Ports Initiative & MSTRS

West Coast Collaborative
March 2015
National Ports Initiative Areas of Focus

- Regulatory Development and Enforcement
- Remove Barriers to Technology Development and Application
- Data: Emissions Inventories, Tools & Metrics
- Create a Bridge to EPA/Federal Partners
- Develop Strategies for Community–Port Engagement
Mobile Source Technical Review Subcommittee

MSTRS Port Work Group

- Advice on actions to improve air quality at ports
- Define a “port” for the purpose of work group
- Improving metrics and inventories
- Determining barriers to technology deployment and how to remove
- Suggesting ways for us to improve federal coordination
- Working with us to strengthen port-community relations
- Next Meeting – May 2015

EPA Supporting Efforts

- Conducting an assessment of port emissions and strategies to reduce (“macro”)
- Developing community engagement materials.
MSTRS Ports Workgroup

MAERSK LINE/ Maersk Agency USA
U.S. EPA
Port of Long Beach
Port of New Orleans
Maryland Port Administration
Virginia Port Authority
Port of Charleston
American Association of Port Authorities
Ports America
Cargill
Target
Walmart
Caterpillar

Manufacturers of Emission Controls Association
Burlington Northern Santa Fe Corporation
Environmental Defense Fund
Evans Delivery
New Jersey Dept of Environmental Protection
South Carolina Dept of Health & Environ Control
Natural Resources Defense Council
Greater Southeast Development Corporation
East Yard Communities for Environmental Justice
Steps Coalition
International Council on Clean Transportation
Fond du Lac Environmental Air Program
Macro Assessment Update

Objective

- Update our national understanding of future port-related emissions for criteria, air toxics, and climate pollutants
- Assess the effectiveness of technological and operational emission reduction strategies across ports with different emissions profiles
- Inform national policy discussion for voluntary port initiatives

Status

- Draft baseline inventories (2011) and emission reduction strategies complete
- Conducting Macro Assessment Webinars for Ports Work Group
  - Baseline inventories complete
  - Control strategies
Macro Assessment Update

- Revisions to Macro Assessment workplan based on Internal & external discussions
- We will report tons of emission reductions from emission control strategies and dollar health benefits of these results
  - The dollar health benefits estimates will use the same methodology we use for the DERA Report to Congress
  - Due to potential for misinterpretation of results and resource constraints, we have decided not to conduct an air quality concentration assessment
    - Case for action can be made without pollutant concentration assessment
- Ports of LA/LB represent unique case due to regulatory implications of their inventories and control strategies
  - Macro Assessment will not analyze LA/LB, however, we will include ARB approved results as a short case study
Community Engagement: Priority Areas

Capacity Building for Near Port Communities

In conjunction with EPA’s Office of Environmental Justice & EPA Regions develop strategies for successful community–port engagement:

- Identify models of effective community-port-government engagement
- Identify data that port communities need to quantify environmental/health impacts
- Facilitate Understanding of Community/Port concerns
- Citizen-based Evaluation and Assessment Projects (data)
- Possible Pilot funding
Community Engagement: Priority Areas

Creating a Bridge to Federal Partners

- Increase Federal Partners consideration of the air quality impacts of their actions
- Encourage early community involvement on federal projects.
- Build a regional based community resource list with contacts for Federal agencies
FY2014 Status - $20M for DERA

- $9M for National Regional Competitive RFP
  - 22 awards were made (~$400K on average)
- $1M for Tribal Competitive RFP
  - First year for separate tribal RFP
    - Awarding three Tribal grants
- ~$4M State Program Grants
  - New, stricter requirements for State Program Grants (follow National RFP requirements)
- ~$5M Ports RFP (four grants will be awarded)
- ~$3M School Bus Rebates*
  - 76 rebates funding 210 buses in 30 States
- * Includes carryover funding from closed grants
FY2015 Status - $30M for DERA

Approximate amounts for program

- ~$16M for National Regional Competitive R
- ~$1M for Tribal Competitive RFP
  - second year for separate tribal RFP
- ~$9M State Program Grants
  - New, stricter requirements for State Program Grants (follow National RFP requirements)
- ~$4M School Bus Rebates
MARPOL Annex VI
Emission Control Areas
Sulfur Standards and Enforcement

U.S. Environmental Protection Agency
Air Enforcement Division
Emission Control Areas (ECA)

- **North American ECA**
  - Adopted by IMO: March 26, 2010
  - Entry-into-force: August 1, 2011
  - Enforcement: August 1, 2012 (Reg. 14.7)

- **U.S. Caribbean Sea ECA**
  - Adopted by IMO: July 15, 2011
  - Entry-into-force: January 1, 2013
  - Enforcement: January 1, 2014 (Reg. 14.7)
ECA Requirements... Why?

- Purpose is to reduce emissions and improve public health in the North American and U.S. Caribbean Sea ECAs. *This is a health-based initiative that will have positive long-term impacts on port environments and the communities who live and work in those and adjacent areas.*

- Most dramatic improvements occur in port communities, but even areas far from ports see benefits.
  - By 2030, nitrogen oxides (NOx): 1.2 million tons
  - Sulfur oxides (SOx): 1.3 million
  - Particulate matter (PM) 143,000 tons, respectively

- Annually, by 2030 these reductions are estimated to prevent between 12,000 and 31,000 PM-related premature deaths; 1,400,000 work days lost; and 9,600,000 minor restricted activity days.
Change in Annual Average PM2.5

- ≤ 0.01 ug/m³
- > 0.01 to ≤ 0.03
- > 0.03 to ≤ 0.05
- > 0.05 to ≤ 0.10
- > 0.1 to ≤ 0.25
- > 0.25 to ≤ 0.5
- > 0.5 to ≤ 1.0
- > 1.0 to ≤ 2.0
- > 2.0 to 4.0
**Fuel Oil Requirements**

Annex VI, Reg. 14 and 18:
SOx and PM Emissions & Fuel Oil Availability and Quality

**Shipboard Requirements**

- Fuel Oil:
  - Sulfur Content Caps
  - Fuel Quality Standards

- Operations:
  - Bunker Delivery Notes & Samples
  - Fuel Oil Change-Over Procedures
  - Fuel Oil Change-Over Logbook Entries

### Annex VI, Reg. 14
Fuel Oil Sulfur Content Limits

<table>
<thead>
<tr>
<th>ECA Sulfur Content Cap</th>
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<tbody>
<tr>
<td><strong>Effective Date</strong></td>
<td><strong>Sulfur Limit %m/m (ppm)</strong></td>
</tr>
<tr>
<td>July 1, 2010</td>
<td>1.00% (10,000)</td>
</tr>
<tr>
<td>January 1, 2015</td>
<td>0.10% (1,000)</td>
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</table>

<table>
<thead>
<tr>
<th>Global Sulfur Content Cap</th>
<th></th>
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<tbody>
<tr>
<td><strong>Effective Date</strong></td>
<td><strong>Sulfur Limit %m/m (ppm)</strong></td>
</tr>
<tr>
<td>January 1, 2012</td>
<td>3.50% (35,000)</td>
</tr>
<tr>
<td>January 1, 2020</td>
<td>0.50% (5,000)</td>
</tr>
</tbody>
</table>
Annnex VI - Domestic Implementaion

• U.S. domestic law implementing Annex VI– authorizes enforcement by two separate U.S. government agencies.
• Coast Guard has the lead on vessel inspections.
• EPA has the lead on shoreside fuel supplier inspections, and on violations that are referred to EPA by the Coast Guard for enforcement.
USCG Referral to EPA

• Factors the USCG will use when determining whether to refer a matter to the EPA include:
  • Repeat offenders
  • Evidence obtained from a case involving EPA fuel-sampling or other assistance
  • Serious noncompliance, e.g., entering the ECA without compliant fuel onboard
Joint Agency Annex VI Implementation

- EPA Role
  - Shore-side fuel supplier compliance
  - Provide USCG with expert assistance on vessel fuel sampling
  - Fuel Non-Availability Reports
  - Civil penalty enforcement
  - Assistance in criminal investigations
EPA Enforcement

- EPA may adjudicate civil penalties for
- EPA enforcement is particularly targeting:
  - Shoreside fuel supplier violations
  - Ships detained by Coast Guard for substandard MARPOL Annex VI compliance
  - Ships that consistently fail to get LSFO or do not make best efforts to get LSFO (fuel nonavailability issues – FONARs)
EPA Penalty Policy

• Domestic legislation requires penalties be calculated taking into account “the nature, circumstances, extent, and gravity of the prohibited acts committed and, with respect to the violator, the degree of culpability, any history of prior offenses, ability to pay, and other matters as justice may require.”

• Civil penalty capped at $25,000 per day, per violation (will be adjusted for inflation).
EPA Penalty Policy: Released Jan 16, 2015

• Two main goals:
  • (1) Deterrence
  • (2) Level Playing Field

• Main components of a civil penalty calculation:
  • (1) Economic Benefit
  • (2) Gravity
  • (3) Other adjustments – to achieve fair and equitable penalty
EPA Penalty Policy

- Economic Benefit = avoided cost of purchasing compliant fuel.
  - Differential in price between non-compliant fuel and compliant fuel.
  - How much non-compliant fuel did the vessel burn and over how many days?
  - Obtain information thru direct reporting or estimation. Underlying calculations depend on ship speed, distance traveled, assumed engine load, etc.
EPA Penalty Policy

- Gravity – an amount to reflect the seriousness of the violation in terms of environmental harm.
  - Penalty per ton of non-compliant fuel used based on sulfur level.
- Recordkeeping Violations - ships burning non-compliant fuel may also be in violation of other requirements of MARPOL Annex VI.
  - Failure to maintain appropriate written procedure showing how fuel change-over is to be done.
EPA Penalty Policy

- Recordkeeping Violations can’t—
  - Failure to record volume of low sulfur fuel oil in each tank, as well as the date, time, and position of the ship when any fuel oil change over operation is completed prior to the entry into (or exit from) the ECA.
  - Failure to maintain bunker deliver notes or MARPOL sample.
- Adjustments to penalty – degree of willfulness, negligence, cooperation, history of noncompliance, litigation risk, ability to pay, performance of supplemental environmental projects.
EPA Enforcement

- EPA will attempt to cooperatively settle civil penalty actions with violators.
- If settlement fails or there is insufficient/no cooperation, EPA will file an administrative complaint (there is no judicial action for the initial penalty under our domestic law).
- Default judgment to be collected against LOU.
- If no LOU, EPA has the option to pursue in rem action against the vessel.
Fuel Oil Nonavailability

- A vessel is expected to use compliant fuel when operating in the ECAs.
- If a ship owner is not able to obtain compliant fuel because it is not available, a Fuel Oil Non-Availability Report (FONAR) must be submitted.
- A FONAR is not a waiver! It is a formal statement of noncompliance.
- If 0.10% (1,000 ppm) is not available, another ECA-compliant fuel must be used if it is available.
- ECA-compliant fuel will not be deemed “unavailable” for the purposes of a FONAR if another compliant fuel is available, for example a low sulfur marine distillate (MGO/MDO) below 1,000 ppm).
Voyage Planning and Due Diligence

- Assuring compliance with the ECA begins when voyage planning is initiated.
  - Can the vessel comply with the ECA with fuel currently on board?
  - If not, can the vessel take on fuel at an intermediate port?
  - If not, should the trip be assigned/contracted to a different vessel that can comply?
  - Then, voyage plan should be established.

- Expectation:
  - Voyage plan will reflect measures taken by ship owner and operator to assure entry into ECA with compliant fuel.
ECA Exemptions & Equivalencies

- USCG works with EPA in considering exemptions (Reg 3) and equivalencies (Reg 4).

- The Coast Guard, in consultation with EPA, is responsible for issuing exemptions or equivalencies for U.S. flagged vessels.

- Foreign ships must follow their flag administration exemption or equivalency process.

- EPA and USCG review foreign ship proposals to consider acceptability to U.S. government.

- USCG verifies compliance with method approved and documented in the IAPP to achieve equivalent emissions reductions.
Annex VI Resources

• Coast Guard Homeport: www.Homeport.USCG.mil
  Select the following links: Missions > Domestic Vessels > Domestic Vessel General > MARPOL ANNEX VI
  • CG-543 Policy Letter 09-01 (Annex VI Implementation)
  • CG-CVC Policy Letter 12-04 (ECA Compliance)
  • CG-CVC Policy Letter 13-02 (IEE/SEEMP)

• EPA MARPOL Annex VI
  http://www2.epa.gov/enforcement/marpol-annex-vi

• EPA Ocean Going Vessels Air Emissions Web Page:
  http://www.epa.gov/otaq/oceanvessels.htm
Alternative Fuels for Heavy-Duty Applications

Tom Brotherton
CALSTART
West Coast Collaborative
March 3, 2015
AGENDA

• Fuel Prices
• Natural Gas Vehicles
• Electric Vehicles
• Incentives
Fuel Prices

- Diesel price dipped below CNG, now back up
- Low prices: current stress and strain on NG production
- Oil price slump driven by Saudi Arabia short-term geopolitical strategy
- Oil prices heading back up

Fuel Price Volatility

- Oil prices more volatile than natural gas

Figure 1. Historical crude oil front month futures prices

Figure 13. Historical front month U.S. natural gas prices
A doubling of the price of natural gas increases prices at the pump only $0.50 per GGE.
NGV Roadmap: Key Findings

• Market for heavy-duty natural gas trucks in So Cal Gas territory expected to grow **5X by 2020** and up to **15X by 2030**, possibly reaching 115,000 trucks by 2030 – recent release of 11.9L NG engine is a key enabler.

• **Regional/local delivery** and **line haul** are forecasted to be the key growth markets.

• Natural gas will have a **majority market share** in **transit** and **refuse** applications in **So Cal**.

• Refuse trucks: opportunity to use landfill gas to fuel trucks: “close the loop”
E-trucks: Distance Ranges from Ports

Source: CALSTART
Technology Option 1
Range Extended Electric Vehicle (REEV)

The “Chevy Volt of Trucks”

- Electric drive with engine backup – Natural Gas, Diesel, Turbine
- ZE much of the time; very low emissions otherwise
- CA funded demo projects
Technology Option 2
Battery EV (BEV)

The “Nissan Leaf of Trucks”

- Zero Emissions all the time
  - Only battery power; no engine
  - ~100 mile range per charge
- Some Smaller BEV Trucks are Available Right Now
Technology Option 3
Fuel Cell Range Extended EV (REEV)

The “Honda Clarity of Trucks”

- Zero Emissions all the time – hydrogen fuel with batteries
- Produces only water

Tyrano™
The world’s 1st Hydrogen Fuel Cell powered Class 8 Truck

FEATURES:
- Zero Emissions
- Zero CO2
- Zero Fossil Fuels
- Zero Noise Pollution
- Zero Carbon Footprint

Financial incentives, Federal tax credit and State incentives available
Incentives Available

• California HVIP:
  – Funded at $10-15M per year for electric, hybrid trucks and buses

• California Energy Commission: NGV Incentives

• California ARB:
  – Upcoming development and deployment programs for ZE and near ZE pilot demonstrations
  – Pushing both NOx and carbon reductions
California HVIP

Electric trucks and buses:

Hybrid trucks and buses:

californiahvip.org
ARB Priorities Signaled by New Funds

• ARB/GGRF (Greenhouse Gas Reduction Funds)

• 4 tech categories – 2 imminent
  – ZE Drayage Demos – up to $25M
    • RFP EXECUTED early March
  – ZE Multi-Source Facility – up to $25M
    • RFP EXPECTED early March –
  – ZE Truck and Bus Pilots – up to $25M
    • Late Spring 2015
  – Other Unique Projects – TBD – up to $10M
    • Spring 2015
Conclusion

• DON’T BE FOOLLED BY NEAR TERM PRICES DROPS
  • it is likely not what the world will look like in 6-12 months
  • but do be aware of the full benefits of the tech and fuel you are deploying or evaluating

• NEED TO KEEP OUR EYES ON THE LONG TERM TREND LINES