



The Port of
LONG BEACH

Sustainability in Port Engineering

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Introduction



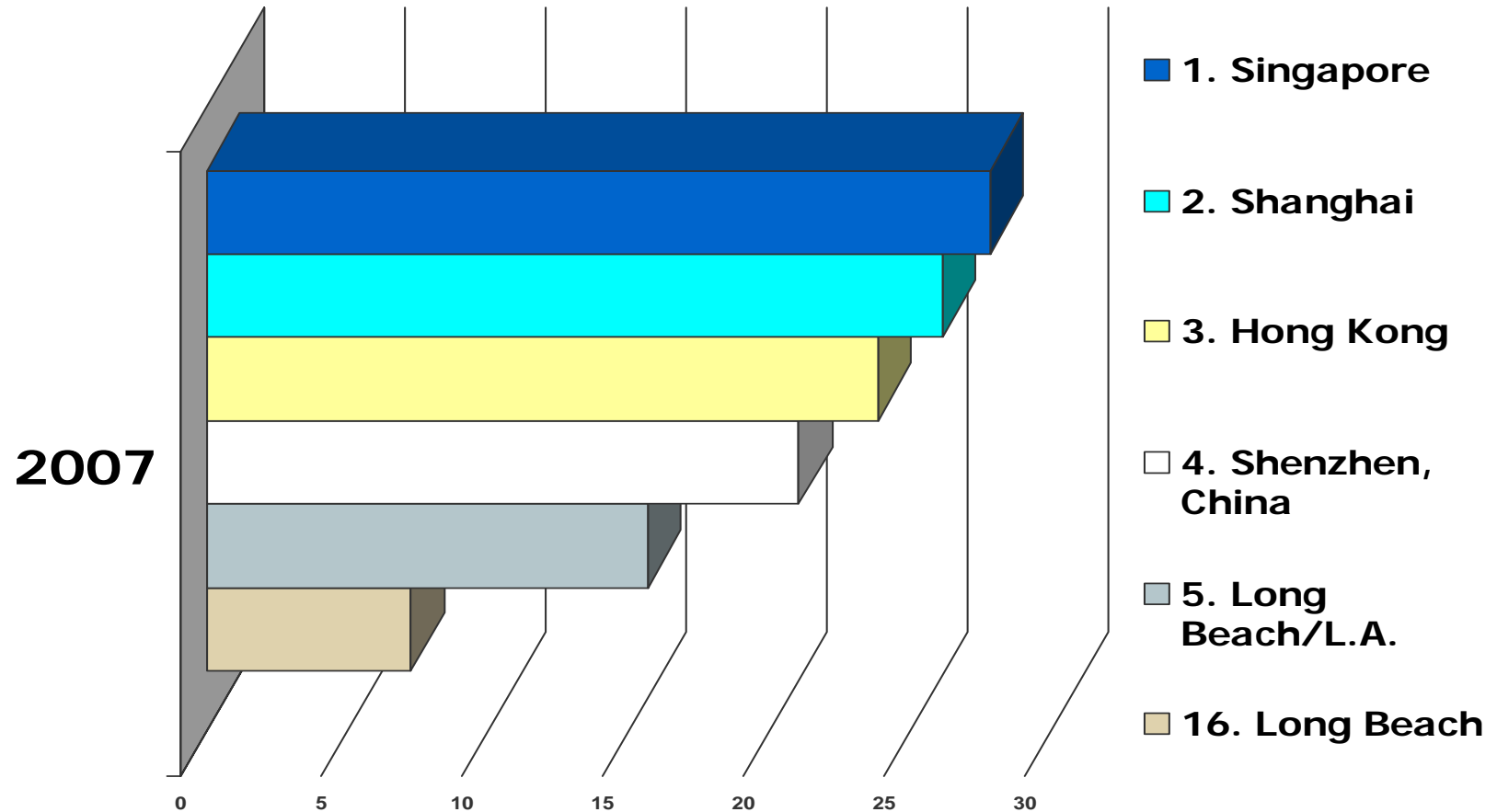
- Overview of the Port of Long Beach
- Review of Sustainability Initiatives and Programs
- Challenges Adapting Sustainability to Engineering
- Using an EMS to integrate Sustainability

POLB Overview



- 3230 Acres
- 7 Container Terminals
- 80 berths
- 76-foot-deep main channel
- 72 post-panamax cranes
- 2007 Cargo
 - 7.3M TEUs
 - \$140B value

World's Top Container Seaports

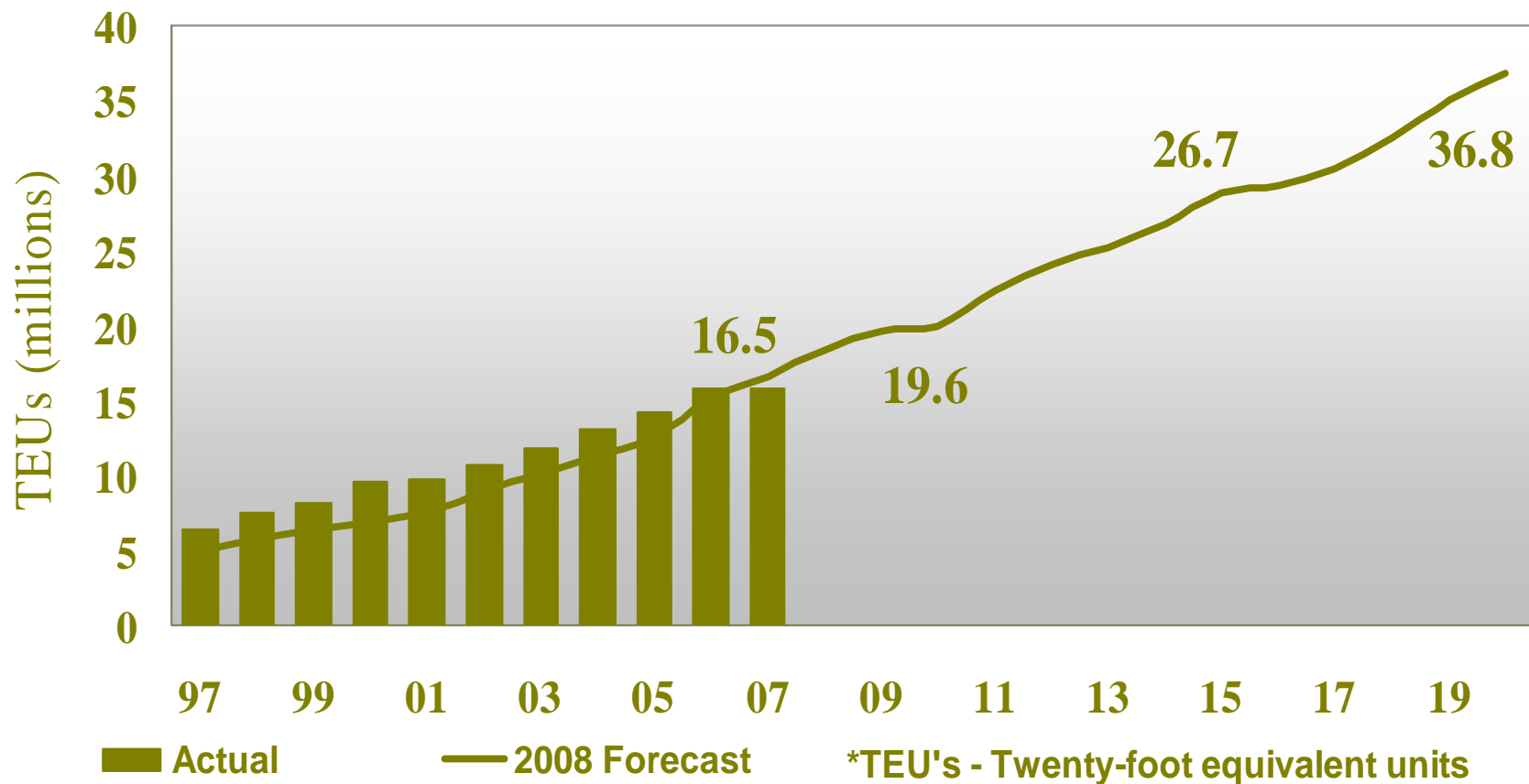


*Twenty-foot-equivalent units (TEUs)

Trade Growth



San Pedro Bay Cargo Forecasts - Actual vs. Forecasted TEUs* (Loaded and Empties)



Port's Response to Growth Trends



- **Efficiency Improvements**
 - Technology
 - Densification
 - More On-Dock rail
- **Capital Improvements**
 - Terminal Expansions
 - Infrastructure and Navigation Projects
 - Rail Enhancement Program
- **Revised EIR Processes and Mitigations**
 - Clean Air Action Plan (CAAP)
 - Throughput Limitations
 - Cold Ironing
- **Green Port Policy**

Green Port Policy



GREEN PORT POLICY

- Protect the community from harmful side effects of Port operations
- Distinguish Port as leader in environmental stewardship and compliance
- Promote sustainability
- Employ best available technology to minimize environmental impacts
- Engage and educate the community

SIX KEY STRATEGIES

AIR



WATER



WILDLIFE



SOIL/ SEDIMENT



SUSTAINABILITY



COMMUNITY ENGAGEMENT



The Triple Bottom Line



- **Economic Benefit**
- **Social Responsibility and**
- **Environmental Accountability**



Clean Air Action Plan Strategies



- Clean Trucks Program
- Clean Vessels Program
 - Vessel Speed Reduction
 - Alternative Fuels
- Shore-side power for ships
- Clean Locomotives Programs
- Clean Cargo Handling Equipment
- Clean Harbor Craft
- Tariff changes
- Incentives/Voluntary measures
- Alternative technology Program
- Reduce pollution by 45% within five years



Other Sustainability Programs



- Green Port Integrating Committee
 - Reincarnation of Sustainability Task Force
- Green Leases
- Solid waste recycling programs
- Green Port Fest
- Educational Partnerships
- “Let’s Talk Port” Community Outreach
- Urban Reforestation Program
- Sustainable Landscaping Palettes



Transporting Sustainability from Environmental to Engineering



- General perception
 - Sustainability is primarily an environmental program
- Implementation centers on environmental issues first
- Sustainable environmental initiatives evolve into sustainable operations
- Sustainable operations requires sustainable engineering practices
- Sustainable development focuses on the building industry
 - Commercial and residential accounts for 40% of total US energy consumption
- What about **Sustainable Infrastructure**?
- How do we apply sustainability to the engineering environment?

Port Engineering Applications



- LEED "Green Building" Program
- Materials Recycling/Reuse/Reduction
- Railroad Sustainability Standards
- "Green" Construction Methodologies
- Engineering Bureau Purchasing and Procurement Environmental Management System



LEED “Green Building” Program



- City of Long Beach Green Building Ordinance
- Security Command and Control Center
- New Port Administration Building/Maintenance Facility Complex
 - Gold certified
- Pier G Silver LEED Terminal
 - All buildings Silver LEED Certified
- Targeted Effect:
 - Energy Efficiency → reduction in greenhouse gases
 - Green energy
 - Water conservation
 - Stormwater Management
 - Resource conservation



Materials Recycling/Reuse/Reduction



- Operational recycling programs
 - Office paper, cardboard, magazines, food/beverage containers
- Construction Waste Recycling Program
 - COLB ordinance (60% diversion from landfill)
 - LEED points (90%+ achievable)
 - Specs require recycling of concrete, asphalt & rock rubble
 - Soil import/export guidelines
- Locally purchased materials
- Recycled building products
- Reused materials
- Targeted Effect:
 - Materials conservation
 - Energy efficiency → reduction in greenhouse gases
 - Reduced resource consumption



Railroad Sustainability Standards



- \$2B Rail Enhancement Program
- More on-dock and near-dock rail
- Truck trip reduction strategy relies on more rail
- Hybrid and alternative fuel locomotives
- Developing Sustainable Design Standards
 - Modeled after LEED Standards
 - Defining broad categories rather than individual points
 - Incorporate into design development process
- Targeted Effect:
 - Materials conservation
 - Hazard materials reduction
 - Air quality improvements
 - Energy use



Green Construction Methodologies



- Ultra Low Sulfur Diesel
- USEPA Tier 3 non-road standards equipment
- Fugitive dust controls
 - Soil stabilizers
 - Wheel washouts
 - Wind fencing
- Truck idling reduction measures
- Storm water management
 - SWPPP
 - BMP's

Engineering Bureau Environmental Management System for Purchasing and Procurement



- Defining the “fenceline”
- “Greening” the Engineering Process
 - Materials Purchasing
 - PS&E’s on CD’s
 - Equipment, Vehicles and Supplies
- “Greening” the Engineering Product
 - Procurement of professional and construction services
 - Specification of construction products and methods
- Developed significant aspects
 - Air Emissions
 - Construction Waste
 - Contaminated Materials
 - Storm Water Management
- EMS Framework developed as a pilot project
- Reduced scope – addressed Storm Water Management in first round

Storm Water Management EMS Elements



- Construction SWPPP SOP
 - Increased inspections
 - Improved record keeping
 - Periodic auditing
- Design Phase SWM SOP
 - Design checklists for construction and operational BMP's
 - Integrated into the design process
- Orphaned Areas/Inactive Construction Sites SOP
 - SWPP Capital Project for Orphaned Areas
 - Annual inventory of orphaned areas & inactive construction sites

Storm Water Management EMS Benefits



- EMS is a process driven system
 - Not performance based
- Systematic determination of environmental impacts
- Systemic structure addresses impacts throughout organization
- Example: SW Design Checklists
 - Requires designers and PM's to address construction and permanent BMP's in PS&E's
 - Built into QA/QC process through audits
 - Non-conformances trigger continuous improvement cycle
 - Enhanced cooperation by defining roles & responsibilities between divisions
- Continuous improvement cycle applied to other aspects

EMS in the Engineering Environment



- Challenges
 - ISO 14001 procedures need to be adapted
 - Fencelines are “virtual”, not physical; difficult to define
 - Aspects in an engineering environment are vague and difficult to envision
 - Strict reliance on procedures may not fit an organization’s culture (process vs. results)
- Benefits to Engineering
 - Improved standardization of the design process
 - Improved QA/QC process enforced
 - Methodical implementation fits the engineering process
 - Business benefits can be extended to non-environmental aspects
 - Sustainability benefits can be systematically applied and measured

Summary



- EMS offers a structured and proven methodology for addressing environmental impacts
- Engineering fencelines are generally “virtual”, not physical
- EMS structure can be extended to business processes, particularly the engineering process
- Clearly defined roles and responsibilities enhances collaboration on projects
- Structured methodology can be applied to sustainability aspects and used for implementation

Thank You!



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