



# US Maritime Administration Maritime Environmental and Technical Assistance (META) Program Updates

July 18, 2017



# META Overview



- Maritime Environmental and Technical Assistance (META) Program
  - **Pre 2009**
    - Need for research to assist with good policy and rulemaking
    - End of year funding – Ad hoc
    - Other Agencies Funding
  - **Post 2009**
    - FY10 first year of direct funding
    - In FY12 Congress expressly provided
      - “...may engage in the environmental study, research, development, assessment, and deployment of emerging marine technologies and practices related to the marine transportation system...”
      - “...coordinate with the Environmental Protection Agency, the Coast Guard, and other Federal, State, local, or tribal agencies...”
    - Circa 2012 Administration budget requests

# META – How it Works



- Annual funding
  - Have received congressional funding since FY2010
  - Typically receive between \$3-4 million
  - 2 year funding starting in FY16
- Program execution thus far
  - Emerging Environmental Issues Identified
    - Based upon input from USCG, EPA, other agencies
    - Based upon listening to stakeholders and Congress
  - Engage in cooperative agreements
  - Advertise RFPs/RFAs (as needed)
- Leveraging and partnerships
  - Demonstration projects costly
  - Encourage multiple partnerships
- Partners
  - Maritime industry (ships and ports)
  - Other government agencies (Federal/state/local)
  - Academia (subject matter experts)
  - Classification societies

# How We Choose (to date)



- Primary areas of focus to date
  - Aquatic invasive species (ballast water, hull fouling)
  - Port and vessel air emissions, alternative energy and energy conversion technology, energy efficiency
  - Industry Guides
  - Multimodal emissions and energy analysis tools
- Why we did the projects
  - Result of outreach with industry
  - Result of environmental regulations
  - What works on land or other transportation modes does not necessarily work on vessels????
    - Development of standards and guidelines
  - Proof of concept
- Outcomes/results
  - Data driven
  - Publicly available results
  - Publication in peer review journals and trade pubs

# META Projects



- Water quality
  - Ballast water
  - Hull fouling
  - Other non-indigenous species work
- Air quality
  - Emissions reductions
  - Alt fuel testing – bio-fuel, LNG, hydrogen (liquid and gaseous), low sulfur fuel
  - Energy conservation
- Alternative fuel and power conversion
  - Hydrogen/Fuel cells – main and auxiliary power for port and shipboard applications, propulsion, hybrid power for shipboard applications
- Multimodal freight modeling
  - Multimodal emissions and energy analysis tools

# Ballast Water/Invasive Species/Hull Fouling Updates

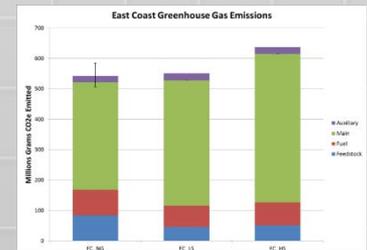
- Continue to provide funding for the 3 US-based BWMS test facilities, primarily infrastructure maintenance/upgrades
- Studying promising compliance monitoring tools for rapid BW discharge indicative analysis (such as hand-held fluorometers) for regulated and regulators
- Pursuing novel methods for removing and capturing hull fouling. (Still looking!)
- Developing international standards for sampling of ballast water: from where/how to take the sample, to handling it once taken.
- Vessel Incidental Discharge Act



# Air Emissions/Energy Updates



- Emissions Testing
  - LNG, “drop-in-biofuel”
    - Drop-in-biofuel tests
      - Tested airborne and under-water sound transmission tests
      - Conducted air emission tests in accordance with ISO and EPA guidelines
- Total Fuel Cycle Analysis
  - Methanol
- Scrubbers
  - Demonstration
  - SOCP work
- Algal Flow way Technology



# Alternative Energy/Power Conversion



- Hydrogen-Fuel Cell
  - 100 kW containerized fuel cell generator for port and on-board applications
    - Partially tested and is being refurbished
    - Next deployment
  - SF-BREEZE (San Francisco Bay Renewable Energy Electric Vessel with Zero Emissions)
    - Part I - Completed feasibility study, includes economic analysis
    - Part II – Optimization study, being conducted
  - Zero emission oceanographic research vessel
    - Feasibility study being conducted
- Hi-power Battery
  - Conducted a 2-day workshop at MARAD
  - Hybrid technology application with hydrogen-fuel cell and hi-power battery project is being awarded



# Future META Projects?



- Noise
  - Plan to conduct comparative analysis of underwater sound transmission and air emission tests and analysis
- Marine fuel testing and evaluation
  - Partnership with Maine Maritime and others
- Other
  - Develop standards and guidelines on marine application of hi-power batteries by ASTM
  - Battery safety joint development project
  - Development of guidelines for Environmentally Applicable Lubricants by ASTM

# Contact/Info META



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- <https://www.marad.dot.gov/environment-and-safety/office-of-environment/environmental-technology-assistance-initiative/>