



Alternative Maritime Power “Off and Running”



Faster Freight Cleaner Air
Long Beach, CA. – January 31 – February 1, 2006

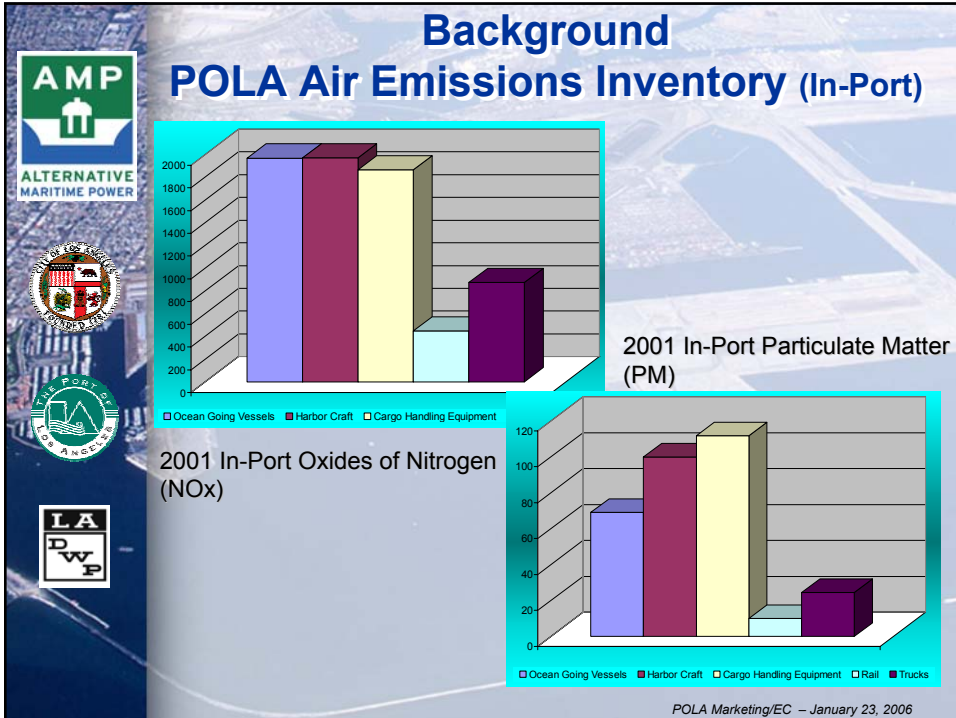
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AMP at the Port of Los Angeles

- Background
- History
- China Shipping
- AMP Projects
- AMP Program Acceptance

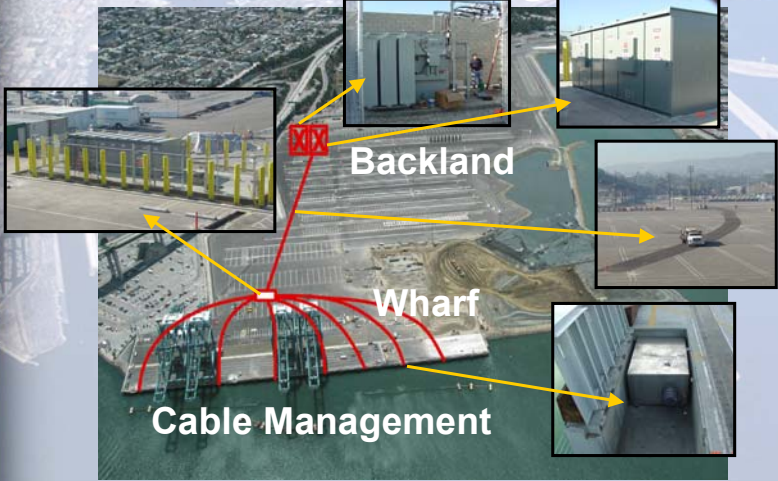
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- ## AMP at the Port of Los Angeles
- **August 2002**: AMP was born
 - **November 2002**: AMP R& D MOUs were signed with 7 container carriers
 - **February 2003**: First AMP seminar was held in San Pedro, CA..
 - **March 2003**: Settlement Agreement which required AMP at Berth 100
 - **May 2004**: AMP goes into operation at Berth 100 - China Shipping
 - **August 2004**: Arrival of the M/V NYK Atlas
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AMP – Berth 100 Port of Los Angeles



- 34.5 KV in Trench, Street to Substation
- POLA 6.6 KV Substation on Terminal


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AMP at the Port of Los Angeles

Berth 100 (China Shipping)

- \$6,800,000 backland - \$1,000,000 AMP barge
- Vessel Outfitting Cost: \$320,000 per vessel
- 17 vessel are AMP ready.
- 40 AMP Calls during 2005 = 77%
- NOx saved 2005 - Approx . 37 Tons



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AMP – Yusen Terminals Port of Los Angeles

- 34.5 KV in Trench, Street to Substation
- POLA 6.6 KV Substation on Terminal

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AMP – Yusen Terminals Port of Los Angeles

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AMP at the Port of Los Angeles

Berth 212 - 216 (Yusen Terminals Inc.)

- 6.6kV – Two Connectors – One Vault
- Synchronized Power Transfer
- Vessel Outfitting Cost: \$830,000 per vessel
- 1 vessel AMP ready:
M/V NYK Atlas (8/04)
- Use of existing conduit
- 6 month construction
- \$1,200,000 backland



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AMP at the Port of Los Angeles

Berth 206 - 209 (P&ONL Inc.)

- 6.6kV – One connector
- Upgrade 4160 volt transformer to 6.6 kV
- Synchronized Power Transfer
- 4 vessels – 5000 TEU
- 100% of Ship calls – AMPed
- \$1,200,000 backland
- Completion: 3rd qtr 06



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AMP at the Port of Los Angeles

Berth 231 (Evergreen Marine)

- 6.6kV – Two connectors
- Synchronized Power Transfer
- \$1,2 million - backland
- 7024 TEU vessel
- Vessel Cost: \$2 million
- Shore Infrastructure: June 2007



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AMP at the Port of Los Angeles





Berth 400 (APM Terminals)

- 6.6kV – Two connectors
- Conduit & vault installed – Phase 2
- Joint AMP study with Maersk



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San Pedro Bay Ports

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AMP at the Port of Los Angeles Cruise Terminal






Berths 91-92
Berth 93 Ramps
Berth 93 Bldg.
Future AMP System
Proposed DWP Substation (I.S.)
Proposed AMP Outlet
Proposed AMP System

Princess Cruises – Standard
 6.6 kV & 11kV – 15MVA

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AMP at the Port of Los Angeles Issues

- Cost to outfit vessels
- Cost of electricity
- System Grounding Requirements
 - Each AMP Berth requires its own transformer
 - Power vaults located at approx. 175 to 200 feet apart
- 50 mHz – 60 mHz
- Formalize AMP Standards

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AMP – Expansion Beyond the Port of Los Angeles

Ship Building

- Estimated that 50 newbuildings are being readied for AMP.

North American Ports

- Port of Long Beach – Alternative Compliance Strategy is available
- Port of Seattle – Cruise Terminal
- Port of San Francisco – Cruise Terminal

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AMP – Expansion Beyond the Port of Los Angeles

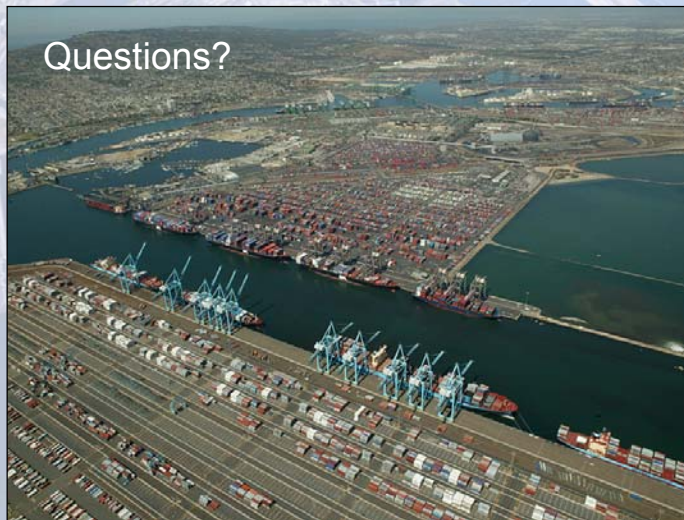
- Port of Rotterdam AMP Study
 - Euromax Terminal
 - Full build-out (approx 320 acres)
 - Cost 40-50 million Euro
 - Major cost element: Frequency converter
 - Focus on feeder and barge services
- Port of Los Angeles Green Port Agreements (Asia)

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Alternative Maritime Power at the Port of Los Angeles

Questions?



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