Berth 121 Cold Ironing Project
A BP and Port of Long Beach Joint Project
The Berth 121 Project Summary

• A pilot project
  – Joint BP and Port of Long Beach
  – First of-a-kind

• Goals
  – Tests feasibility on oil tankers
  – Define opportunities and challenges
What We Have Learned So Far

• Cold ironing is not a universal solution
  • Regulations should not dictate which technology is used to achieve emission reductions
• Cost and complexity of cold ironing is easily under-estimated
  • Voluntary participation less likely without incentives such as emission reduction credits
Why This Pilot Project Makes Sense

- Vessel Design – Electric Motor driven crude pumps
- Berth infrastructure - $2m pre-invested in electrical infrastructure
- Vessel visit frequency – Tankers built to transport crude from Alaska to California
- Port of Long Beach support for the project
- Pollutant emission reductions (NOx, SOx, PM, CO, ROG)
- Greenhouse Gas emission reductions (CO2)
Emission Savings Vary by Vessel

• During discharge cargo operations:
  – Steam ships and Motor ships derive ~5% of their energy from electricity
  – Diesel electric vessels derive ~95% of their energy from electricity

• 1998 – Nov 2004, Berth 121 had 1143 ship calls; less than 10 of these have been from diesel electric vessels
  – At that time, 3 of these ship calls were the Alaskan Frontier
Vessel Generators MAN B&W 6L48/60 – 6.3MW
Project Considerations: Shore-side

- Port area power availability
- Facility electrical (berth power distribution infrastructure)
- Voltage requirements (6.6 kV) / transformers
- Dock structural issues (cable management system platform to withstand impact by ship)
- Operating costs – electrical costs, maint. costs, power outages, added personnel
- Construction window – dock downtime
Project Considerations : Ship-side

- Electric-driven pumping system
- Bumpless power transfer (safety)
- Vessel length (placement of CMS platform)
- Voltage requirements (6.6 kV) / transformers
- Space for placement of power receptacles
- Port vs starboard connections, crane placement, cable guides
- Vessel demurrage costs
Project Considerations Summary

• Not applicable to steam ships or ships with steam driven pumps in most cases
• Cold-ironing is more expensive than other emission reduction strategies, making voluntary participation less likely without incentives such as emission reduction credits
• Safety issues should be fully vetted with Port Authorities early in the process
• Existing port and berth infrastructure play a key role in determining feasibility
• Electrical power transmission and distribution systems to ports are a pivotal project consideration
Summary

- The Berth 121 pilot project provides a unique opportunity because:
  - Infrastructure in place for Shoreside Booster Pumps
  - Diesel electric vessel design
  - Vessel visit frequency for ANS fleet
  - Shared capital expense with POLB
- Cold ironing is clearly not a universal solution
- Regulations should not dictate which technology is used to achieve emission reductions
- Cold ironing is a more expensive option making voluntary participation less likely – use of emission reduction credits could help offset this expense and provide short-term incentives
Any Questions?
## Expected Emission Savings

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<tr>
<th>Scenario</th>
<th>Estimated Emission Reductions (tons/year)</th>
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<tbody>
<tr>
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<td>Incremental to base case, Net of land-based power plant</td>
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<tr>
<td>BASE CASE: No changes</td>
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<td>No SSP’s ; 0.8% S fuel oil</td>
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<tr>
<td>COLD IRONING – Alaskan Class Vessels (short tons/ship call)</td>
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<tr>
<td>No SSP’s</td>
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<td>Annual Emission Reductions for Alaska Class Vessels – Tons (Assume 12 Calls/Yr.)</td>
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