

# Sustainable Port Development: Summary of Environmental Initiatives at Seaports Worldwide

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# I2S2

The *I2S2* is the *Institute for Sustainable Seaports*:

- Non-profit **Center of Excellence**
- Designed to support port authorities, tenants and members of the maritime community implement sustainable practices



# Research Objective

- ***To provide stakeholders (internal and external) with a greater awareness and understanding of how seaports are managing natural resources, adopting new operating methods and planning for sustainability***
- ***A better understanding of the geographic, community, financial and regulatory context that led to the project sustainability decisions***

# Research Parameters

- Snapshot (Summer/Fall 2009)
- I2S2 and Port of Portland Staff
  - I2S2: International Ports
  - Port of Portland: North American Ports
- Interviews
- Literature search

# Research Parameters

- Tools:
  - Questionnaire
    - Air quality; climate change; water quality; waste minimization; dredging; energy conservation; natural resources; sustainability; environmental management systems.
- Data Pool
  - International Association of Harbors and Ports
    - Environmental committee
  - American Association of Port Authorities
    - Harbors Navigation and Environment Committee

# Air Quality

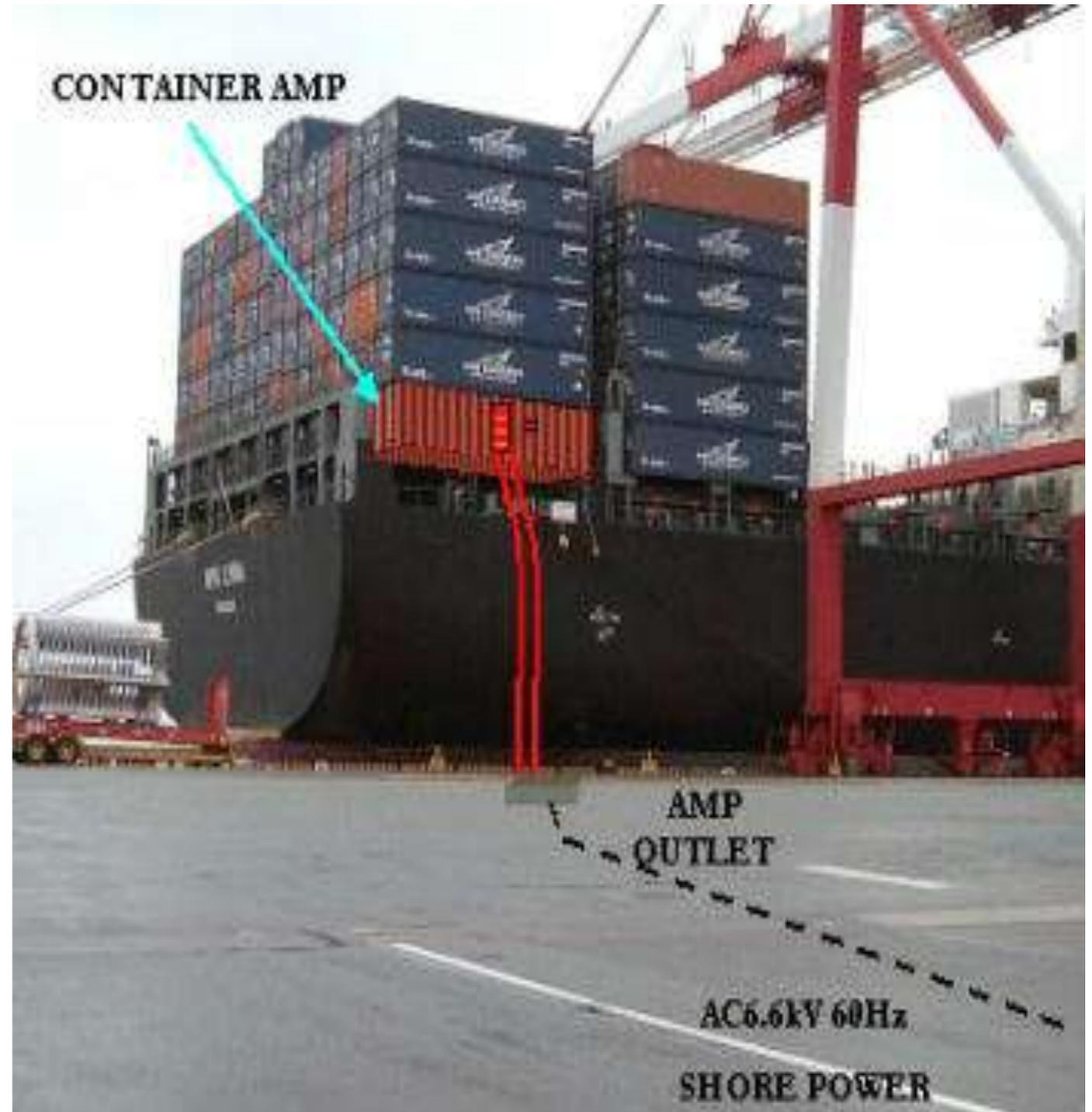
- Replace equipment with newer more efficient models
- Repower equipment
- Retrofit current equipment with emission control devices
- Refuel equipment with cleaner burning fuels
- Reduce emissions through operational changes



# Air Quality

## Shore Power

- Where it works
  - Cruise industry
  - Harbor craft
  - Same vessel repeat port calls
- Challenges
  - Standard for connections
  - Varying power demands for different types of ships
  - Expensive infrastructure



# Shore Power

## Shore Power for Harbor Vessels

- Partnership between Port of Portland and Shaver Transportation Company

 **PORT OF PORTLAND**  
Possibility. In every direction.



# Water Resources

- Stormwater discharge limits
- Infiltration to address stricter discharge limits
- EPA regulations attempt to standardize approach; However, state, regional and municipal regulations lead to additional and conflicting requirements
- Water conservation focused on landscape irrigation and use of low flow fixtures in buildings



# Water Resources

## Storm water management:

- Bioswales, infiltration basins
- Pervious pavement

## Conservation

- Landscape irrigation
- Water use restrictions
- Building fixture replacement with more efficient devices
- Best Management Practices
  - Port of Brisbane (efficient fittings, education, usage of non-potable water)



# Porous Pavement



# Recycling

- Ports using both in-house and local community programs
- Municipal ordinances often drive port programs to achieve various levels of recovery of recycled material
- Construction project related recycling is widespread
- Several ports include reduce-recycle-reuse policies as part of their Environmental Management Systems (EMS) and sustainability programs

# Recycling

## Common materials being recycled

- Construction debris (metal, wood, concrete)
- Glass, plastic, paper
- Compostable materials
- Government Support:
  - Japan



# Energy Conservation & Renewable Energy

- Reliance on the ability to purchase “green power” or renewable energy credits from local energy providers
- Cruise terminals appear to be a popular choice for the installation of solar equipment
- Partnerships with local power providers and tenants



# Solar and Wind Power

- Installation of renewable energy sources such as solar or wind power generation equipment on port facilities is beginning to be implemented
  - Wind - Japan, Amsterdam
  - Solar – San Diego, New York/New Jersey
  - Feasibility studies for installations being conducted



# Natural Resource Management

- “One size fits all” solution to management port natural resource issues does not work
- Two common approaches
  - Formal wetland mitigation and shoreline protection programs
  - Case by case or project by project approach.
- Teaming on mitigation projects with local municipalities, state agencies and community groups
- Establishing mitigation banks
- Financial support for projects at off-site locations by other entities in order to obtain mitigation credits to offset wetland impacts on port facilities.

# Natural Resource Management

- Partnering
  - Port of Longview, Washington
  - Port Autonome du Havre – Camargue Horses
  - Associated British Ports – Royal Society for the Protection of Birds
- Establishing mitigation banks
  - Port of Portland
- Community investment projects
  - Port of Sydney



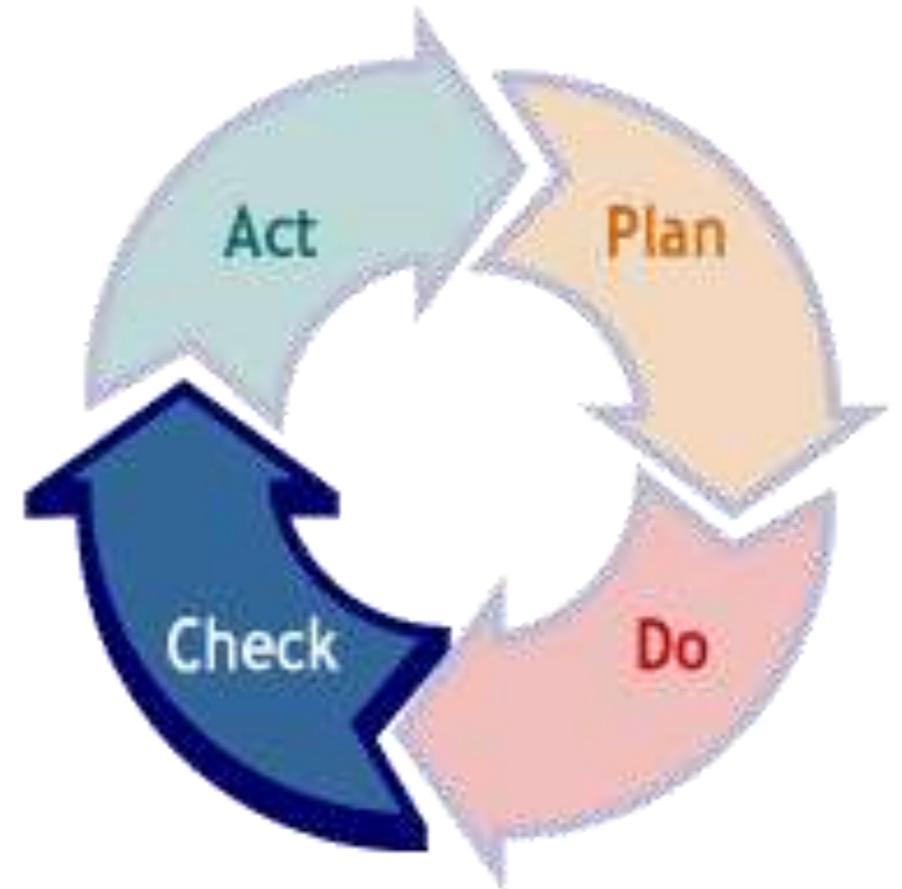
# Sustainability

- Sustainability policy development.
  - The definition of what sustainability means to each port as well as the focus of the policy varied significantly from port to port.
- Heavy reliance on the Leadership in Energy and Environmental Design (LEED) Green Building Rating within the US
- Many ports have policies in place that dictate new construction meet a specific LEED certification level or similar system
- Creation of development standards and guidance manuals for design and construction of new and redeveloped facilities



# Environmental Management Systems (EMS)

- The majority of US ports that utilize an EMS limit the systems to specific properties, operations or programs. This approach is commonly referred to as a “fence line EMS”.
- While the EMSs are becoming more common at ports in the US, full ISO 14001 certification of these programs is often viewed as a time consuming and costly endeavor that only a few ports have completed.
- AAPA Program Port EMS Assistance Project led by AAPA, USEPA and the Global Environment and Technology Foundation (GETF)



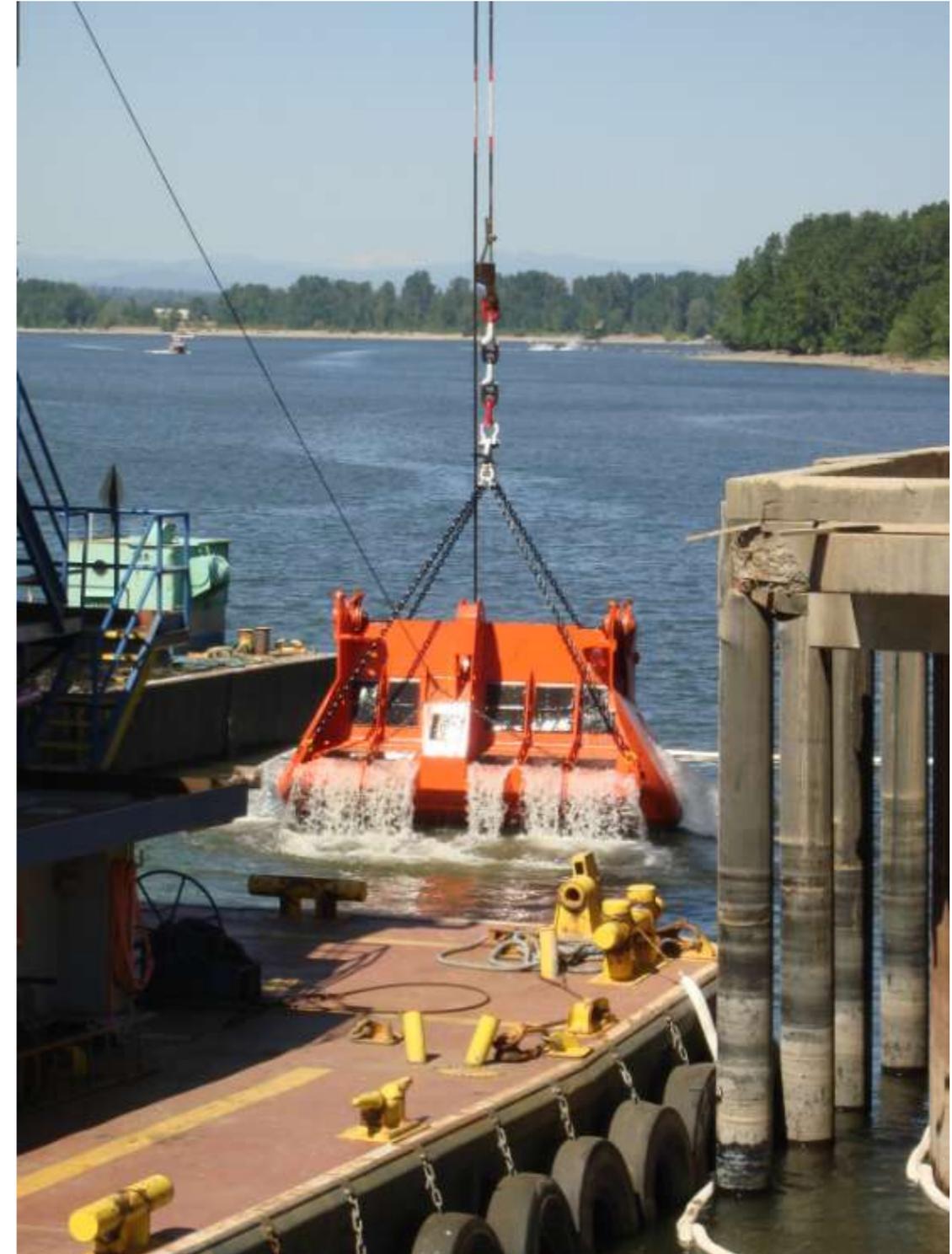
# Environmental Management Systems (EMS)

- EMSs widely used internationally
  - ISO 14001 (e.g. Port of Genoa)
  - Port Environmental Review System (PERS) Certificate supported by ECOPORTS
  - Eco-Management and Audit Scheme (EMAS) supported by the EU



# Dredging Activities

- Water quality and endangered species issues impact projects
- Biological testing involving sediments is becoming a common requirement.
- Placement options for dredge material vary widely
- Fill material for habitat creation
- Upland disposal and confined disposal sites are often used for contaminated dredge material



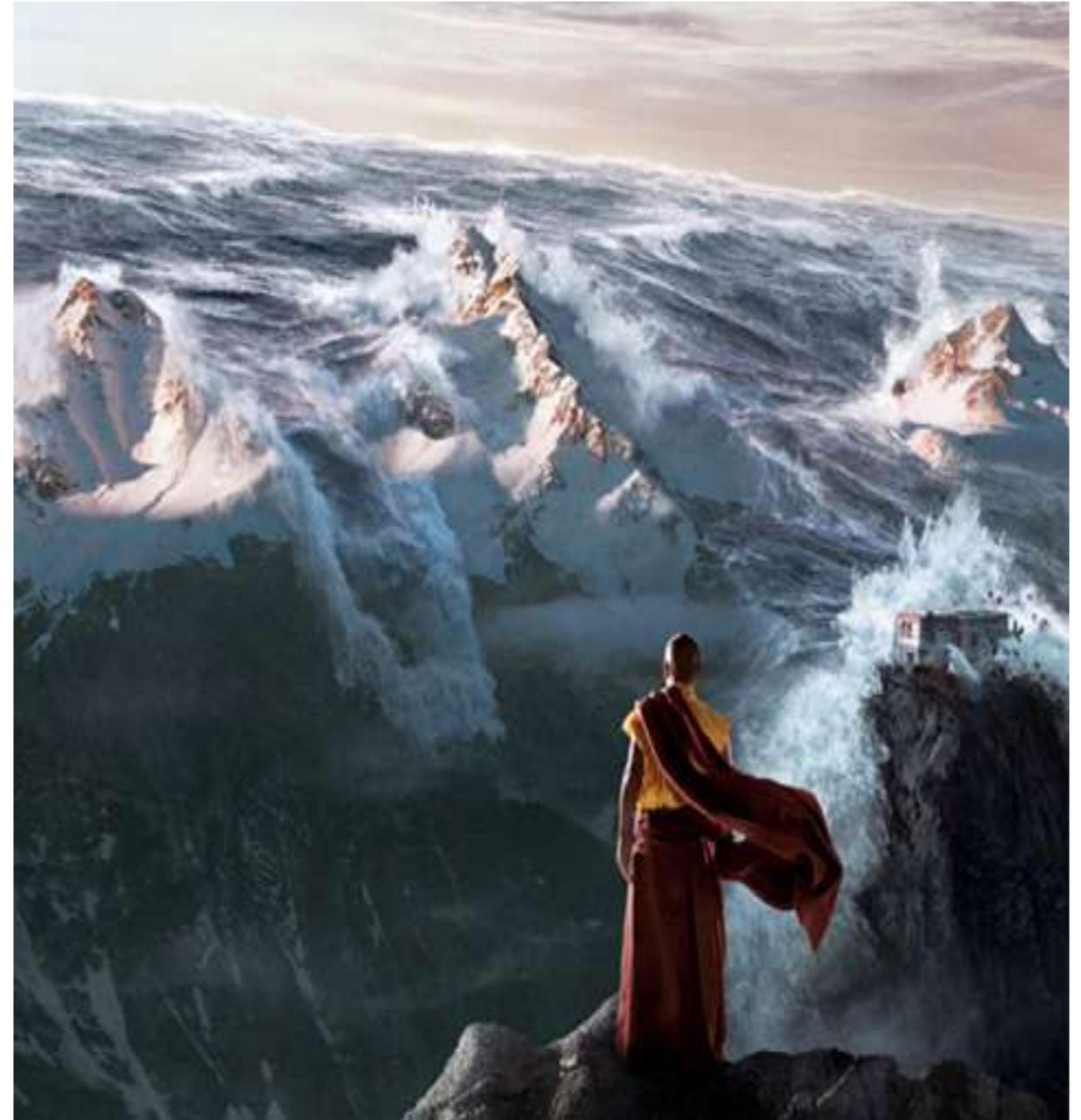
# Dredging

- Placement of facilities in locations with hydrologic conditions that scour berth areas decrease or eliminate the need to dredge
- Unique solutions and technology being evaluated
  - Singapore (MPA) partnership with New Earth Pte Ltd
  - Port of Charleston Sediment Suspension System



# Climate Change

- International Agreements/partnerships
  - Green leases, carbon measurement tools
  - World Ports Climate Initiative (WPCI) includes US ports
- Green House Gas (GHG) inventories
- Sea Level Rise – Port of Brisbane
- Building Guidelines – Port of Sydney
- Sustainable Port Development – Port of Cape Town



# Summary

Air emissions, climate change and how these issues effect business and the bottom line are the predominant topics on most ports' current environmental agendas.



Source: PIERS Global Intelligence Solutions

# Summary

- Grant funding, pilot projects are essential sources for completion of (US) projects



# Summary

- Exploiting opportunities during new development or redevelopment projects
  - Can upgrade equipment and practices to current standards: can yield increased efficiencies that produce financial and environmental benefits



# Summary

- Partnerships

- Teaming with tenants, community groups, environmental groups, municipalities, state, provincial and federal agencies, associations, NGO's, trade associations and regional consortiums is very common



Alliance of the Ports of Canada, the Caribbean, Latin America and the United States

# Summary

- This survey is a snapshot of current environmental initiatives in use at ports around the world
- The global economic downturn has made ports acutely aware of the bottom line
- Each port has a unique set of circumstances that affect the way it approaches environmental matters:
  - Types of operations (auto, cruise, container, breakbulk, bulk, etc.)
  - How the ports manage their facilities (.e. landlord port, facility operator or a combination)



# Summary

- Suite of businesses lines that are managed by each port
  - marine terminals,
  - airports,
  - real estate and industrial developments, bridges, bridges, tunnels and ferries, etc.
- Location often determines what environmental conditions are encountered and how they are handled
  - freshwater river system, estuary, saltwater harbor
- Regulations

