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# Reducing Ferry Boat Emissions In New York Harbor

National Idling Reduction Conference  
Albany, New York  
May 17-19, 2004

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# NYC Harbor – Ferry Profile

## Highlights:

- More than 130,000 commuters per day use the ferry system
- Approx. 34,000 passengers/day transported by private ferries (pre 9/11)
- Approx. 65,000 passengers/day transported by private ferries (post 9/11)



# NYC Harbor Private Ferry Fleet Operators

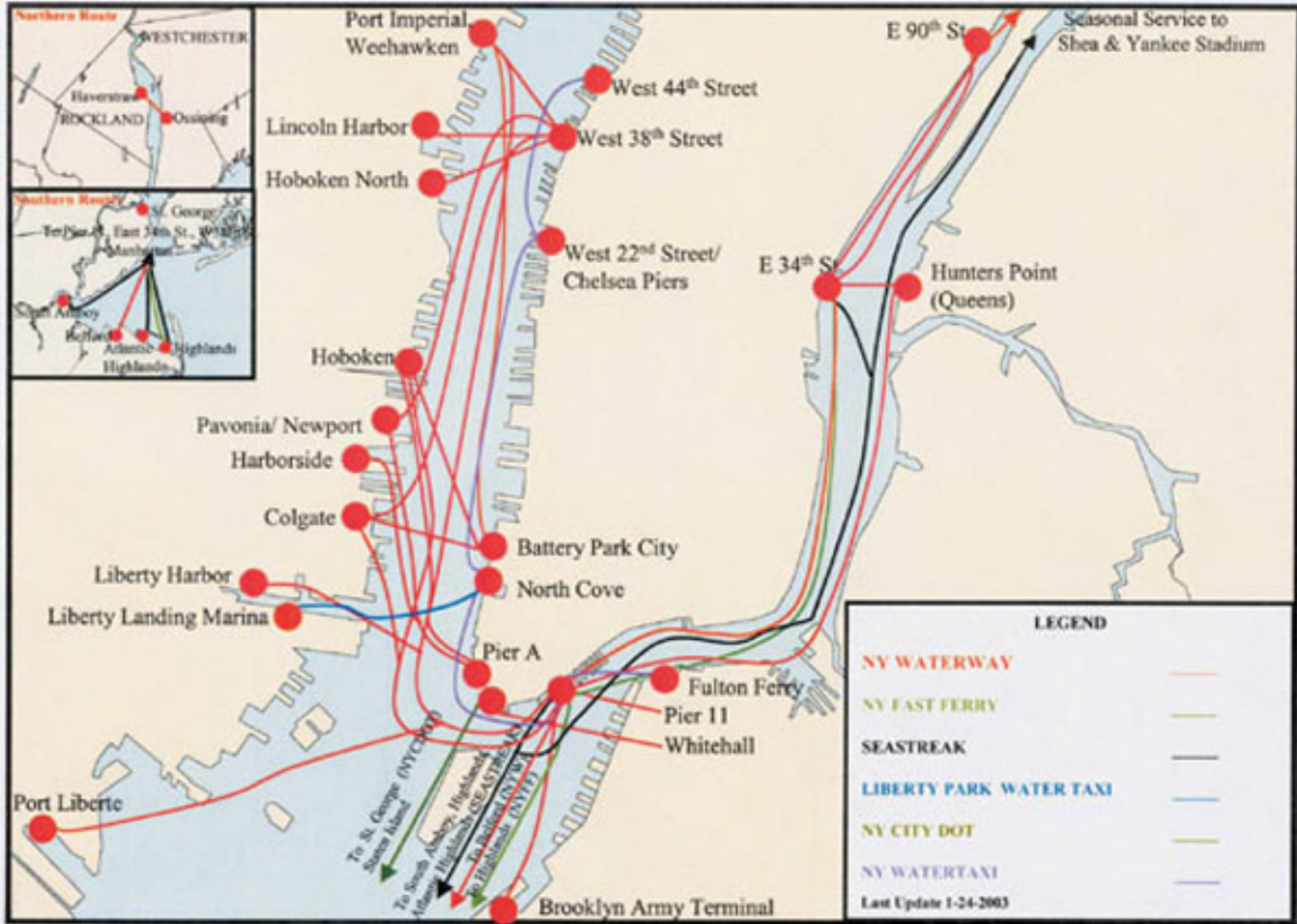


Three main private ferry operators

Total population of 40 vessels

Power ranging from 1,200 to 7,500 hp

# NEW YORK HARBOR FERRY ROUTES



# Other Ferry Fleets



Public Transit –  
Staten Island Ferry  
New York City DOT Operated



Specialty Tours –  
Circle Line

# **Programmatic Driving Forces**

**Marine emissions have been substantially less regulated, than the on-highway and off-road vehicle sectors**

**Even with new federal regulations for off-road and marine engines appearing on the horizon...**

- The regulations will apply only to new engines**
- The long life of diesel engines will keep older, dirtier engines in service for many years after the new regulations kick in**
- Marine emissions reductions on existing engines are on a voluntary basis in the meantime**

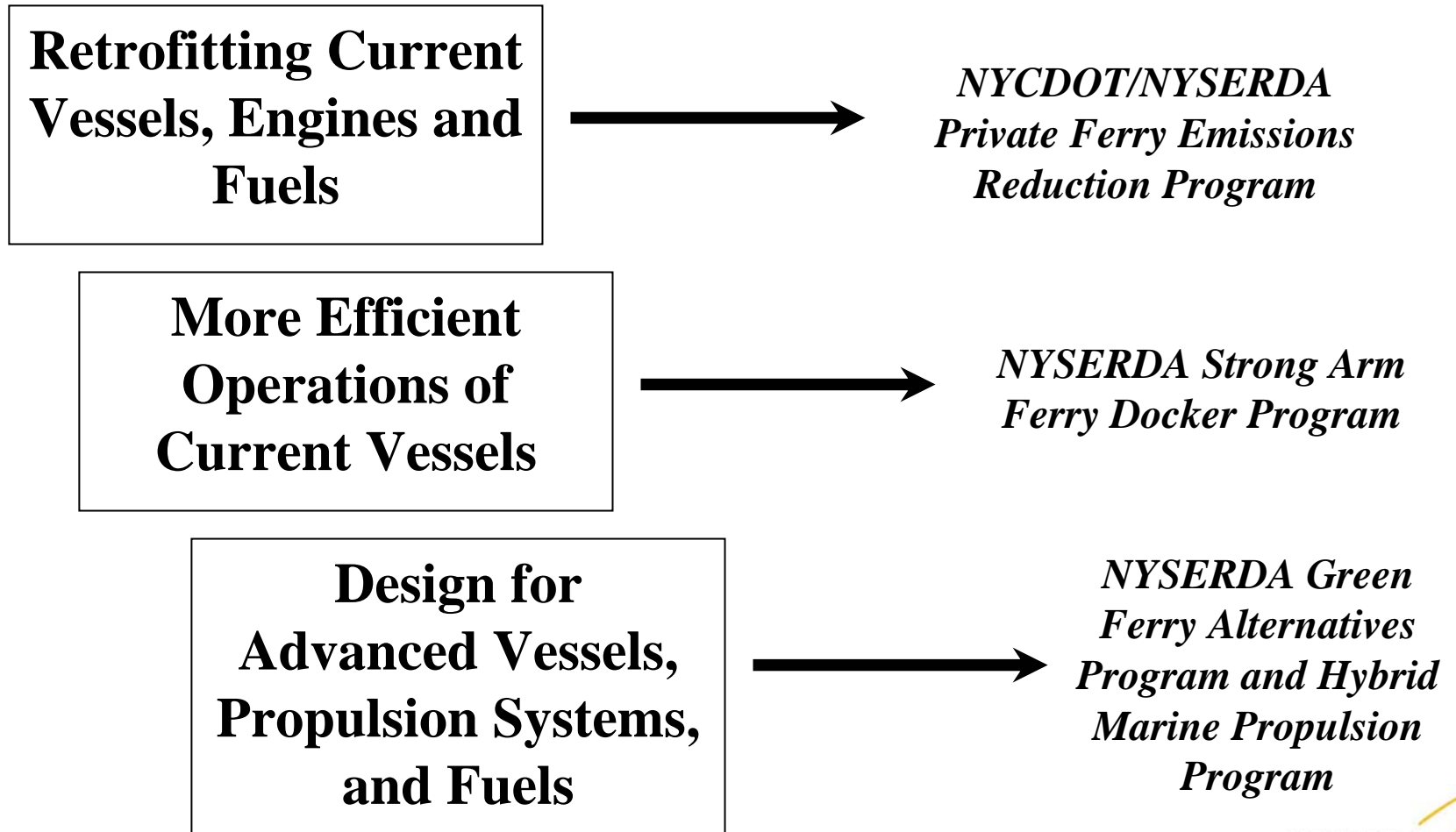


# **NYSERDA Programs**

**NYSERDA programs are addressing both  
the retrofitting of existing engines plus  
developing advanced technologies for  
new vessels**



# Current NYSERDA Thrusts





# **NYCDOT/NYSERDA Private Ferry Emissions Reduction Program**

## **Objectives:**

- Reduce private ferry fleet emissions
- Focus on NO<sub>x</sub> reductions, also particulate (PM<sub>2.5</sub>)
- Aim at near term results – not new boat construction
- Ultimate widespread deployment

## **Genesis:**

- Successful NYCDOT CMAQ proposal (FHWA funding)
- Outreach to NYSERDA for program management support
- Substantial additional funding from FTA
- Strong support and coordination from EPA



# Private Ferry Emissions Reduction Program Players



## Program Management:

NYSERDA - New York State Energy Research and Development Authority

NYCDOT - New York City Department of Transportation

## Phase 1 Engineering Contracting Team:

Seaworthy Systems, Inc., with subcontractors: NESCAUM, Environment Canada, ESI



Environment Canada

## Project Advisory Group:

NYSDOT - New York State Department of Transportation

NYSDEC - New York State Department of Environmental Conservation

PANYNJ - Port Authority of New York/New Jersey

NJDOT - New Jersey Department of Transportation

EPA - U.S. Environmental Protection Agency

FTA - Federal Transit Administration

EDF - Environmental Defense

MARAD - Maritime Administration

USCG - U.S. Coast Guard

Universities - Rutgers, U. Delaware, Rochester Institute of Technology

Private Ferry Operators: NY Waterway; SeaStreak; NY Water Taxi



# Private Ferry Emissions Reduction Program

## Project Scope

### **Phase 1: Technology Analysis and Demonstrations (approx \$1 mil)**

- Survey of private ferry fleets
- Baseline data collection
- Engineering analysis of emissions reduction options and downselection of optimum technologies
- Demonstration/validation of selected technologies

### **Phase 2: Deployment (approx \$5 mil)**

- Incentives to fleet operators to implement technologies

# Private Ferry Emissions Reduction Program

## Types of Emissions Reduction Measures

*Open to all major approaches, but focus is on readily available technologies, not developmental approaches*

- Exhaust gas treatment (SCR, particulate traps, oxidation catalysts, etc.)
- Alternatives (drop-in replacements) to marine diesel fuel (ULSD, diesel/water emulsifications)
- Engine modifications, operational changes (EGR, timing changes, etc.)
- Other technologies, and combinations of the above

# Private Ferry Emissions Reduction Program

## Project Status

- Phase 1 Technology Analysis and Demonstration is currently underway
- Survey of private ferry fleets is complete
- Engineering analysis of emissions reduction options and downselection of optimum technologies is currently underway
- Data logging and baseline emissions testing have been performed
- An early demonstration of ultra low sulfur diesel fuel has recently been completed – 4 representative ferries
- Completion of technology selections and demonstrations are scheduled for this fall, to be followed by issuance of the second phase deployment program solicitation



# Private Ferry Emissions Reduction Program; ULSD Demonstration



# Staten Island Ferry Emissions Reduction Program

- A parallel program, spearheaded by the New York City DOT and the Port Authority of NY/NJ, and synergistic with the private ferry project
- NYSERDA is one of several project advisors
- Objective: Demonstrate and ultimately implement retrofit technologies to reduce NO<sub>x</sub> and PM on large NYCDOT-operated Staten Island Ferries
- Selective Catalytic Reduction demonstration planned for this summer
- Protocols developed in this project for data logging and emissions monitoring are being used in the NYSERDA/NYCDOT Private Ferry Program

# Strong Arm Docker Program

*A NYSERDA initiated and funded project*

Objective: Establish the feasibility of a mechanical quick-docking system for ferry vessels

Status: Contractor selected, initial benefits analysis completed; concept design effort underway

Benefits: In NYC harbor, with many cross-river routes, up to one-half of the vessel's duty cycle can be in "push" mode, i.e., using high propulsive power to hold vessel against dock during passenger loading and unloading.

- By rapid mechanical docking, and going to idle rather than propulsive push mode, substantial fuel savings and emissions reductions can be obtained





# Advanced Initiatives – Applicable to New Vessels

*Two additional NYSERDA initiated and funded projects*

## Green Ferry Alternatives

Objective: Broad study of all options for energy and environmental optimization – hull designs, propulsion systems, fuels

Status: Team formed, initial NYC fleet characteristics identified as baseline; literature search completed; options being studied

## Hybrid Marine Propulsion

Objective: Develop and demonstrate an advanced, hybrid propulsion system for ferry class vessel

Status: Contractor selected; identification of duty cycle and propulsion options in initial stages



**Thank You !**

# Questions and Feedback

Contact Information for related NYSERDA Marine and Environmental R&D programs:

NYSERDA Transportation R&D Program

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