reduction of NOx
  - 20% reduction in GHG

- Project Partners/Cost:
  VeRail - $3+ Million
  Combined Ports - $600,000
  SCAQMD - $1,000,000
  Southern California Gas Company – $500,000
  Pacific Harbor Lines - In-Kind Services


Thank you
COSCO